MyCity: a data-driven city
We read about Smart City programs and their success, yet there is still uncertainty about whether these programs are the right way for cities to go. In this paper, we explore the Data-Driven City as the way forward.

As a digital services company, Atos’ duty is to contribute what we are good at: designing, implementing and operating secure, stable and flexible technology solutions that support cities and citizens in realizing a Data-Driven City. Everyone in Atos is also, of course, a citizen. We can consider and discuss what we can contribute to a healthy, prosperous and safe city wherever we live.

In this document, you will read about our MyCity vision, the key components of a Data-Driven City, the enablers for making this a reality, and relevant projects we have completed for clients in cities across the world.

As this paper will show, as we increasingly rely on the flow of data, it is essential to ensure that the required data is available at all times without impacting the privacy of citizens – especially with the introduction of more sensors and the Internet of Things. The solution we position to cities in creating a Data Driven city is Urban Data Management and builds on our growth pillars: CANOPY Hybrid Cloud orchestration and CODEX data analytics with a high level of SECURITY.

“I am convinced that digital transformation is not only about making our cities better places to live and work, it is also an economic imperative. Leveraging data and digital technologies, cities can create new economic opportunities and shape a prosperous and innovative future for citizens and businesses.”

Thierry Siouffi
Senior Vice President
Public and Healthcare markets
Atos
Introduction

In an era of technological advance and political devolution, in return for greater autonomy, more will be expected from cities and local services in terms of value for money and innovation.

In today’s hyper-connected world, public services are on a journey of transformation towards greater efficiency with higher levels of citizen engagement across multiple channels, all available via smartphones, tablets, wearable devices, interactive digital signage and social media networks. These technologies make it easier to connect everything we do in our daily lives in the city; traveling, working, socializing, visiting attractions and making discoveries. Through technology, all these aspects of our lives are being transformed.

While we might not be able to predict exactly what the future will look like, one thing is very clear: digital technologies will power tomorrow’s cities.

As the volumes of data generated through these technologies continue to grow, Atos’ vision is to harness that data for citizens, city services and partners to co-create healthy, prosperous and inclusive cities.

The purpose of this paper is to outline Atos’ vision for MyCity as a Data-Driven City and how we can help realize it in partnership with cities, citizens and private sector partners. MyCity covers all aspects of city life: data is everywhere and it is the connecting element between cities, citizens and private sector partners. A clear strategy for cities in their Secure Digital Journey is what we want to help define and realize.

About the author
Albert H Seubers

Albert H Seubers (1959) graduated at Agricultural University Wageningen in 1985. Ever since he worked in IT consultancy focused on governmental topics. He worked for Dutch Telecom implementing the first fiber networks in Netherlands, for CMG as director in the Public Sector Service group, for HP as Public Sector executive before he joined Atos. Since 2011 he is Director Global Strategy IT in Cities for Atos. The Atos MyCity program focusses on the virtuous circle of managing a city by city administrations to help citizens understand the impact of their daily choices on their city and make better adjustments accordingly. It is used by the city to enhance the quality of services to citizens at lower cost. Real-time data is captured and analyzed to inform the way traffic, transport, air quality and so on are managed. A Data-Driven City fosters a sense of community and cooperation to create higher quality of living and attract new residents and investors.

Digital Vision: MyCity

Cities are responsible, on average, for over 80% of a nation’s Gross Domestic Product. Cities and their inhabitants have an important role to play in a world facing major environmental, economic and security challenges.

For us all to participate in addressing these challenges, we need to understand our choices impact our communities, our nations and, ultimately, our world. Then we need to adjust our daily lives and routines accordingly. In the digital age, data is a vital resource to support individual and collective decision making. Atos’ vision is the Data-Driven City, in which data is used to help citizens make informed choices, to improve city life, and to target city services more effectively day to day.

In the Data-Driven City, data is securely shared by individuals and held by city administrations to help citizens understand the impact of their daily choices on their city and make better adjustments accordingly. It is used by the city to enhance the quality of services to citizens at lower cost. Real-time data is captured and analyzed to inform the way traffic, transport, air quality and so on are managed. A Data-Driven City fosters a sense of community and cooperation to create higher quality of living and attract new residents and investors.

To break down data silos across the whole city and maximize the value of data, our vision is to implement Urban Data Management with tight controls to maintain public trust and individual privacy. This joins up data from different sources and systems and in different formats and enables analytics to be applied across these newly created datasets.

MyCity: a data driven city

Data-Driven Cities are not out-of-the-box solutions that can be bought and sold; they are co-created by citizens, public bodies and the private sector. In the Data-Driven City, the city is the enabling partner in an ecosystem of collaborating partners and citizens. This ecosystem uses a multi-sided approach, sharing and using data for the benefit of all participants. In the new Economy of Data, data is the new currency that can fund the improvement of city services. Alternative business models make it possible to deliver innovative public services with minimal up-front investment and risk.

In future public services will be fueled by more devolved political authority with innovation, new markets and new collaborations between the public and private sector. Atos is committed to working alongside city leaders and other partners to help create and support sustainable, secure and prosperous environments for citizens, communities, businesses and city authorities to thrive.
It is the citizen who will shape the digital transformation of city services.

We are living in times of unprecedented change and opportunity; in elections and through new movements and communities across the world, the voice of the citizen is being heard and changing the climate politically. Cities, and we as citizens, have the power and opportunity to effect positive change. This is an amazing opportunity to shape local government culture and services. Digital technologies are vital to this, and future thinking cities will need to design the digital journey for the citizen (or, even better, with the citizen), as well as developing the relationships between citizens and public bodies.

As citizens, we expect the same level of online interaction with our city services as we have with commercial companies. We are willing to share our data with retailers in exchange for a small discount or free delivery. We are intrigued by wearable technologies that promise to help us stay healthy and in shape. These tools and networks generate huge volumes of data and enable us to use and consume public services differently.

**Building a sense of community**

Traditionally, delivery of many city services may have been driven primarily on what time and budgets were available. Now, city administrations are starting to build 360° views of their residents. In this way, they can make cost savings while delivering more personalized, optimized services. There is potential to enhance citizen experiences through predictive real-time services based on data gathered via the Internet of Things.

Citizens want to live in their city of choice: one that provides them with a safe and clean environment, with affordable housing, good-quality education and health services and economic opportunity. We want to live in a city that is managed efficiently and in a transparent way that engenders trust, a city where we can connect and move around using different channels and modes of transport that suit our needs at any moment. As citizens, we can participate in shaping our cities of choice by adjusting our daily routines based on information provided to us, for example to make informed decisions on how and when we travel, or how we can save on energy to reduce our own costs while helping to lower the carbon footprint of our city. Through these choices and connections, we can build a sense of community that empowers citizens to take more responsibility for their city and the environment in which they live.

**High-quality connectivity is what we need to support our fast-developing digital lifestyles: but is that what makes a city smart?**

In recent years, a plethora of new digital services have become available in cities and a broad spectrum of Smart City projects are underway. While most of these are small-scale, some have formed investment partnerships to deliver city-wide projects. All, however, take a single issue as their focus, such as parking, streetlighting or waste collection.

**Holistic approach**

City administrations are on their way to breaking down the silos between different departments to create a more integrated 360° view of each of their residents. Yet to maximize the value of data, when cities are breaking down silos on one hand, they shouldn’t re-instate silos on the other by creating parallel Smart City projects that cover only one aspect of city life. We don’t just need a Smart City to improve services and quality of life; we need a Data Driven City. We can adapt our lifestyle using information from all available data resources, from the Internet of Things to contracted city service partners. Issues such as parking, lighting and so on are connected and need to be addressed in a more holistic way with citizens at the heart of the solution.

In times of austerity it may seem impossible to create lifestyle changes among citizens when there is no budget to do so. Alternative business models make it possible to deliver innovative public services with minimal up-front investment and risk. While big budgets may be available from technology companies to showcase their products by delivering Smart City projects, the city should retain control and develop its own city strategy that is smart, not a smart city strategy.

We citizens do not need a Smart City; we want to live in a city that is managed in a smart way.

Citizens have the power:

The Journey to Citizen-Centric public services

- **Departments.gov** - Traditional siloed authorities and services
- **Services.gov** - Service centric network of authorities & platforms
- **Citizens.gov** - 360° Citizen-centric authorities and platforms for common good & sustainable growth

**MyCity: a data-driven city**

High-quality connectivity is what we need to support our fast-developing digital lifestyles: but is that what makes a city smart?
MyCity is data-driven

With citizens at the heart, data connects city services and connects the city to its citizens.

For services such as traffic management and waste management, service providers need to collect data to optimize the services they deliver. Data, however, is also of value to the city. So, data captured by service providers should also be made available to the city in a way that the city can use.

Today’s Smart City projects are based on capturing data for use in promoting services to the public and informing the public about events. These projects are creating new mini-silos of data. In contrast, Urban Data Management captures data from Smart City projects and service contracts together with data that cities already hold.

Urban Data Management joins up data from different sources of different types and formats and provides a platform for analytics to be applied across these new datasets. In all cases, however, the city has control over who has access to which combinations of data in order to ensure privacy regulations are met, to publish transparently on which urban data is used, and to ensure that benefits are delivered for all participants in this new ecosystem.

The guaranteed availability, security and integrity of data is essential to ensure that services can be built on top. Data, like any utility in a city (such as water or electricity), will need to be secured and protected. To protect the privacy of citizens and personal data, cities need to monitor closely who is accessing data and for what purpose.

A combination of social, environmental and economic factors are driving the need for the Data-Driven City.

Almost every article we read about Smart Cities tells us the number of people who will be living in a city in 10 to 15 years from now. However, urbanisation is not only about rising populations and their impacts on infrastructure. There are a number of other developments influencing our cities today.

Globalization has one of the biggest impacts on daily city life. Different cultures in city communities are raising demand for new services in multiple languages. Ageing populations and the rise of long-term conditions are other key factors. To live safely and independently for as long as they can, citizens need more personalized support, from household services to medical or personal services.

At the same time, a multitude of forces have driven our adoption of new digital tools and channels. The explosion in the use of social media, cloud and mobile technologies combined with changing citizen expectations are driving the digital transformation of public services. Ongoing austerity and rising demand for services requires public bodies to do things differently not just more efficiently. Many citizens expect their local government to provide the same type of modern, automated, personalized online experience that they have in other aspects of their lives.

The combination of factors from globalization and economic development, together with demographic changes, new legislation and technological developments all emphasize the value of using data to connect the citizen to the city.
Building the Data Economy

The digital revolution is built on data

Data is a new type of economic asset, which is rapidly becoming vital in the global economy. Most economic activity will depend on data within a few years - This provides great opportunities for all sectors, including:

- Health
- Food Security
- Resource Efficiency
- Energy Management
- Intelligent Transport
- Smart Cities
- Smart Agriculture
- Civil Protection

Access to large and diverse datasets is a prerequisite for innovation.

- Agriculture: weather or soil data used by farmers
- Energy: data from smart meters for the development of infrastructure
- Manufacturing: sensor data used to predict maintenance needs
- Geo-spatial data: data from satellites, e.g. earth observation and meteorological data

In the Data-Driven City, the city is the enabling partner in an ecosystem of collaborating partners who can exchange data for the benefit of citizens and all participants.

Within the ecosystem of partners in a city, some are contracted city services providers, and others are commercial service providers. These partners can form relationships and agreements using a multi-sided approach based on connections between the citizen, the city and all service providers. In this multi-sided model:

- citizens can choose and pay for commercial services that are offered to them based on their profile and data shared about them
- providers of these commercial services pay for having access and using the data
- contracted city services partners provide and use data as part of the contracted services, lowering their costs and the cost to the city for the benefit of the city, the citizen and the providers.

There is also an opportunity for cities to support citizens’ own sharing economy whereby citizens share skills or needs via a digital platform so that either the city can provide the services needed, or citizens themselves can exchange goods and services, further developing a sense of community.

A new ecosystem

All data between these parties is shared in a transparent way and with consent of the citizen.

Data is shared via the Urban Data Management Platform (see page 26). If service providers who are not contracted by the city access data published on the Urban Data Management Platform, they need to apply for access and agree on payment terms.

One important development for cities is that procurement is changing. Today, cities publish specifications of services they require and select the provider that makes the offer that best fits the requirements at the best prices. In a multi-sided market, service providers are selected based on the best fit with the existing ecosystem of partners. Services provided by the city can be replaced where appropriate, enabling citizens to choose which services and service providers to use. What’s important for cities is the role they play as the enabler of this multi-sided model. While the city is responsible for monitoring its own Data-Driven model, it cannot and should not be in control of the relationships between citizens and service providers other than by maintaining regulations, laws and contracted agreements.

Reduction of city costs against data

Personalized services against payment

Data against added value

Citizens

Service Providers

Urban Data Platform
While the technologies needed for the Data-Driven City are available, many cities lack the budget and time needed to implement them. Here is where the Economy of Data can help.

The Economy of Data brings together citizens and city, with a multi-sided model built on data that is made available and shared through contracts, through apps and smart devices, and through services that are delivered based on shared data.

Payment for the systems to support this Economy of Data can be through added value or hard currency. In other words, contracted service providers to the city can grant access to data captured while delivering services (traffic management, collecting waste, public transport and so on).

**Enhancing services**
The city can open up access to the data they hold where and when needed, with individual data only shared with the active consent from the relevant person. Citizens who sign up for services from the city or contracted service providers will share their data (based on profiles) to enhance the quality or personalization of services. Service providers will pay for accessing the data. This is a big change to the current Open Data mindset that some cities still have. If data is published for free, then it may appear that there is no value in it for the city. Cities with Open Data programs today may be increasingly convinced that attempts to create value out of it have failed.

To create the Data-Driven City, the city must start making changes at various levels. Today’s service contracts, for example, are unlikely to contain a paragraph on data. Take waste collection as an example. A contract on waste collection is focused on routes per day and in some cases about the weight of waste collected. This data is provided in periodical reports. Whereas the data from sensors in bins is used only to optimize the waste collection process, that data is not shared. Repurposing the data on the completion level of bins can provide new services to citizens or support more severe enforcement on littering.

Today, paying for accessing data is based on transactions or volumes; in the near future, this will be based on Blockchain technology. Blockchain will ensure better quality of the data, as responsibility will be much more distributed than it is today. It can be seen as a decentralized ledger system for managing and controlling the sharing of data. It helps to ensure the quality and origin of data as well as the fees that apply for accessing data according to predefined economic rules.

**Reduced service demand**
Cities

**Services more personalized against shared data or pay**

**Services Providers**

**Urban Data Management platform**

**Citizens**

**Improved services at lower costs**

**Data as the new currency**

In the Data-Driven City, data is the new currency that can be shared and used to finance city services and deliver value to citizens and providers. A Data-Driven city will create the conditions for startups and scale-ups to generate new city solutions. Startups bring innovation that will distinguish the Data-Driven City from others, driving up economic growth (because large corporates tend to want to collaborate with startups), and branding the city as an incubator of new services that can be exchanged for others. A Data-Driven City will invite more interest from investors, and the creation of new jobs.

Furthermore, services that work in one city will also work in other cities, so as a direct result of Urban Data Management standards, exchanging of these information-based service technologies (such as APIs, algorithms and apps) is possible, further developing the economy and creating new jobs.

Creating ‘social value’ in a Data-Driven city is a key enabler for success. For example, Digital Social Value, redefined by technology and based on real-time data, focuses on enabling, enhancing and offering greater choices and connectivity to the city’s population. New and innovative services should also include solutions targeted at the less digitally experienced or digitally able citizens.

**As well as improving the quality of services, the Data-Driven City will deliver longer-term economic and social value.**

**The Data-Driven City will make information available for citizens to make more informed choices and for the city to improve the quality of services to citizens at lower costs. Real-time data will be shared through smartphone apps, digital signage and other channels to inform citizens on traffic, air quality and so on throughout the day.**

Through Urban Data Management, a city can support the use of joined-up data from different sources to provide accurate information to citizens. Out of this, a new economy can emerge, with:
- providers exchanging innovative models for delivering city services
- technology companies developing data exchange technologies (APIs) and data analytical models or algorithms to use in sensors
- local entrepreneurs finding opportunities to create information-based services for citizens, commuters and visitors.

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Data is an enabler to create early warning indicators that help keep citizens safe and secure.

Using more responsive, capable, real-time technologies, local police can respond to alerts and incidents more quickly and enhance citizens’ feelings of safety. Furthermore, the digital transformation of policing means that intelligence can be extracted and delivered to officers wherever and whenever they need it.

Timely sharing of appropriate information within the police service and across city departments means that citizens’ issues can be dealt with more rapidly, repeat work can be reduced and incidents that do not require a police response can be redirected earlier. With smart use of data, police services can react more swiftly to crime, creating a more predictive, proactive and pre-emptive police service.

Ensuring citizens’ safety is about more than policing and fighting crime. Traffic safety is just as important, such as identifying potentially risky situations, enforcing regulations such as speed limits, and giving warning signs to drivers by making streetlights blink or change color when needed.

Next-generation services
Connected buildings can send early alerts before smoke or fire detection systems raise the alarm for fire services. The micro-grid inside a connected building understands when electrical systems or appliances show an abnormal consumption pattern and can send early alerts. Just imagine the fire brigade pulling up to a building before a call to 911 has been made.

Next-generation 911 systems will respond not only to phone-calls or alarms from smoke and fire detectors; calls will be made through Internet of Things connected systems, social media and so on. Communication from the dispatch center to members of the public and police, fire and ambulance services will be done through multiple channels to ensure that all relevant parties are reached quickly. A citizen’s alert can also be triggered through use of a Light-Emitting Diode (LED) streetlight system.

EINDHOVEN
In the City of Eindhoven, Citypulse combines existing sources of information such as the analysis of citizens’ walking patterns from surveillance cameras and the analysis of sound spectrums and social media to create a holistic, real-time picture of what is happening on the streets and to trigger early warnings on incidents that require intervention.

A clean city means a healthy environment, with good air quality and no littering. Among other things, air quality is highly impacted by traffic and, in some cases, by household heating systems.

Energy transition is an important element in creating a cleaner and healthier city. This means reducing levels of pollution from carbon-based energy sources and changing to renewable sources where possible. Energy transition requires not only the availability and accessibility of new energy sources, but also a change in the mindset of citizens to use alternative energy sources and reduce energy use. Communities of citizens already exist in many cities to invest in renewable energy systems and to buy energy collectively. In parallel, smart meters that provide real-time feedback on energy consumption help citizens to understand the impacts of their consumption levels. Companies make use of connected building technologies with micro-grids and a range of technologies to reduce overall energy consumption in buildings. Often, these are designed for cost reduction only, but whatever the reason, they contribute to creating a cleaner city.

Reducing pollution
With air quality already under threat in some places, this means reducing travel (especially at peak times) and switching to more sustainable forms of mobility. Cities tend to change their own vehicles to be more electrified or hybrid and public transport is also becoming greener. For example, London’s buses are increasingly hybrid. To reduce pollution from traffic in cities, a trans-modal shift is happening with easier access to alternative modes of transport such as shared bikes, shared cars, bus, metro and so on.

Visible pollution is also the result of litter. If the city operates a good waste management service, enforcement on littering should be intensified. A sense of community is needed to share feelings of pride and success on keeping the city clean, which in turn prompts more positive action.

Many Smart City projects today are about waste collection. Sensors that indicate a bin is full create data that enables waste collection services to optimize routes and reduce mileage. However, these services need an incentive to do so that is agreed as part of the contract. Greater benefits can be realized if the trucks only drive at times when they have the least impact on traffic levels. This makes the contract beneficial for both the city and the contracted partner. Using the data on whether bins are full or not creates a whole new element of servicing the public. If people can check at their front door whether the bin is full before taking rubbish to it, this enhances the feeling of customer service while also preventing people leaving rubbish next to full bins. If citizens have this information, there can be tighter enforcement and penalties for those who do leave their rubbish in the street next to a full bin.

Brighton & Hove City Council together with their waste management service partner Egbert Taylor Group started using sensor pins and bin-compacting technology to extend the capacity of waste bins. The outcome of using these new technologies was a reduction in emptying trips by 80% (source: egberttaylorgroup.com)
Connected city administrations will be available 24x7 for many services, with citizens able to digitally interact seamlessly with local public service providers.

Transforming relationships with citizens

Now is the time for cities to digitally transform their relationships and services for citizens. There are three compelling reasons for this:

1. The financial imperatives are as unarguable as the opportunity. How to deliver more for less is a challenge for local governments. To deliver value for money and meet the demands of growing and ageing populations, public services must leverage innovation and collaboration from all sectors and take advantage of more devolved responsibility to become more agile.

2. Citizens’ expectations are changing. Most cities have moved on from written postal forms to call centers and websites. Yet with populations becoming more digitally mature, people want self-service, speed and convenience, with proactive online local government services delivered to them any time and anywhere.

3. Hyper-connectivity is evolving. With the convergence of device, connectivity and social media, citizens are becoming more digitally connected. The data they generate will enable local authorities to gain actionable intelligence about behaviors and preferences that has never been available before, establishing a virtuous circle of data-informed continuous improvement.

MyCity Connected

"The city center is no longer the place to shop and buy; we as a city must ensure the city center is the place people want to be."  
Rob van Gijzel  
(former Mayor of Eindhoven)
Mobility in cities is under severe strain. Citizens can play a major role in addressing the problems - given access to the right data at home and on the move.

The pressure on mobility in cities is due to a combination of factors including an increase in deliveries of goods purchased online and changing retail strategies. It is not cost effective for retailers to store goods in expensive retail space, so deliveries happen more frequently, and as delivery services extend their services, there is constant pressure on traffic and mobility in cities.

In addition to these changes, it is we, the citizen, who also play a major role. Overall, motorists choose to use their cars and park where it is easiest and most convenient for them instead of using alternative transport and parking options.

There are many Smart City projects already underway to reduce numbers of cars, optimize traffic flows, enhance parking capacity and offer alternative modes of transport such as bikes and car shares. All these projects serve the greater good, yet there is more that can be done to change day-to-day choices. Data captured on current traffic situations, parking availability and options for alternative transport modes should be presented in a single view to enable us to make decisions on our travel plans in real time. Of course, only a proportion of the population can decide not to travel or change their travel times - yet if there are 10% fewer miles driven to find a parking space as part of a complete journey has started. This information should include predictions on the impact of incidents and updates for drivers on alternative routes and modes of traffic to prevent congestion. Switching to an alternative mode of transport must be easy and comfortable, for example a single access card to pay for national rail, local rail, parking, shared bike use and so on, using either a bank or credit card or a city or transport card. Added value services around the change in transport will encourage people positively to change their plans, such as valet parking, discounts on combination tickets for park & ride - even a parcel drop-off service or deposit boxes at the park & ride.

POZnań

The City of Poznan has issued over 300,000 city cards for residents to access public transport, together with other city services such as the library. The city card is a community card with a loyalty scheme. The integration of city services and data from different sources in order to optimize services is best explained in the picture right. Providing a complete overview of traffic related data in one single application for drivers to use while driving is not easy to achieve given the complexity of data sources involved. Information therefore needs to be provided based on personal profile, location and time of day, all in a format that is supported by the device that is in use.

Improving parking

‘Smart’ parking solutions are part of many Smart City projects. The idea is to reduce miles driven to find a parking space as part of a complete overview of traffic information. To encourage drivers to use a different mode of transport, it sometimes makes more sense to remove parking options so that drivers will change their routine and park elsewhere. Changing to maximum duration of parking with a limited number of minutes for each vehicle allows for delivery and pick-ups to support the local economy. The ‘smart’ in parking comes with sharing information on availability, access to parking and making enforcement more targeted based on the available data. Abuse of designated areas, parking in delivery zones and so on has a big impact on traffic and quality of life. An even smarter approach to parking would be to dynamically allocate space for parking.

Reducing congestion is often best achieved by completely removing parking options, encouraging drivers to use park & ride or offering them other modes of good-quality transport. In Singapore, clean, low-cost public transport is always available, giving citizens options that are just as appealing as their own private transport.

Keeping a city mobile directly impacts air quality, so energy transition in transport is also important. Electronic vehicles do not reduce congestion, but they do reduce environmental pollution. These require more charging stations to be available across cities which could also function as parking spaces. From a grid perspective, it is interesting to combine charging and generation by use of solar for instance. The management of a charging grid and public charging stations must ensure easy access for all drivers using e-vehicles and all types of cars, bikes, scooters and so on.

With many new developments being tested such as autonomous vehicles (either in designated lanes or as part of daily traffic), all planned investments planned in parking and road upgrade programs need to be reconsidered. Current infrastructures will one day become obsolete. If we expect autonomous vehicles to operate personal or group mobility services, why would a city invest in parking?

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While cities can’t enforce healthy lifestyles, they can promote them by providing citizens with positive opportunities.

Demand for social care in cities is rising. Joining up data can promote healthy lifestyles to reduce pressure on services, as well as help target social care resources most effectively.

Increasing demand for social care is not only a result of ageing: high-density populations and infrastructures mean that stress levels are rising in cities, causing all kinds of issues.

While cities can’t enforce healthy lifestyles, they can promote them by providing citizens with positive opportunities. From a design perspective, more open and preferably green space is needed to help provide clean air and time to relax.

The City of Copenhagen is a very good example of these design principles. Within 15 minutes, every resident can reach a park or waterfront on foot or by bicycle. The City of Houston has a very well designed riverside park where cycling, running and other types of sports are possible. Attracting people to sports in parks is done in some cities in partnership with sponsors such as Nike providing a running track equipped with a high-tech video wall that enables athletes to compete against their avatar. These green spaces not only support healthy living and a cleaner environment, they can also create opportunities to deal with other challenges cities are facing like storm water management.

Personalizing health and social care

Ageing also has an impact. As we grow older, we want to live independently for as long as possible, creating an increasing demand for home and health support. This is in the interests of city services for whom the costs of elderly and retirement homes are high. Home support services are provided by commercial companies, sometimes contracted by the city and sometimes directly by residents. Currently, the services delivered tend to be shaped by the availability and schedule of the provider. Instead, access to biometric data can help personalize services much more effectively for individual citizens. Wearable technologies can capture such data, with highly secure connected bracelets providing real-time data on vital functions to a care provider’s dashboard. And there are other uses for such data. It can for example help city planners to identify traffic situations that are particularly challenging for elderly or disabled people by analysing heartbeat and blood pressure captured. A wearable device could even trigger the lights at a pedestrian crossing to allow the wearer some more time to cross the street.

While healthcare is not a city service, changes in cure and recovery programs are impacting the city. Patients, where appropriate, recover more quickly in their own environment than in hospital. Connectivity is a key enabler for this. New or redesigned housing should accommodate easy and secure connectivity at all times; the next step is to provide connectivity in public spaces. While free wifi is already a topic of discussion in cities across the world, it does not have the capacity to support the secure connection of patients.

Delivering targeted and timely social care in a city means breaking down silos of data held in different systems. Combining data from social services with police records and education service systems can trigger alerts about vulnerable or potentially vulnerable individuals and families who need help. Of course, privacy needs to be taken very seriously. The results of the analysis must be presented in a way that protects data and privacy, with training for city workers who receive the alerts.

In a ground-breaking collaboration in South Wales, five public service organizations are working closely together to identify people who may be vulnerable and who may benefit from multi-agency support. Local councils, a health board, and Gwent Police share information through innovative data-matching, predictive analytics and consultative dialogue to identify individuals and groups most at risk in the area who can then receive earlier, better-targeted help and interventions.
As we see in the news every day, cyber-crime is on the rise. Citizens need to be able to trust city services to ensure the security, integrity and availability of data at all times.

With the growth in sensor networks, connected buildings, connected vehicles and data connections between city departments and service providers in cities, cyber security is critical.

Wealth located in cities will attract cyber-criminals; cities’ strategic political importance and media focus will attract disruptive actions by protesters, nation states, hacktivists and terrorist groups. Many of them have aspirations to cause practical damage through cyber activity. This aspiration is less about the IT equipment itself and more about disrupting the processes it controls (such as stopping trains running, flood barriers or water supplies). A ‘global city’ role brings an intensity of focus and magnifies the potential impact of any vulnerability. When Atos builds the infrastructure for an Olympic Games, we do so in full recognition that for the 17-day period of the Games, it will be one of the world’s top cyber security targets.

The security challenge is far broader than simply addressing one issue such as securing data, securing mobile devices or securing cloud computing environments. A cyber security strategy that addresses these interrelated issues in an integrated way is essential. Achieving a cyber security posture across all key areas is vital for a city’s future growth, innovation and competitive advantage. It is also vital for fully exploiting the business and economic opportunities provided by Urban Data Management in an open, secure and prosperous environment.

A safe city is one that can rely on a secure ICT infrastructure that can continuously develop, evolve and transform.

Security in the cloud

Government Cloud initiatives have started in many places to address the most common challenges to deliver a logical infrastructure that supports and enables change. As the ‘move to the cloud’ accelerates, there is a pressing need to ensure that cyber security capabilities, monitoring and response are included in the cloud services.

While cloud adoption in the public sector might still lag behind commercial companies, the six organisations above are front runners willing to share their experiences. For cities, cloud is everywhere as more and more contracted service providers run their operations in the cloud. It is vital that cities select a Hybrid Cloud Orchestration partner who can securely integrate cloud services from different providers and ensure that data is stored and shared according to security and privacy regulations.
MyCity is a Smart City

The Vision of a Data-Driven city

The technologies needed to realize the vision of a Data-Driven city exist. What is needed is collaboration and cooperation across an ecosystem of public and private partners and citizens to realize the vision.

To implement the infrastructure for enabling a Data-Driven City, there are six key components:

1. A single platform to ensure all data connections can be monitored with controlled access to data; this is called the Urban Data Management Platform.
2. High security standards and tools applied to cyber security, data access and applications that use data.
3. Data science skills and tools to minimize any risks of joining up data.
4. Active consent for the use of personal data from individuals, with opting out, or applying the right to be forgotten.
5. Data analytics in real time and constantly monitored as part of Urban Data Management.
6. Transparency to ensure the support and understanding of citizens, with Governments trusted to safeguard and explain what data is used and for what purpose.

Crucially, to create a Data-Driven City, city leaders need partners who understand public sector responsibilities and are committed to the same values of trust and transparency. Above all, vision and leadership from mayors, councilors, political leaders and private sector industry representatives need to be aligned to engage with citizens and to design, build, improve and evolve the digital world that citizens will expect.

Securing privacy of all citizens

It is the responsibility of all governments to secure the privacy of all citizens is secured. Open Data programs, as existing today are not designed for this. Simply because these programs are focused on publishing data. Whoever downloads the data can combine it with other data sources from Open Data programs or commercial available data, meaning it is no longer possible to monitor the use of Open Data as it was published.

Urban Data Management allows access to outcome of analytical routines, not data. It allows cities and local governments to enhance their Open Data program and turn it in to Managed Urban Data programs where more data can be made available for use under better monitoring conditions.

Urban Data Management includes data that is captured by delivering companies during the contract they hold with the city. Companies for instance providing waste management collect interesting data, they use for optimizing their costs of delivery. Reusing this data could help provide new or improved services to citizens.

Joining data from the different sources into one single Urban Data Management platform allows Use Case support by the city to investigate possible risks on intrusion on citizen’s privacy. Companies can request data access for a defined use case, data collection from needed data sources can then be created virtually. The analytics routines will be stored as part of the CODEX managed data analytics services and executed. The results of the analysis are subject to privacy risk analysis using Data Science techniques. In case a possible risk is expected, the city can deny the request for data access based on the expected risk. The city can allow data access for the defined use case under conditions like citizens need to provide an active consent on use of personal data.
Urban Data Management depends on designing, building and operating a highly secured data platform for storing and accessing all data captured in the city for the benefit of citizens, businesses and city services.

Urban Data Management is by nature supported by cloud, due to the vast amounts of data and the flexible demand for compute power needed to support data analytics and to manage data from multiple sources in a secure way.

Atos’ ambition is to offer Urban Data Management as a Service as a means of developing an ecosystem of partners with our customers, whether they be city, county or state. The opportunities are endless to create or recreate services based on data to strengthen the local economy in cities.

Results of data analytics can be published and accessed through mobile apps, dashboards etc. In some cases the analytics result will mean real-time alerts have to be shared and pushed to smartphones. There are other communication options for reaching groups of people; for example, LED streetlight systems through a machine-to-machine interface can send signals such as blink, change color and so on, to alert people on the streets.

The diagram below illustrates the model for an Urban Data Management Platform:

Urban Data Management builds on several products Atos offers.

Innovative pricing
Offering Urban Data Management as a Service to entities within the city ecosystem of partners is based on a pricing structure that encourages a city to work with us on a risk and reward basis. Additional revenue and margin will come from participating in an active Economy of Data.

The graphic below shows how such a layered approach can work.

Public service partners (xN)
- Budget reallocation to support enabling role of the city based on results (like reduction of operational cost, achieved outcomes against city strategic plans)
- Cost / Revenue shared with enabling city

Commercial partners (xN)
- Pay per use of data at volume level or transactions
- Rate maybe depending on data they share and business benefits

Contracted partners (xN)
- By procurement contract obliged to grant access to data / get access to data
- Rate based on volumes, contracted devices or transactions

City as enabler
- Contracted service (xN) + Paid, at base rate xUSD per resident (property)
Maintaining security

Implementing solutions like Atos’ Evidian will allow cities to enable the Economy of Data supported by Urban Data Management in a highly secure way. It provides uninterrupted data availability but also monitors access to data, network security and so on.

About Blockchain

To participate in today’s digital society, we all share a great deal of information about ourselves, and in doing so we have become used to effectively donating our data. Yet a shift is now underway towards citizens taking more responsibility as to who we allow to use our data. Cities moving to use data as a trading asset to personalize citizen services, reducing cost or improving on quality of city life in general need to be in control of data quality and use of data. Only those service providers partnering in the ecosystem of the city will have access, and the return for the city and the citizens will determine the financial contribution for accessing the data.

Maintaining quality of the data will affect citizens’ relationships with Government. Integrated identity (that is, one core set of personal data) is much easier to accept and implement when the citizen is in charge of it, and Digital Government needs to become the citizen’s partner in establishing and assuring the citizen’s possession of his or her own data.

Blockchain was introduced as a way of establishing trust between essentially trust-less transacting parties. It became the underpinning protocol for the crypto-currency Bitcoin. Yet Blockchain has applications far beyond digital currency: it could be the fundamental enabler for the Economy of Data.

In the new Economy of Data, certain data assets will be transacted in a similar way to traditional currencies. A way of establishing smart contracts that validate such transactions will therefore be needed. Blockchain could be part of the solution, and therefore applied in almost every industry from manufacturing (for authenticating supply chain transactions) to media (for managing digital rights). What is more, as transaction ecosystems within the Internet of Things evolve, establishing trust between essentially trust-less entities will become critically important.

Digital Government could be the key enabler for a transformation of the relationship between the citizen and Government. Citizens will possess (not merely own) their own data, and will grant access to that data to digital entities for defined purposes, for a defined duration, and with a defined scope. Blockchain is a key technical platform on which this digital trust can be delivered. Digital Government must be the citizen’s champion.
The next step: Readiness workshop

As many Smart City projects today are single-issue-focused and siloed, the risk is that cities may not have an overview of the links between multiple Smart City projects. This calls for a City Strategy that is future-driven, future-proof and smart.

Implementing Urban Data Management and starting up an Economy of Data may seem out of reach for many cities. Yet most cities may already be part of this without fully recognizing it.

To help cities understand what their role is and how prepared they are for it, Atos offers a Readiness Workshop to explore the impacts and opportunities of a data-driven future.

What the workshop covers
The workshop is non-technical and structured around three steps:
1. Understand the possibilities and implications of Urban Data Management and key technology enablers such as cloud, network operation, data analytics and cyber security
2. Assess opportunities for quick wins using the Atos MyCity wheel (and its eight key topics)
3. Explore innovation accelerators and use cases for proving value of a Data-Driven strategy, including solutions and opportunities to attract interest from companies to design, develop and implement as partners in the ecosystem.

The output of the workshop will be a vision for the future, underpinned with greater awareness of the changes needed to realize this vision, and an overview of initiatives to deliver quick wins.

Currently cities are planning projects years ahead as approval and budgets need to be secured before publication and involvement of businesses for detailed planning, design and realization. In relation to data-driven services, a different, more agile approach is needed: iterative development and testing of data-driven innovations that help to change the daily routines of citizens should be tested in real-life with real citizens and reiterated until the right design and technology is reached.

These are exciting times for cities to harness the power of technology to improve the city environment and create spaces and economies that attract investment and new opportunities. On this journey towards a more data-driven digital future, the focus of a city should always be on the needs of the citizens it serves. Driving innovation in this way often demands new ways of thinking and ideas, which is exactly what a Readiness workshop aims to provide.
About Atos

Atos is a global leader in digital transformation with approximately 100,000 employees in 72 countries and annual revenue of around €12 billion. The European number one in Big Data, Cybersecurity, High Performance Computing and Digital Workplace. The Group provides Cloud services, Infrastructure & Data Management, Business & Platform solutions, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting-edge technologies, digital expertise and industry knowledge, Atos supports the digital transformation of its clients across various business sectors: Defense, Financial Services, Health, Manufacturing, Media, Energy & Utilities, Public sector, Retail, Telecommunications, and Transportation. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Consulting, Atos Worldgrid, Bull, Canopy, Unify and Worldline. Atos SE (Societas Europaea) is listed on the CAC40 Paris stock index.

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Let’s start a discussion together