

DATA, CITIES AND CITIZENS

REBOOTING THE CITY OPERATING SYSTEM
TO CORRELATE DATA AND DEMOCRACY



Smart digital technology, data and artificial intelligence (AI) are transforming society at a rate never seen before in the history of humanity.

Looking beyond the smart territory, this revolution is showing us a glimpse of the long-term promise of zero territories: territories that are free of waste, congestion, greenhouse gas emissions, pollution, crime, health problems and exclusion... if we manage to involve the social, technical, political and economic actors of the territory around a common project.

This also brings about enormous risks for democracy and citizens' individual rights: the risk of feudalization of territories and our entire economy around platforms operated by tech giants, the risk of data dictatorship where data is used to produce an Orwellian vision of mass surveillance and social control measures, or, worse still, the risk of algocracy, where algorithms themselves replace democracy.

The COVID-19 crisis highlights, in the countries that have been able to rely on intelligent infrastructures and services, the benefits but also the ethical limits on the use of these same nationalized infrastructures under the guise of collective protection.

What can we hope to gain from artificial intelligence as a response to the challenges that our territories face? In return for the huge potential of AI, do we have to pay the price of giving up entrepreneurial freedom, citizen rights and our ability to control our own destiny? Can we re-think how we organize our territories in order to maintain our place as citizens?

At a time when technology is advancing at the frenzied pace dictated by Moore's Law, yet with some countries still working on outdated operating systems, the issue is both critical and urgent.

This study, conducted by Caggemini Invent in partnership with Netexplo, aims to provide guidance on the scope of possibilities and risks surrounding the use of artificial intelligence in the development of zero territories.

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Towards Zero Territories

THE UTOPIA OF THE “ZERO” TERRITORY

On a territorial scale, the mass collection and processing of data and artificial intelligence techniques are paving the way for tremendous opportunities in response to current and future societal challenges.

With multiple projects already rolled out, in the test phase or developed at scale, the outlines of several zero territories are beginning to take shape:

- **A zero waste territory**, where citizens only consume what they need to prevent wastage; where waste is automatically sorted and directed to the correct recycling channel, and exchange platforms simplify the organization of a circular economy by integrating reverse logistics for reuse;
- **A zero congestion territory**, where transport is provided as a service and traffic and parking are optimized;
- **A zero greenhouse gas emission territory**, where infrastructure can predict demand and optimize storage and consumption of renewable energy, and reduce buildings' energy consumption;
- **A zero pollution and environmental risk territory**, where the risks of water and air pollution and environmental events are predicted, detected and measured in real time, and mitigated using specific sensors;

- **A zero crime territory**, where the deployment of law enforcement authorities is prioritized for at-risk areas; abnormal behavior and criminal activity are detected in real time, and suspects are apprehended through image analysis and facial recognition;
- **A zero health problem territory**, where health is monitored in real time and a personalized prevention plan and, if necessary, care plans are proposed; and where epidemiological risks are measured and mitigated;
- **A zero exclusion territory**, where people's well-being is continuously measured to adapt public policies accordingly; where tools are implemented to encourage social inclusion of marginalized populations, and access to education is promoted for all.

« In 2030, information about energy, air quality, and traffic flow will be collected via various IoT sensors and devices. Smart connected digital platforms will enable authorities to manage the data captured to monitor environmental impacts, keep traffic flowing, manage parking, and improve the quality of life for citizens.”

Florent Andrillon - Vice President, Sustainability & Energy Transition Global Leader – Capgemini Invent





ZERO WASTE

Demand forecasting
Automatic waste recycling
Circular economy



ZERO CONGESTION

Mobility « as a service »
Autonomous vehicles
Traffic management



ZERO CARBON FOOTPRINT

Smart grids
Renewable energy
Smart buildings



ZERO POLLUTION AND ENVIRONMENTAL RISK

Air pollution forecast, detection and prevention
Forecasting, detecting and preventing water pollution
Forecast of exceptional weather events



ZERO CRIME

Crime scene prediction
Detection of crimes or abnormal behaviour
Tracking / Digital Image Processing



ZERO HEALTH ISSUE

Connected medical devices
Smart hospitals
Optimisation of care pathways and the health system



ZERO EXCLUSION

Improve well-being
Foster social inclusion
Universal access to education



ZERO WASTE territory

By collecting and analyzing wastage data, citizens' consumption and needs can be predicted, therefore avoiding over-production and consequently wastage.

This is what Sodexo is doing with its "WasteWatch" program powered by LeanPath to monitor the quantity and nature of any discarded food. As a result, the company has reduced its food wastage by 50%². On a smaller scale, restaurants and canteens are using data to predict needs and prevent wastage, notably the restaurant Nolla³ (zero in Finnish), based in Helsinki.

Managing urban waste, from collection to recycling, is a major expense for cities.

Using data collected via connected bins equipped with sensors that measure fill rate and odors, it is now possible to prevent overflowing and pollution, as well as to anticipate waste collection needs.

Several private players are joining this market, such as BigBelly⁴ and Econic⁵, with clients all over the world, including in New York, Geneva and Singapore.

Meanwhile, through smart robots, it is now possible to recognize and automatically sort waste. This is the role of Max AI, the robot designed by Veolia and already rolled out in Amiens⁶.

Other approaches promote the development of the circular economy through returnable packaging collection systems and reverse logistics to encourage product reuse.

In the US, IKEA uses a platform developed by Optoro, which uses Machine Learning and predictive analysis to optimize management of unsold goods and adjust their resale price⁷.



ZERO CONGESTION territory

The use of travel data offers the opportunity to radically transform mobility by providing an exhaustive, multimodal, real-time and detailed vision of movements on the territory, and thus to promote seamless flows.

With this objective, mobility-as-a-service (MaaS) applications are being developed to enable users to access a range of services before, during and after a journey.

Thanks to these applications, it is now possible for travelers to find a suitable mode of transportation for their needs or desires by centralizing information on the transportation network (cars, buses, bikes, taxis), while also offering tailored services (route search, availability of nearby car parks, orientation towards the cheapest petrol station, etc.). With its Moovizy 2 project, Saint-Étienne is the first city in France to deploy a MaaS service⁸.

« Mobility as a service is a wonderful promise, but it faces operational constraints that complicates its implementation. Open data is key to facilitating the interoperability of different means of transport, in a logic of multimodal experience. »

Jean Jacques Thomas – Director of Digital and Innovation – SNCF Réseau

In addition, the autonomous vehicle revolution is coming, with the promise of a fluid transport network. This sector is also growing, with several new companies and manufacturers entering the market, such as Israeli start-up Mobileye, specializing in embedded computer vision systems.

Other avenues for transforming mobility are also being explored, such as the installation of sensors and cameras to regulate traffic lights to keep traffic moving, map out available parking spaces, and analyze the use of cycle paths: this system has already been rolled out in Angers⁹.

This data can not only be used to improve citizens' everyday life by reducing congestion, travel time and ecological footprint, but it can also be used in the planning of urban mobility networks as a whole.

2. Sodexo, Press Release : Sodexo steps up fight against Food waste, aims to deploy data-driven program at 3,000 sites within year, 2019
3. Fast Company, This zero-waste restaurant generates literally no trash, 2019
4. Connect Sytee, Bigbelly, le système intelligent qui change la ville
5. Cleantech ALPS, Collecte « intelligente » du verre et du PET à Genève, 2013
6. Veolia Planet, Interview avec Marc Brunero – Max-AI®, l'opérateur-trieur du futur, 2018
7. IKEA, Press Release, IKEA retail U.S. partners with OPTORO to reduce waste from returns, 2019
8. Ville de Saint-Etienne, Moovizy 2, l'appli qui révolutionne la mobilité urbaine, 2019
9. Angers Loire Métropole, L'avenir est au territoire intelligent, 2019





ZERO GREENHOUSE GAS EMISSION

territory

The energy sector is central to carbon neutrality. The aim is to create territories where energy demand is predicted, and management of the entire electricity network is optimized with smart grids.

Based on available data, smart power grids can identify energy consumption peaks and adjust production and distribution accordingly to avoid energy wastage. Amsterdam and Grenoble have chosen to join forces to inaugurate City-Zen, a project with the sole aim of achieving carbon neutrality¹⁰.

Alongside efficient energy management thanks to smart grids, greener energy production contributes to achieving this goal, and once again data can play a driving role. Let's take the example of the Ile-de-France region and its newly rolled out 'Mon potentiel solaire' service. This allows citizens to view their property's capacity to produce solar energy, while accompanying them throughout the entire solar panel installation process¹¹.

In a utopian zero greenhouse gas emission territory, all buildings are smart. They are carefully designed before being constructed and are characterized by lower energy consumption (or even energy-positive status) and by architecture with optimized positioning and design. But that's not all!

The crucial element of a smart building is its ability to optimize energy management for its residents. In fact, the building can produce its own energy, which it redistributes according to the occupiers' needs, while minimizing waste using the same logic as smart grids. This innovation is no longer a utopia but a reality, like the Capital Tower in Singapore, winner of the Green Mark Platinum Award in 2018.



ZERO POLLUTION AND ENVIRONMENTAL RISK

territory

In a bid to achieve sustainability, data can be used to limit urban pollution and mitigate the environmental risk. The Internet of Things (IoT) and analytical capacities can be exploited to predict and measure fine particle emissions, which actively contribute to air pollution, as in Beijing with the Green Horizons initiative¹².

Image analysis can evaluate pollution levels in a city, as is the case in Singapore, where the Nanyang Technological University has developed AirTick¹³.

In addition, poor quality water can cause potentially life-threatening health problems for living organisms. Available technologies can be used to measure the quality of water distributed to and consumed by citizens. For example, cities such as Seoul and Singapore use sensors to continuously monitor water quality and provide this data to their populations.

Also, potential leaks in water distribution networks that can significantly impact water quality can be detected: Washington uses robots and autonomous drones to observe and analyze its water distribution network in real time¹⁴.

Finally, using weather and spatial data, it is possible to predict extreme weather events: in fact, the Deep Thunder software developed by IBM and implemented in Rio de Janeiro is already doing that¹⁵.

Territories now even have the ability to identify at-risk areas during extreme weather events. Jakarta has rolled out PetaBencana, which, in the event of a flood, indicates in real-time the areas at-risk and the areas considered safe, and communicates efficiently on measures to take¹⁶.

10. Amsterdam Smart City, City-Zen, 2019

11. Région Ile de France, Dossier de presse - Île-de-France Smart Services : la plateforme de services numériques et durables pour tous les Franciliens, 2019

12. Sithon Technologies, Comment Pekin utilise l'IoT pour réduire la pollution atmosphérique, 2019

13. New Scientist, Pic-scanning AI estimates city air pollution from mass of photos, 2016

14. SmartCitiesDive, How AI and data turn city water management from an art to a science, 2019

15. Information Week, IBM's Deep Thunder Shows How Weather Is Big Business, 2016

16. The Jakarta Post, PetaBencana.id offers real-time flood updates via interactive map, 2020





ZERO CRIME territory

Minority Report is no longer just fiction!

A major part of smart city projects is focused on safety and policing. More than just smart cities, we now speak about safe cities. By installing a large network of video-surveillance cameras, which generate data that is processed continuously and in real time by control centers, territories can predict crime spots and at-risk areas in order to optimize deployment of officers.

Thanks to suitable infrastructure and PredPol crime prediction software, Santa Cruz has seen a 19% drop in burglaries in one year¹⁷.

As well as predicting crime, the technology allows territories to detect crime or abnormal behavior with image analysis. Thanks to the installation of over 15,000 cameras connected to a control station equipped with smart algorithms, Mexico City's crime rate has reduced by 56% in 5 years¹⁸.

Organizers of high-risk events have also opted to use this technology, such as the New York marathon and the Paris 2024 Olympic Games.

Finally, this same surveillance network, coupled with image analysis, makes it possible to identify and track license plates or suspects. Several cities, such as Hangzhou, Kuala Lumpur and Nairobi, have chosen to install an intensified surveillance system thanks to the 'city brain' solution developed by Chinese giant Huawei.



ZERO HEALTH PROBLEM territory

Ageing populations, rising chronic illnesses, cuts to public resources and epidemic risks significantly complicate the work of public health authorities.

The number of connected medical devices is rising: these tools measure vital variables and detect anomalies, and, in general, make patient monitoring easier.

More and more start-ups have come on board, such as Implicity, a French company that sorts and synthesizes data from pacemakers and defibrillators.

Technology can also be used to optimize hospital facilities in order to improve management of patient flows, thanks to better understanding of the overall running of the structure. In turn, this improves medical staff working conditions and patient monitoring.

In 2018, Japan chose to invest heavily in artificial intelligence in the health sector, with the target of creating 10 AI hospitals by 2022. The main objectives of these hospitals are to automatically update patient records, detect illnesses, assist employees in their decision-making processes and optimize management of hospital resources¹⁹.

Finally, on a larger scale, analyzing the data produced by a territory can optimize the patient care pathway by providing a deeper understanding of life-threatening illnesses. For example, the Ile-de-France Regional Health Agency, winner of the call for Health Data Hub projects, has developed a data processing initiative to improve the care provided to heart attack patients²⁰.

Data can be an advantage in monitoring and managing epidemiological risks. With the COVID-19, governments are seeking to rely on artificial intelligence to limit the spread of the epidemic²¹ and to identify a cure²².



17. Predpol, Predictive Policing in Santa Cruz Leads to 19 Percent Drop in Burglaries, 2019

18. Imaginez demain, L'intelligence artificielle au service des citoyens ?, 2019

19. Asia Nikkei, Japan plans 10 'AI hospitals' to ease doctor shortages, 2018

20. Agence Régionale de Santé Française, L'ARS Île-de-France, lauréate de l'appel à projets du Health data hub, 2019

21. Reuters, Coronavirus brings China's surveillance state out of the shadows, 2020

22. Vox Recode, Scientists are identifying potential treatments for coronavirus via artificial intelligence, 2020



ZERO EXCLUSION

territory

Well-being and inclusion are the cornerstones of tomorrow's smart territories. Data can play a central role in measuring citizen well-being and shifting public policies accordingly.

The city of Santa Monica in the US has established the Santa Monica Office of Civic Wellbeing, which uses data gathered from questionnaires, administrative processes and social media to assess the well-being of its population using the Wellbeing Index.

By analyzing this data, the city can understand its citizens' stress levels or assess their sense of community in order to quantify their quality of life. These findings have encouraged the city to take simple measures to address the problems revealed.

Well-being is also influenced by social inclusion, particularly among marginalized populations, such as disabled or elderly people. Again, data can play an informative role for public authorities, which can simultaneously implement initiatives to respond to their needs.

London has made the choice to collaborate with the Royal London Society for Blind People to implement a navigation tool for blind and vision impaired people: Wayfindr. BrightSign, a London start-up, has also developed a smart glove that translates sign language into speech²³.

Finally, it's essential to mention education as an inclusion factor, by adapting work tools to people with difficulties, as demonstrated by ObjectiveEd. This tool evaluates the abilities and skills of students with difficulties and adapts their learning program accordingly.



23. WIPO Magazine, BrightSign: a smart glove that gives a voice to those who cannot speak, 2019



Towards Zero Territories

ZERO PLACE FOR CITIZENS?

Deploying artificial intelligence at scale requires considerable resources: access to a rich, unrestricted bank of data, rare skills and costly computation capacities. Today, American and Chinese technological giants are clearly leading the way, with significantly higher levels of investment than many others.

« Dystopia projects us into the worst of society to allow us to anticipate our risks. »

**Etienne Grass – Head of public services Europ
- Capgemini Invent**

However, the utopia of a zero territory also leads us to imagine three extreme dystopian models: the feudalization of cities and our entire economic structure around platforms operated by technological giants; data dictatorship where data is used to produce an Orwellian view of mass surveillance and social control measures; or, worse still, algocracy, where algorithms themselves replace democracy.

A SOCIETY VASSAL TO THE TECH GIANTS ?

Today, a handful of private players, primarily American, have a dominant position in their sectors, as a result of their resources and their competitors' slow uptake. Further, their activities are diversifying. Through numerous acquisitions, new markets are becoming available to them, giving them access to an incalculable volume of personal data, now considered a monetizable asset.

Take Toronto for example, where an ambitious plan has been developed with Sidewalk Labs, a subsidiary of Alphabet, to collect and process citizen data in the new Quayside district²⁴.

This new district designed entirely by technologists, has raised a fundamental issue: personal privacy. Several debates on this subject have slowed down the project, forcing the city to demand more transparency regarding data storage locations and to request firm guarantees on data ownership, which must be returned to the city and, by extension, the citizen.

The same issue has proven problematic in Google's acquisition of connected watch and bracelet manufacturer FitBit²⁵, giving it access to an enormous database of health information. Despite the US giant's promises regarding its use of this data, what is the reality? And what will Alphabet do with Canadian citizens' data?

Furthermore, thanks to their available resources, these private players are monopolizing the e-commerce, tourism and mobility markets (Amazon, Booking, Airbnb, Uber, etc.). With new innovative business models based on data platforms, these players are feudalizing our economic structure at a city, regional and national scale.

Self-employed workers are becoming increasingly dependent on these major players. A shopkeeper watches their success grow with Google reviews, and a hotel or restaurant sees their customer numbers change based on ratings on Booking or TripAdvisor.

Although they have become an essential part of our lives, some applications could jeopardize the overall running of our territories. Let's take the example of Waze which, by diverting drivers from main roads, causes traffic jams and therefore noise and pollution.

To mitigate the harm caused by this app, towns such as Lieusaint (Seine-et-Marne) have implemented actions to beat the algorithms, such as the installation of traffic lights and speed limit reductions²⁶.

This leads us to ask: should Waze be dictating the urban policies of our territories? Should Airbnb or Booking replace the housing ministry and Doctolib the health ministry?

« Quayside is emblematic of the tensions caused by the arrival of big tech players, namely GAFAM, in a field that has traditionally been a matter of public action »

Marie Baléo – Head of studies of “La fabrique des cités” – author of “Toronto, jusqu’où?”





AN OMNIPRESENT AND OMNISCIENT TOTALITARIAN REGIME?

In another vein, should we, or do we want to, create omniscient public institutions, by providing totalitarian governments with nationalized databases and artificial intelligence?

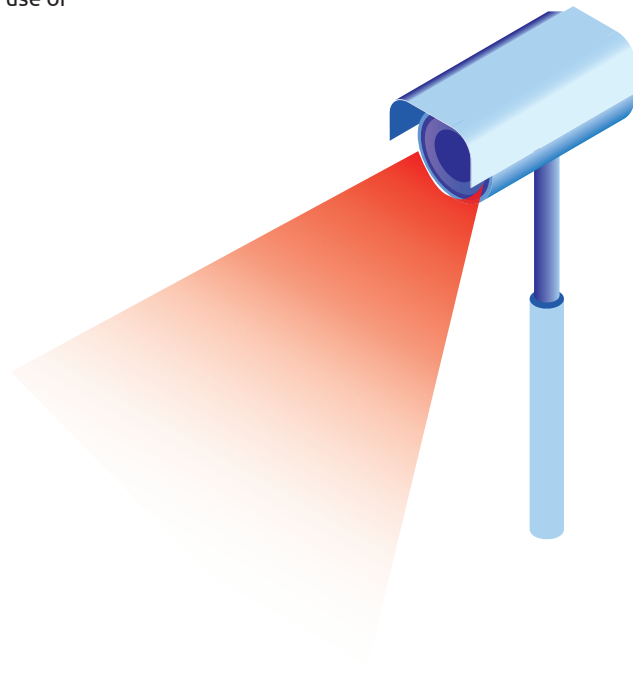
Although they are omnipresent in the utopia of a zero territory, camera networks can be used for improper purposes, such as mass population surveillance, potentially targeting ethnic minorities. An example of this abuse is the profiling of Uighurs, a minority living in the province of Xinjiang²⁷.

AI may also be used to implement other social control measures by governments with little concern for their citizens' privacy. This is the case with the social rating system implemented in 2014 in various Chinese provinces, where citizens' behavior is continuously evaluated through a social credit score. This system, which aims to maintain order across the country, goes against individual freedoms and sets ethical limits on the use of AI by public authorities.

For example, 2% of the Chinese population were banned from travelling in 2019 as their score was considered too low²⁸. Others were refused jobs or, worse still, university places.

Finally, the double-edged potential of data could negate democracy by manipulating public opinion.

The revelations surrounding the Cambridge Analytica²⁹ scandal illustrate how a cocktail of political and private interests can lead to electoral results where the value of the democratic process could be questioned, as demonstrated by the Leave.eu and President Trump campaigns.





A DICTATORSHIP OF ALGORITHMS (ALGOCRACY)?

Finally, a risk that is futuristic but far from being unique is the loss of control over algorithms.

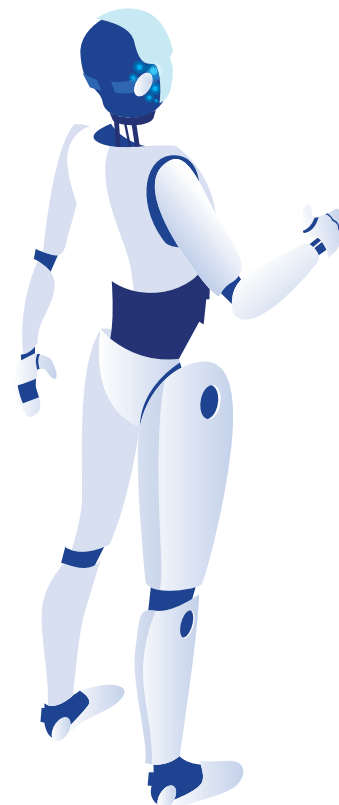
The use of algorithms raises ethical questions, to which regulations do not yet have the answers.

Social bias and determinisms that can arise from the use of artificial intelligence are problems that need to be anticipated before they occur at scale. For example, the city of Durham in the UK has implemented an algorithm that can predict criminals' risk of reoffending. This type of program could be a source of racial bias and challenges the reintegration of ex-prisoners into our societies³⁰.

Similarly, AI can be used to make decisions – sometimes major ones – as illustrated by Moral Machine, a site developed by MIT that simulates the moral dilemmas that autonomous vehicles could face. This raises the issue of the explicability of algorithms and consequently the notion of responsibility.

These questions must be addressed within the context of tomorrow's smart territories: In the event of an accident caused by an autonomous car or a medical error caused by an algorithm, who is responsible?

The ability to automate increasingly complex human activities raises the question of the place of humans and algorithms regarding work, and its potential impact on inequalities. In his book *Homo Deus*, Yuval Harari pictures a layered model of society, with an increasingly small elite that concentrates the intellectual property of algorithms, a cast of engineers and developers that works for the small elite on the development of new algorithms, and a large majority of the population that carries out on-demand unskilled activities that have not yet been automated.







Towards a Territory Data Trust

R²=1 – FITTING THE MODEL TO DATA, CITIZEN AND DEMOCRACIES

To improve quality of life, the competitiveness of territories and to develop more efficient urban services, smart territories face the following challenge: How best to organize data collection and sharing to successfully involve and manage social, political and economic stakeholders in the territory around joint projects.

This raises several questions: How to make data available? How to ensure protection of citizens' data? How to organize balanced roles for a territory's public and private stakeholders and citizens? How to create a space for gathering and sharing, in compliance with individual freedoms and democracy?

To answer these essential questions, we have conceived a Territory Data Trust as a means of implementing a framework for the virtuous use of data, by way of a data provision infrastructure, an ethical and law-compliant structure, shared security rules and new governance.

DATA AS A SHARED INFRASTRUCTURE

To develop and operate a territory's services, it must be possible to collect, analyze and cross-reference the data it generates. Yet this data is often partitioned in proprietary systems, accessible only to those who collected it.

Today, territories own and operate basic infrastructures (schools, hospitals, etc.). Can data generated within the context of public services provided by a community be considered as shared heritage that should be available to everyone?

This heritage would be consolidated by the different territory data trusts through shared platforms, made available to a multitude of stakeholders depending on requirements, from a territory's highest level of governance and decision-making bodies – the State – to the lowest.

With this goal in mind, in 2018 for example, the French Ministry for Solidarity and Health launched the Health Data Hub, a national platform that aims to provide open access to health data³¹ for researchers wanting to develop a public interest project.

In the same way, the French Ministry of Ecological and Solidarity Transition, following a bid for programs launched in May 2019, supports the Compte Personnel de Mobilité, a neutral trusted third party data and services platform available to all stakeholders. The purpose is to provide an application to generate personal mobility data and to store this data in a cloud-hosted personal account. It will be useable by individuals, communities that want to launch data creation campaigns, and by companies to produce company travel plans³².

« The acceleration we are witnessing in terms of data sharing is essential to foster progress in implementing autonomous mobility. The ecosystem approach to issues is necessary but will require safeguards to guarantee ethics in data processing and respect of privacy concerning collection and storage. Data centralization and sharing, between manufacturers and with the public authorities, is an innovation driver. In the specific case of the autonomous car, it can help to make 3D maps and embedded perception systems more reliable, which are cornerstones of autonomous mobility. It is interesting to note that, once again, technology could help us, in particular thanks to a cocktail of AI and homomorphic encryption, that enable the processing of encrypted data without diminishing the performance of algorithms. This is a matter to follow... »

Patrick Perez – Chief Data Officer – Valeo

Establishing data as a benefit that serves the community involves opening up this heritage to the widest audience possible. This principle is even avowed in law and public contracts, such as the law for a Digital Republic enacted in France in 2016, the aim

of which is to create, around data, an open and inclusive digital republic, liberate innovation and create a clear framework of trust³³.

The city of Paris, for example, has included a clause in its public contracts making it compulsory for some urban services to make generated data available, subject to complying with enforced confidentiality rule³⁴.

This openness implies the definition of rules for sharing data, depending on their level of sensitivity and the type of associated use, at the same time as guaranteeing their anonymization.

The objective is two-fold: guarantee the protection of citizens' data and redress the balance between public and private sectors.

However, these ambitions come up against strong technological constraints due to the highly diverse digital maturity among stakeholders. Data APIzation imposes control of sharing standards, facilitating portability and use for all participants in the ecosystem. Several participants, in the form of private and/or public collaborations, are trying to enforce a standard, like the Data Transfer Project or the Energy Web Foundation (EWF) in the field of energy based on blockchain.



31. Le Big Data, Health Data Hub : tout sur la plateforme française de données de santé, 2019

32. Ministère de la Transition écologique et solidaire, Transition énergétique : Elisabeth Borne annonce le soutien de l'Etat à 12 nouveaux programmes d'économies d'énergie représentant 78 millions d'euros, 2020

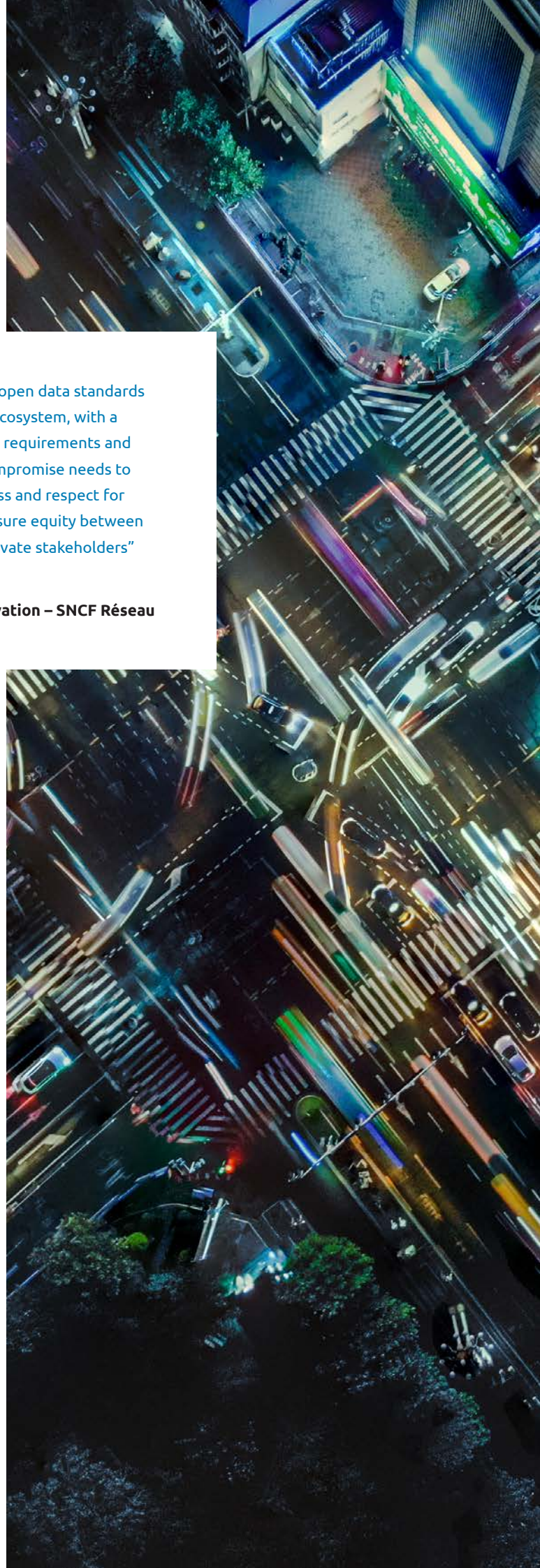
33. Ministère de l'économie, des Finances, de l'Action et des Comptes Publics, La #LoiNumérique en 15 points clés, 2016

34. Le Monde Informatique, Paris ajoute une clause Open Data à ses marchés publics, 2014

Standardizing sharing technologies and even dataframes would indeed largely facilitate the free circulation of data between participants, governed by the data trust.

« The Lemaire Law enforces open data standards on all stakeholders in the ecosystem, with a distortion and inequality in requirements and expectations. The right compromise needs to be found between openness and respect for intellectual property to ensure equity between the different public and private stakeholders”

**Jean Jacques THOMAS –
Director Digital and Innovation – SNCF Réseau**



ETHICS AND PERSONAL DATA PROTECTION AS A NEW SOCIAL AGREEMENT

Would the success of an organization such as this require the implementation of a new social and moral agreement?

It would include ethical principles and clear and structuring governance rules between the citizen, the company and the public authorities, on the territorial, agglomeration or national level.

Against this backdrop, the access rights of each one to citizens' data, as well as the associated uses, are defined together with the entire ecosystem and the data used is protected via anonymization.

In addition, having a high level of transparency in terms of the use of citizens' data, as well as the algorithms used to deliver services, makes it possible to account for maintaining the balance of forces. Thus, audits on the databases used can be carried out frequently with the aim of providing protection against risks linked to abusive use of data, by both public and private authorities; and guaranteeing that the algorithms used do not unfairly impact the citizens involved.

This transparency generates the need to inform citizens how their personal data is used, make them aware of the issues linked to protecting this data and define, with them, the terms for exercising their rights of access, withdrawal or opposition, just like the Commission Nationale de l'Informatique et des Libertés proposes in France. With its Smart City et données personnelles (Smart City and personal data) study, this committee even announces the possibility of navigating in private mode in the urban space without personal data being used.

« Artificial intelligence is going to change the relationship between companies and consumers, to the detriment of the consumer. Consumers often don't know when or how algorithms are used, for example to approve loans. It is essential that people understand what data decisions are based on and how these decisions are made. »

Ursula Pahl - Deputy Director General the European Consumer Organisation

This amounts to restoring producers' control of their personal data. These practices are becoming more democratic, like the

Self Data concept announced by the Fondation Internet Nouvelle Génération, defined as "production and sharing of personal data by individuals, under their control and for their own purposes". Other initiatives have been launched, such as MiData in the UK or Blue Button in the US.

Lastly, and still with a view to providing a favorable framework between citizens, companies and public stakeholders, the use of AI must be regulated. This is why the

European Union has defined seven criteria to ensure trustworthy AI: human agency and oversight, robustness and safety, privacy, transparency, diversity, societal and environmental well-being and responsibility³⁵.

These ethical criteria could be integrated into algorithms from the outset to avoid social and human biases, as explained by Michael Kearns and Aaron Roth in their book "The Ethical Algorithm"³⁶.

« Today, the use of citizens' data is becoming more widespread with practices and uses that reflect the culture of the country; as we cross the Atlantic or the North Pacific, we move from one extreme to the other. In addition, cyber threats are multiplying, putting cybersecurity at the heart of countries' concerns. Guaranteeing cybersecurity is a two-fold challenge: protect the population and cultivate trust in digital services; this involves the implementation of clear rules and hard, but also soft, regulations, at the international, national and territorial levels. »

Christophe Fichet – Partner – Dentons law firm

CYBERSECURITY AS A NEW SOVEREIGN PUBLIC SERVICE

In an increasingly digital world, ensuring security in the virtual space is essential and shifts cybersecurity to the center of the concerns of citizens, public bodies and our national economies. However, who should guarantee this security? On which scale should we guarantee it: regional, national, European, or global?

Cyber-attacks are a major risk for our essential services: indeed, the professionalization of cybercrime and increased dependence on digital technology requires action.

Public authorities must play a central role in digital hygiene awareness, in the definition of joint public/private principles to secure our critical systems and ensure effective cyber crisis management.

Promoting awareness and educating territorial stakeholders would make it possible to minimize the consequences of cyber-attacks. Los Angeles has thus implemented its LA Cyber Lab Threat Intelligence Sharing Platform, a platform that allows citizens and companies to become aware of good practices and to share attempted attacks made against them. This platform has led to better protection of citizens and improved the collection of essential information, making it possible to establish a full portrait of attacks on the city.



To sum up, the government faces four main challenges:

1. Give meaning to digital security issues and make them accessible to national stakeholders (citizens, businesses & public services) to strengthen cyber culture
2. Develop regulations, in partnership with the European Union and national experts (publics/privates/research) to ensure applicability and relevance
3. Develop Cyber Excellence skills in domestic and defense forces and support business' quality of cyber transformation
4. Demonstrate full control of crisis situations, in training, real-time management and post-incident recovery.»

Jeanne Heuré – Lead Digital Trust & Security – Capgemini Invent

Guaranteeing security involves the implementation of guidelines and clear regulations, in collaboration with territorial stakeholders. The United Arab Emirates have created the Dubai Electronic Security Center, the role of which is to define good practices, security standards and to verify their implementation by government entities.

To ensure the application of shared rules, the legal framework can be adjusted with the definition of sanctions for persons and entities responsible for cyber-attacks, which is what the Council of Europe³⁷ or the United States³⁸ have done by integrating cyber-crime sanctions into their criminal code.

Beyond the regulatory framework, public authorities play a role in strengthening and managing structures dedicated to monitoring cyber-threats, such as the Agence Nationale de la Sécurité des Systèmes d'Information (ANSSI)³⁹, as well as in the fight against cyber-crime. In terms of defense, forces such as the Centre d'Analyse de Lutte Informatique Défensive

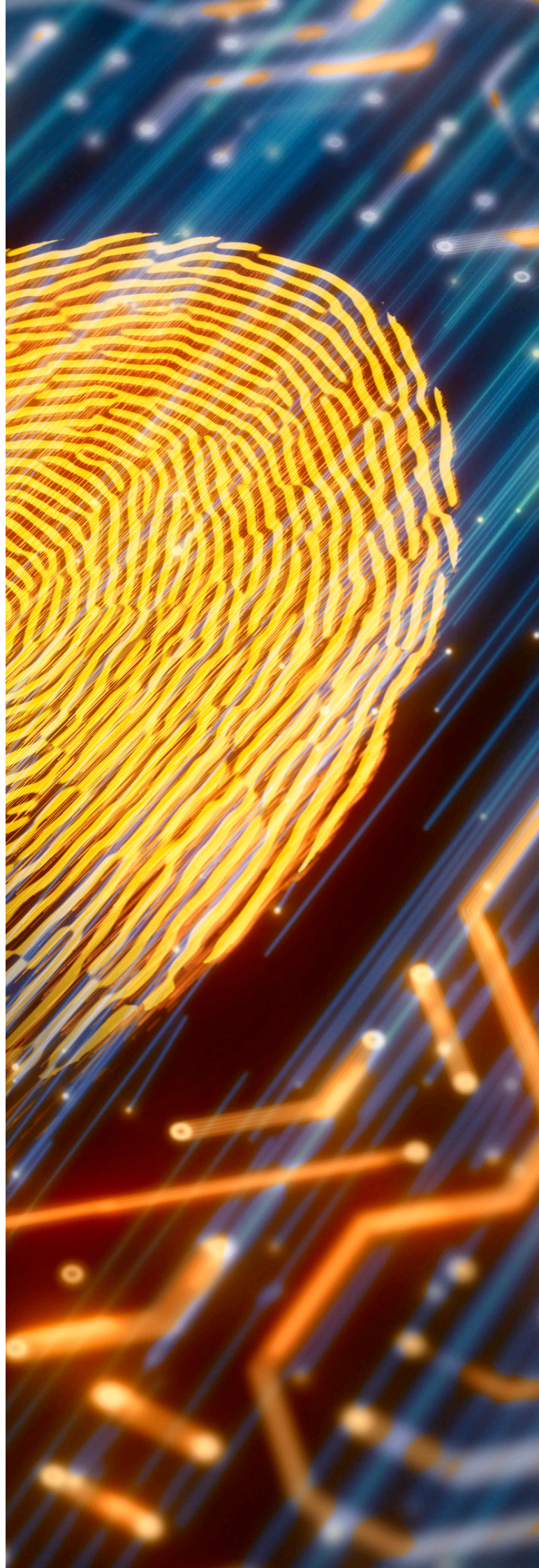
(CALID) in France have become essential in a context of palpable digital war where states are creating teams of elite hackers to defend, but also to attack: Unit 26165 in Russia, APT10 in China, NCSC in the UK, etc.

Furthermore, measures can be taken to ensure business continuity in the event of a cyber-attack, as Estonia has done by creating Data Embassies, which involves the duplication of all of its databases on secure servers hosted in Luxembourg.

37. Conseil de l'Union Européenne, Communiqué de presse : Cyberattaques : le conseil est désormais en mesure d'imposer des sanctions, 2019
38. Hackernoon, Cybercrimes and Penalties : A state-by-state list, 2018
39. Agence Nationale de la sécurité des Systèmes d'Information, Le Centre de cyberdéfense

Beyond governmental resources that can be introduced to institutionalize the fight against cybercrime, regardless of whether it is perpetrated by individuals, states or corporations, technical resources can also minimize exposure of our data to cyber risk. Vivacity Labs, in charge of traffic-monitoring CCTV in London, anonymized data received directly by its cameras before sending it into the cloud, using the principles of edge computing. This has the dual advantage of reducing data exposure and minimizing the computational energy cost. Similarly, the American agency DARPA launched an initiative⁴⁰ to develop architecture standards for hardware simplifying the development of algorithms that consume homomorphically encrypted data.

Public stakeholders must therefore address this citizens' cyber-defense issue, which can only be handled with technology, in order to develop preventive task forces and a regulatory and legal framework that is reassuring for the general public.



PUBLIC POLICIES ADAPTED TO DATA, PUTTING CITIZENS AT THE CENTER

Beyond the technological challenges, the promise of transformation provided by smart territories also depends on citizens' involvement and their adoption of new uses.

In this respect, the development of digital technology provides the opportunity to gather citizens' requirements and improve their participation in decision-making processes.

This is the objective of CitizenLab, a citizen consultation platform that collects citizens' requirements, opinions and ideas. It is used by the Belgian town of Arlon to better identify citizens' expectations concerning the town's urban plan, by Brussels to collect citizens' ideas in terms of mobility and by Liège to implement its "City Plan".

Another example is the open-source platform, DemocracyOS, rolled out in Nanterre, which allows residents to make decisions transparently and collectively by voting for projects to implement in their city and the associated budgets.

To explore the Territory Data Trust vision further, real-life data can be used to better understand the complexity of territories and thus to adapt and make a case for public policies. In fact, developing a society that makes decisions based on statistical and provable facts may have a positive effect on understanding and accepting the role of public authorities.

This is how the Digital Twin is being developed: it consists of 3D virtual replicas which, thanks to AI, can simulate an initiative's impact. This type of analysis has been carried out, for example, in Philadelphia⁴¹. These advanced modelling techniques have made it possible to simulate access to public transport in order to put bus stations in the most optimal position and extend the tramway line to provide a better service to residents, while measuring the economic impact of extending the line.

There is, however, a prerequisite in this vision: all citizens must be included in the decision-making process, regardless of their level of technological maturity. This could involve specific measures including the implementation of a suitable digital infrastructure accessible by everyone, and education in digital tools and content to reduce digital illiteracy, which affected nearly 20% of the British population in 2018⁴².

41. Atelier BNP Paribas, Pourquoi les villes veulent toutes leur double numérique, 2018
42. Office for National Statistics (UK), Press release : Exploring the UK's digital divide, 2019

TOWARDS A 3RD WAY FOR OUR TERRITORIES?

There is no longer any doubt concerning the potential of data and artificial intelligence, as long as it is exploited with respect for citizens' privacy, their needs and their fundamental freedoms.

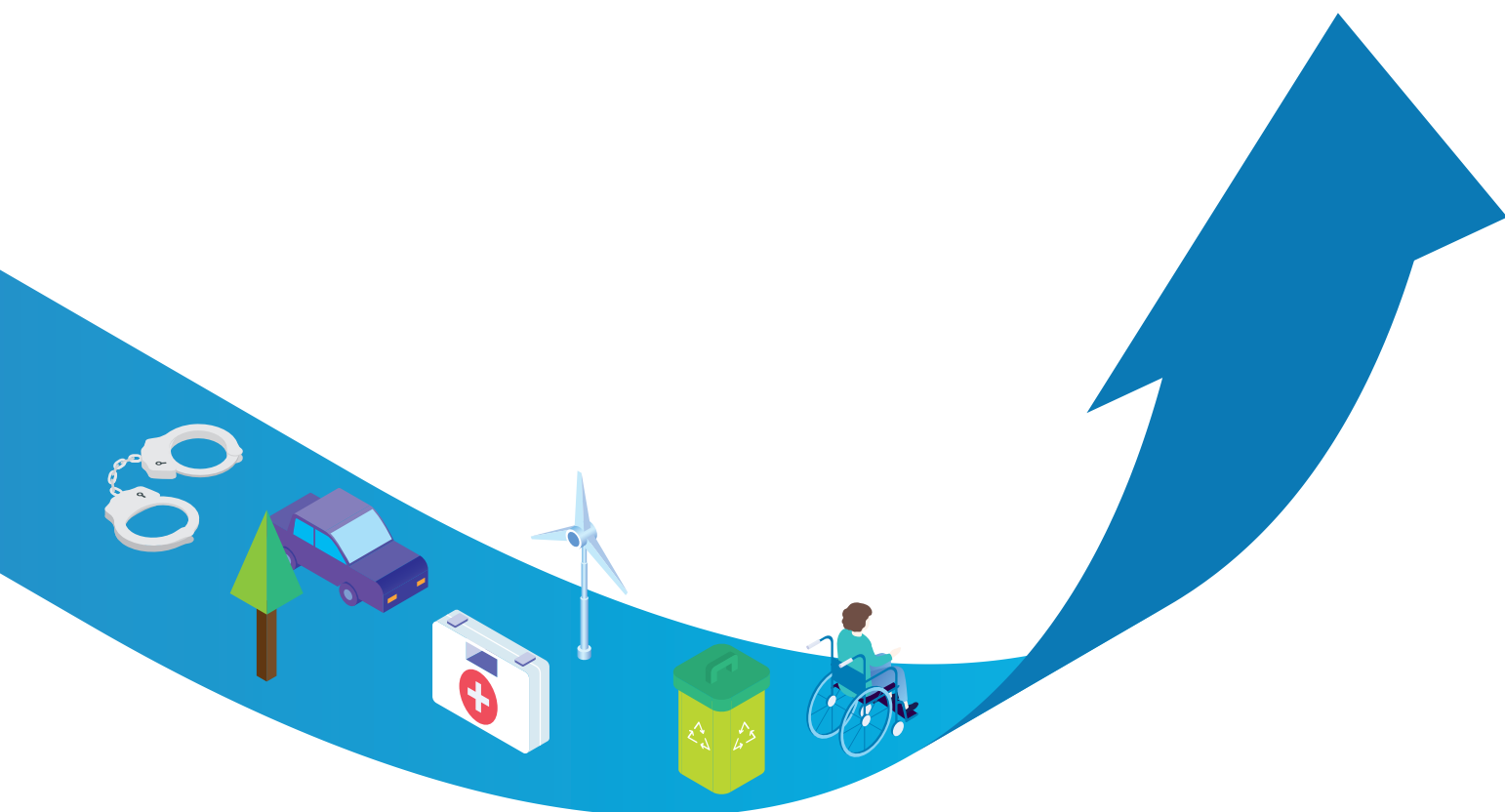
Our vision of the Territory Data Trust arises from the need to find a third pathway between the dominance of private stakeholders (GAFAM notably) and Orwellian government centralization.

This vision would make it possible to create ecosystems, with different levels of granularity (state, territory, village, district, street, etc.), based on solid foundations (data as infrastructure and associated cyber-security) and accelerating the platformization of the territories. The latter would therefore be more able to develop services, urban planning and quality of life designed by and for citizens, thanks to data and to AI, all within a framework of trust created by a new type of social agreement and a secure regulatory framework for citizens.

The central issue of this alternative pathway is to preserve the sovereignty of the territories, their companies and, on a larger scale, the economic model of the country.

This point of view was finalized shortly before the shock that rocked us into this new world, confined, under the threat of a deadly virus causing an unprecedented health crisis and an economic crisis for which we are still struggling to define the contours and impacts.

More than ever, we believe that the Territorial Data Trusts must be deployed to help create greater resilience in line with our modern conceptions of privacy.







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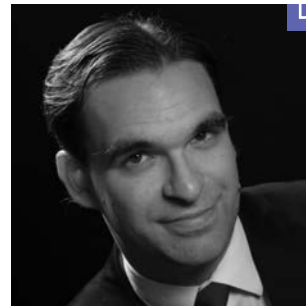
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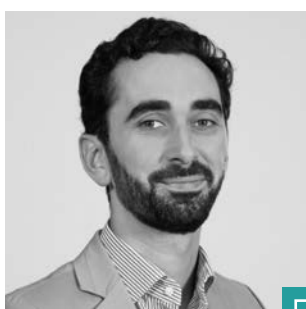
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