ADVOCATING FOR THE GREAT FORGOTTEN:

Public Data-Sharing Infrastructures

REPORT

Septembre 2025

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LE THINK TANK PROGRESSISTE

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DIGITAL NEW DEAL

Contents

OUR APPROACH

February 2024. Dominique Pon and I were invited to the 2-year anniversary of Mon espace santé (My Healthcare Space) to look back on its beginnings. The entire e-health ecosystem and the press were gathered at the *Maison de la Chimie*, transformed for the occasion into a giant birthday party. The atmosphere was at once highly professional, natural and joyful.

The French Minister of Health, who had been in office for a month, introduced the event: "T*his is a great tool, and I say that all the more simply because I had nothing to do with it!*" Patient associations looked back: "*We ended up calling the Dossier Médical Partagé (Shared Medical File) the "Lost Medical File". I didn't think we'd see the end of it in my lifetime. The patient finally really exists!*" Some people explained how *Mon espace santé* helps them to remember vaccination reminders, manage their pregnancy or find their way around the medicines they need to take. One doctor said he no longer wastes time sending back lost prescriptions. A pharmacist explained that, thanks to the vaccination note, he now only has to fill in one document, instead of having to send 3 separate copies to the doctor, the patient and his software. The *CHU de Bretagne* (Brittany University Hospital) testified: "*It's not a project, it's an adventure!*" and explained how the decompartmentalization of local public stakeholders helped convince private practitioners to adopt *Mon espace santé* by showing that almost all hospitals were already using it. An emblematic startup told me: "*It was tough, that's all we did for 2 years. But we went for it, for the patients, for our customers and because the public authorities moved away from a dominant/dominated relationship with us*". As a result of this unprecedented collective commitment, the vast majority of healthcare establishments private practitioners were already submitting health documents in Mon espace santé in a simple, systematic and secure way. More than 20 million French people are already using it. Public officials from the Ministry, the French national health insurance system and the Digital Health Agency looked back on the blood, sweat, and tears that went into achieving these results, and presented the many challenges that lied ahead in order to keep up the momentum.

I remember with emotion our arrival at the Ministry of Health in 2019, when with only a few strings to our bow, we had to get on board with the vision of a public platform, sort things out, negotiate resources, claw our way to key decisions, restore the field, the human aspect, the hope... The countless trials and tribulations, the moments of grace.

Dominique recalls the decisive elements : automatic opening of *Mon espace santé* unless the person objects, obligation to connect and sanctions in the event of non-compliance, direct financial support to software providers for technical upgrades, etc. "*Each time, we were told it was impossible*". To successfully change a legal-administrative framework that did not serve the desired public policies, ultra-competent, committed and determined public officials were first and foremost required. One of them, Olivier, recalls: "*In the beginning, we were more the bearers of a belief than anything else*". Then came the ongoing, effective and sincere co-construction with external stakeholders: via the Tour de France of the regions, the biannual Digital Health Committee, parliamentary exchanges, consultation with stakeholders, including direct consultation with citizens, etc.

I'm thinking of the brilliant public officials with whom we've just set up the "digital and data for ecological planning" roadmap. The entropy we had to overcome to map out what was already in place. The resilience we had to deploy to convince people of the importance of public data-sharing infrastructures in agriculture, responsible consumption, housing renovation or geographic information, as with the "digital health space" at the time. The launch when the roadmap was first published, where, as though it was the early days of a startup, we took care of everything from top to bottom, from the distribution of badges to the reception of a room that was kindly lent to us free of charge, to the keynote speech. The feeling of having moved a mountain, but the awareness that we only had only made it 1% of the way. The anniversary of *Mon espace santé* is heart-warming for me: the beginning of the adventure seems a long way off now, but in healthcare too, we have been through this. I'd like the public officials who contributed to the roadmap to be there so that they can see how hard it is for others too, so that they don't get discouraged. So that the people who are making phenomenal efforts in healthcare, ecology, but also education, culture, the interior or justice to set up data-sharing infrastructures can exchange tips and stick together to move forward as one, a hundred times faster and more pleasantly than usual.

A data-sharing infrastructure structures, aggregates and connects data, and through these data, it connects actors who can then exchange, understand each other and join forces to change dysfunctional systems. In the hope of moving forward together towards a common destiny. What could be more important?

"Blockchain the State! Before others do it for you" In 2016, Clément Bertholet presented the principle of a public platform, following in the footsteps of Henri Verdier and many others. Eight years on, the concept has been put to the test in a number of sectors. It is time to delve back into theory in order to move forward.

The gap between the massive stakes associated with public data-sharing infrastructures and the amateurism with which they are still often implemented is no longer bearable. We have to do much better, and we can do much better, if we develop a shared vision. As the few civil servants who work on these issues, it is our responsibility to raise our voices and, above all, to contribute to our collective improvement.

Although I coordinated this work, it is the result of a variety of thoughts and experiences: those of the contributors explicitly mentioned on p.10, who contributed very directly, but also those of numerous internal and external stakeholders encountered in recent years. The elements that have emerged considerably clarify the principle of a public platform. Nevertheless, they remain to be challenged, completed and refined by all those concerned by the subject. **It is a brick that attempts to aggregate and ensure consistency, in the hope that we can capitalize on the various lessons learned to date.**

We wanted this work to be field-based, collective and ambitious. It is embodied and illustrated throughout its pages and in a series of podcasts by the 7 varied examples of infrastructure presented below. We begin by describing the current situation and the raison d'être for the work carried out ("why?"): similar to a collective catharsis, this part is essential to get off to a good start. We then got to work to develop v0 guidelines, which constitute what we believe to be the best practices for effectively supporting a data-sharing infrastructure ("what?"). Finally, we put forward recommendations to reach v1 guidelines and, above all, to implement them ("how?").

There is a broad consensus on one point: beyond the method, at the end of the day, it's all about people. It comes down to public servants, at both national and local levels, and to committed external actors who work in service of the common good. These are people capable of cutting through bureaucracy, challenging the status quo, and imagining new frameworks better suited to the public interest. People who "betray" in the sense of Aurélien Barrau in *Hypothesis K*, referring to scientists who question the role of science and the scientific process. People who betray "*not the given words, and even less honesty. It's about betraying inherited practices and implicit followings. Betraying the origin. Betraying the expected. Betraying inertia. Displeasing out of righteousness, disappointing out of integrity. Because not betraying, in the face of deviation, is more of a betraying. Betraying out of love, [...] in genuine infidelity. To take the time to confront contradictory injunctions. To welcome the possibility of a meta-fidelity to life. To the future, to the improbable, to beauty, to hope*". The present work is also an opportunity to thank them.

Laura Létourneau

2 year anniversary of *Mon espace santé*, February 2024

Digital Health team Seminar, June 2022

Launch Party for the publication of the roadmap "Digital and Data for Ecological Planning," December 2023

Testimonials

The *Académie des technologies* points out that providing French and European economic stakeholders, as well as administrations and citizens, with the data-sharing infrastructures needed for the virtuous circulation of information must be a priority for European states and Europe as a whole.

A virtuous circulation of digital data is defined as the circulation/sharing of data that benefits all stakeholders in an exchange, which can be triggered at their convenience, and which must be certifiable. This implies that data circulation must be independent of the technical archiving solutions offered by any given supplier. Furthermore, it must not compromise data integrity, privacy protection, individual liberties or property rights. In other words, it must reflect the fundamental values of our society.

Thus clarified, the virtuous circulation of data becomes a key element in increasing business competitiveness. It makes it easier to create new, better-targeted products and services, or to improve existing ones. Indeed, data circulation enables companies to supplement their own data with other data negotiated with suppliers, partners or customers.

Public sector organizations are often characterized by national and/or regional departments organized in watertight silos in terms of the data produced within their scope of responsibility. The circulation of digital data is therefore essential to help meet the increasingly complex needs of users (citizens or businesses). It enables the on-demand aggregation of heterogeneous and scattered data in order to meet a specific need, while guaranteeing speed of response, as well as the individualization of responses and limitation of implementation costs. This way, data circulation becomes a major tool for the rapid and appropriate deployment of public policies.

Data circulation is also an important element in leveraging advanced AI and digital twin technologies. It enables AI to extend its areas of intervention, while increasing the reliability and relevance of predictions by cross-referencing data from different sources. It also facilitates the merging of data and knowledge from various sources to develop high value-added digital twins.

By analogy with other infrastructures and at the risk of oversimplifying, it is possible to say that the virtuous circulation of data is, to digital infrastructures, what the switch was to telecommunications infrastructures, what signaling devices are to the rail network and roundabouts are to the road network. In other words, public intervention to ensure the construction of data-sharing infrastructures and the associated regulation, to enable widespread use of data circulation, is just as justified as the application of public policies in other areas of the country's infrastructure, such as roads, railroads, electricity distribution, telecommunications, etc.

Finally, a data circulation system should facilitate the exchange and sharing of data regardless of its nature where and how it is stored. Given its importance in the value-creation scheme of the digital society, government control of this type of infrastructure is a guarantee of sovereignty and confidence in the country's digital economy.

With this in mind, the Académie des technologies welcomes the work initiated by this report and encourages public and private stakeholders to take up the subject.

Patrick Pélata
President of the *Académie des technologies*

In early 2010, DATAR signed its study report on “Deploying very high-speed broadband networks across France”. By 2011, the public authorities were tackling this issue, and 3 years later, by mobilizing the necessary budgets and teams, the State launched the *France Très Haut Débit plan* (high-speed France plan), which is almost complete today. Reading through this remarkable report on public data-sharing infrastructures, I would argue that we need to adopt a similar approach to ensure the successful digital transition of our country. The public authorities must address this issue with the ambition of a France Public Data Sharing Infrastructures plan.

Patrick Chaize
Senator of l’Ain,
President of the Digital Group of the Senate
President of the AVICCA

Companies need open and reliable data to adjust and perfect their strategies. Furthermore, databases such as *Empreinte* (Footprint) play a key role in the development of environmental displays and other public policies. To ensure their development, it is imperative that the public service makes an official commitment to this issue and releases the necessary funding. We are committed to working closely together to build these infrastructures in partnership.

Impact France

In 2021, the MEDEF, convinced of the imperative of treating data as a source of value, published a guide on the “data valorization strategy”. AI consumes data on a massive scale, therefore, establishing operational data sharing methods is a necessity. However, it turns out to be complex and only a few sectors have tried it out. Without public impetus, standardized frameworks and various financial and legal incentives, we run the risk of not succeeding; the creation of public data-sharing infrastructures is a justified imperative and we will support public/private cooperation to this end.

Mouvement des entreprises de France

At a time when digital technology is at the heart of the major challenges we are facing, public data-sharing infrastructures are for implementing practical cases of general interest in co-construction with private stakeholders. We welcome the value of the elements produced and urge public authorities to seize this key issue with ambition, notably by providing sufficient funding for the necessary infrastructures. The public authorities can count on our associations to deploy them alongside them.

Cigref, France Digitale, G9+, Hub France IA, Numeum, Planet Tech’Care

The data intermediation activity defined at the European level and regulated by ARCEP in France must be able to rely on public data-sharing infrastructures to implement the sectoral strategies of industries. This seamless coordination will allow public and private stakeholders to benefit, with complete confidence, from long-term, sovereign, and secure infrastructures, which are essential for the collective deployment of practical cases that serve both businesses and citizens. This report, based on the experience of pioneering initiatives, will undoubtedly be the reference work to help all public and private stakeholders succeed in the deployment of such infrastructures, which are essential to collectively address issues of general interest.

Association for Data Intermediation

As explained in this report, public data-sharing infrastructures are essential to inform public policies and to enable democratic debate in the context of ecological adaptation. The Digital Twin and the IGN's GeoPlatform are two infrastructures that particularly illustrate this. Breaking down the silos of data stemming from both territorial and sectoral policies is key and requires an interministerial vision and strong political support to succeed.

Sébastien Soriano
President of National Geographic Institute

Spatial data has become a strategic issue for all economic stakeholders, public institutions, the scientific community, and defense. Mastering spatial data, as well as public data-sharing and computing infrastructures, is key to ensuring their robustness, thereby strengthening the competitiveness of the space sector and guaranteeing the sovereignty of France and Europe in strategic areas. The CNES considers this report and the associated resources as an essential building block for an ambitious data policy by the French State.

Philippe Baptiste
President and CEO of CNES

This report is very important; it offers a state doctrine on the issues of public data infrastructures of general interest. The Caisse des Dépôts places great importance on these data-sharing infrastructures, supporting public and private projects in this strategic area to ensure digital sovereignty. The Group is developing an ambitious proposal to support dataspaces, promoting their structuring and success in partnership with Gaia-X and the Institut Mines Télécom. We are fully committed to this ambition, with initiatives such as the TechSprint, which encourages the co-construction of use cases, data interoperability, while ensuring a secure framework for technological development and ecological transition.

Olivier Sichel
Deputy Managing Director of Caisse des Dépôts
et Director of la Banque des Territoires

In the early 1970s, France was lagging behind in the field of telecommunications. The government’s launch of the Transpac network in 1974 enabled us to become the world leader in data transmission until 1991. Fifty years later, France must and can become the global leader in data exchanges, provided it launches public infrastructures supported by a clear interministerial vision, political backing, and the necessary funding. The CEA is already working on sovereign technological solutions in cooperation with the State and industrial sectors and is ready to enhance its contribution in line with the recommendations of this report.

Alexandre Bounouh
Director of the Institute CEA-List

SANTÉ

I have often called the DMP – the so-called 'Shared' Medical File, the 'Lost' Medical File. The success of its successor, *Mon espace santé*, and more broadly the development of digital health, is due to the implementation of a breakthrough method that enabled all stakeholders, particularly healthcare users, to actively participate in its development. A team has managed to put humans at the heart of the strategy, define an ethical framework of values, and listen to citizens in order to create an atmosphere of trust, a desire to move forward, and ultimately, a more vibrant democracy. Let's hope that digital health serves as an example to other public data-sharing infrastructures which are essential to solving the societal issues we face. In healthcare, the health-related nonprofit sector demonstrates its commitment to advancing this humanist engagement on a daily basis.

Gérard Raymond
President of France Assos Santé

Thanks to a close-knit and highly dynamic team, a radical paradigm shift has taken place in digital health since 2019. A respectful and ethical co-construction has made it possible to implement a breakthrough strategy between all digital stakeholders, healthcare professionals, and patients. We were able to constantly exchange ideas, question and understand, decide, and help all doctors to integrate the necessary digital tools into their daily practice to improve patient care. The COVID crisis, and particularly SI-DEP, have shown us that we were right to commit to the construction of public data-sharing infrastructures that ensure quality, security, and respect. Mon espace Santé then became an obvious solution for everyone. It is clear that the initial challenge has not only been met but is on the way to being successful. The CNOM will continue to support decision-makers based on the same principles and with the same high standards.

Stéphane Oustric
Managing Deputy appointed at Health and Digital Data of the *Conseil national de l'Ordre des médecins* (French General Medical Council)

The digital healthcare roadmap called for a shift toward a shared ambition around common objectives. It set a prerequisite, namely the overhaul of data-sharing infrastructures such as Mon espace Santé. Despite the complexity of the subject, the methodology deployed and presented in this report effectively established the purpose of this infrastructure and the projection of expected uses within a co-constructed trajectory. The iterative communication of progress and points of vigilance made it possible to achieve the long-awaited digital transformation.

Bertrand Sommier
General Secretary of the Private Hospital Federation

Faced with the major challenge of responding to a national request to transmit our COVID data during the health crisis, it was necessary to implement both resources and an innovative method in a short period of time. This was achieved through genuine co-construction between healthcare professionals like us and the public authorities. It also required building trust between the different stakeholders and believing that the project could be completed in just a few months. All of this was done with total enthusiasm and determination, demonstrating that it is also achievable in many other sectors.

François Blanchecotte
National President of the Union of biologists (SDBio)

In 2004, there was a public desire to computerize patient files and make them accessible to all healthcare professionals. By 2019, after years of failure, a new team with efficient organizational methods and, most importantly, an attentive ear for the needs of the professionals involved launched *Mon espace Santé*. The power of the state strongly 'encouraged' the relevant industrial stakeholders. Strong cooperation with radiologists created a genuine dynamic of creativity and professional buy-in to the project, making it a success.

Jean-Philippe Masson
President of the National Federation of Radiological Doctors

AGRICULTURE

Agriculture is a strategic sector in France. Digital technology and data flow are essential for advancing agricultural techniques, generating innovations, but also for measuring, tracking, and enhancing our practices. This will make it possible to address issues of food sovereignty and biomass production for decarbonation, while improving our environmental footprint. The State must provide secure data exchange tools, such as those developed by Agdatahub. The Chambers of Agriculture contribute to the development of digital technology while remaining committed to preserving the interests of farmers through these public data-sharing infrastructures.

Sébastien Windsor
President of the Agricultural Agencies of France

Since 2016, La Ferme Digitale has been bringing together independent stakeholders concerned with collection, exchange, and processing of agricultural data. These data must be accessible and interoperable, with the consent of farmers. A unified parcel-based database and centralized authentication are fundamental elements that will facilitate exchanges and create value in a pragmatic way for all. A public data-sharing infrastructure must aim to achieve a flexible and frugal framework, with the collaboration of all stakeholders, and must help to accelerate this simplification.

Jérôme Leroy
PPresident of the Digital Farm

CONSOMMATION

In the future, consumption and, therefore, industrial production will have to comply with increasingly stringent social and environmental criteria. Environmental labeling represents a unique opportunity to promote virtuous productions, including French and European ones. However, strong pressure from the largely globalized industry tends to water down the differences. Only the states can guarantee and organize the objectivity, sovereignty, and transparency of data and methods for a simple environmental and social labeling, SME-compatible, and differentiating for products. Our country is a pioneer in this area thanks to Ecobalyse and the *Empreinte* database and has, thus, a real role to play in showing the way for other European textile-producing countries. Our public sector must assume this responsibility with the necessary human and financial resources. We are ready to co-construct these infrastructures and contribute to the governance of these key mechanisms for our economic sovereignty.

Olivier Ducatillon et Eric Boël
President and Chairman of the Sustainable Development Commission of the Union of Textile Industries

Companies need public data-sharing infrastructures—such as the *Empreinte* database—to assess and develop their practices. These transparent, robust, and open-access databases also make it possible to build environmental labeling and other public policies in the sector. The public sector must officially take on this key issue with the necessary funding. We are ready to co-construct these infrastructures with it.

Julia Faure
President of En Mode Climat

Bringing together luxury and creative houses, the *Fédération de la Haute Couture et de la Mode* wishes to support the launch of public data-sharing infrastructure projects. Drawing on its experience and expertise as well as that of its members, the Fédération is ready to contribute as needed. The textile and fashion sector must be able to rely on a harmonized, accessible, transparent, legitimate, regularly updated, and sufficiently granular life cycle inventory database to calculate and manage the environmental performance of its products.

Pascal Morand
Executive President of the Federation of *Haute Couture* and Fashion

MOBILITÉS

The logistics sector suffers from a fragmentation of its stakeholders, making the exchange of operational information that allows for greater efficiency and responsiveness in supply chains complex. Hence, the proliferation of interfaces between information systems and aggregation platforms, with the associated additional costs and risks of dependence. Carriers and service providers are calling on public authorities to fund and create, at the French level and extendable to the European level, a neutral and protected data space allowing for open yet organized data sharing without redundancy. They are ready to collaborate on this creation to use this digital infrastructure to develop use cases that are the precursors to the deployment of these future sharing tools.

Denis Choumert
President of the Association of Transport and Freight Users and Vice President of France Logistique

France is renowned for the quality of its transport infrastructure. For Mobility Authorities, transport operators, and car manufacturers, the exchange of personal or sensitive data for safety is now at the core of their activities. To fulfill their mission and ensure a high level of service, they require high-level digital infrastructures. The State is expected to extend the 21st-century transportation system through public digital infrastructures.

Antoine Dupont
Managing Director of *La Fabrique des Mobilités*

LOGEMENT

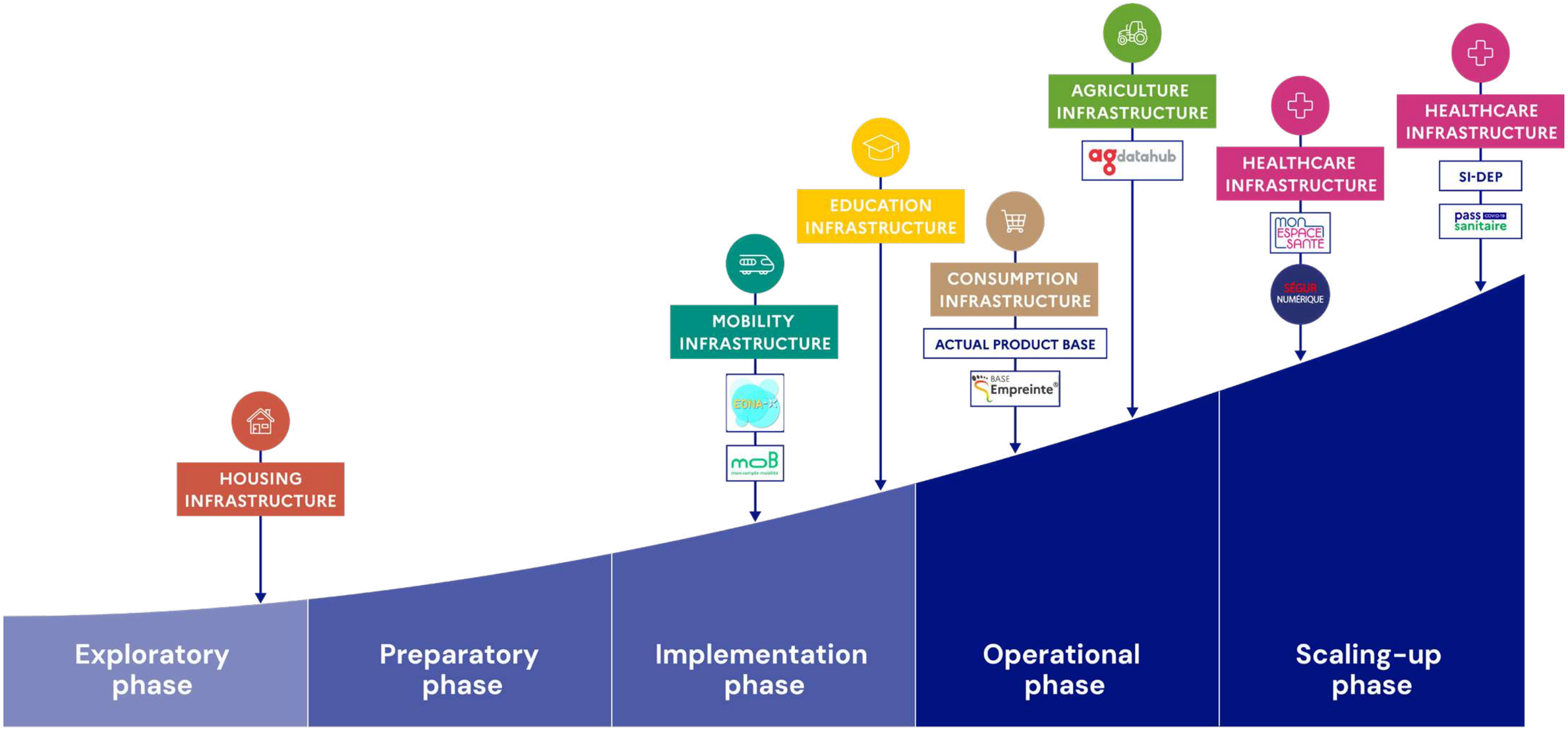
Making the digital data necessary for the transition interoperable and sustainable is essential for integrating housing into its territory, for citizens, and for ecosystem stakeholders. Equally important is understanding the need for mutual investment by public and private stakeholders to address the numerous identifiable use cases.

Christophe Castaing
BuildingSmart France,
Chief of DIGITAL TER X 2050

In a note published in 2023, the FFB emphasizes the importance for the sector to organize itself so that others do not capture the value of the sector's data. The federation closely follows the discussions on dataspaces. The challenge is to ensure the secure and consensual sharing of data while respecting each organization. If there is a public initiative on this topic, it will be essential to involve professionals in order to define the appropriate economic and operational model.

Olivier Salleron
President of the French Construction Federation

THE 7 EXAMPLES OF INFRASTRUCTURE SELECTED



The feedback from these 7 examples of infrastructures was made possible thanks to the extremely invaluable contributions of the people mentioned below. In addition to this report, they share their exciting adventures in the podcast 'Ambition Publique', which we invite you to listen to by clicking this link. A huge thank you to them for their contribution to a doctrine that goes beyond their own design, for their talent, courage, and sense of the public interest <3

Olivier Clatz, Hela Ghariani, Raphaël Beaufret and Etienne Amy of the Ministry of Health and the AP-HP (Assistance Publique–Hôpitaux de Paris)

Sébastien Picardat and Etienne Achille dof Agdatahub and of the Ministry of Agriculture

Pascal Dagras of the Ministry of Ecology

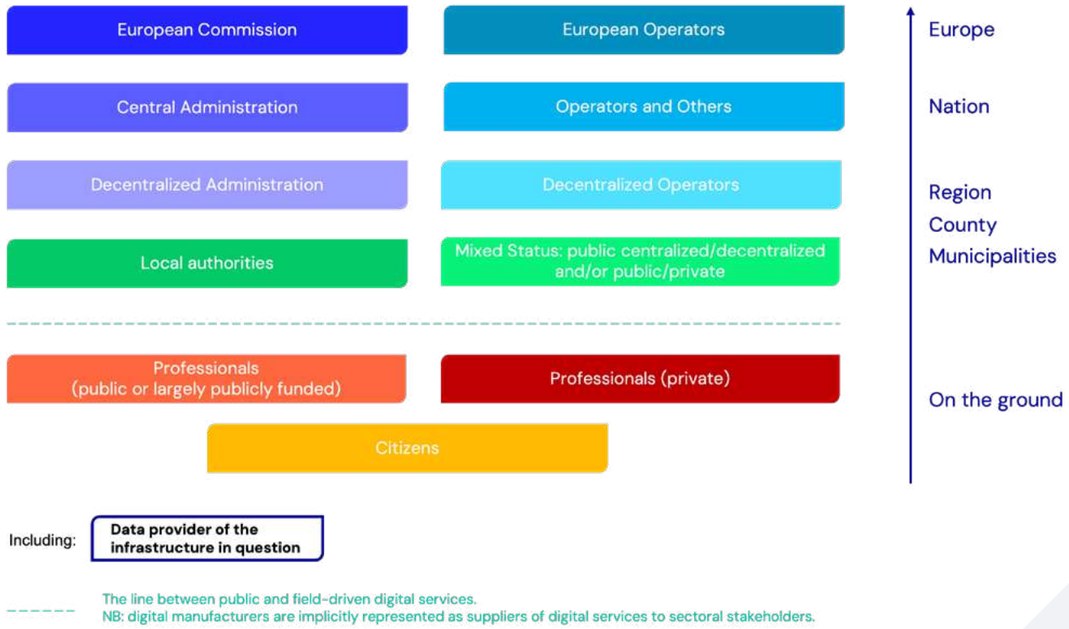
Stéphane Trainel and Audran le Baron of the Ministry of Education

Ghislain Delabie, Dominique Epardeau, Jonathan Huffstutler and Patrick Gendre of *La Fabrique des Mobilités*, EONA-X, and the Ministry of Ecology

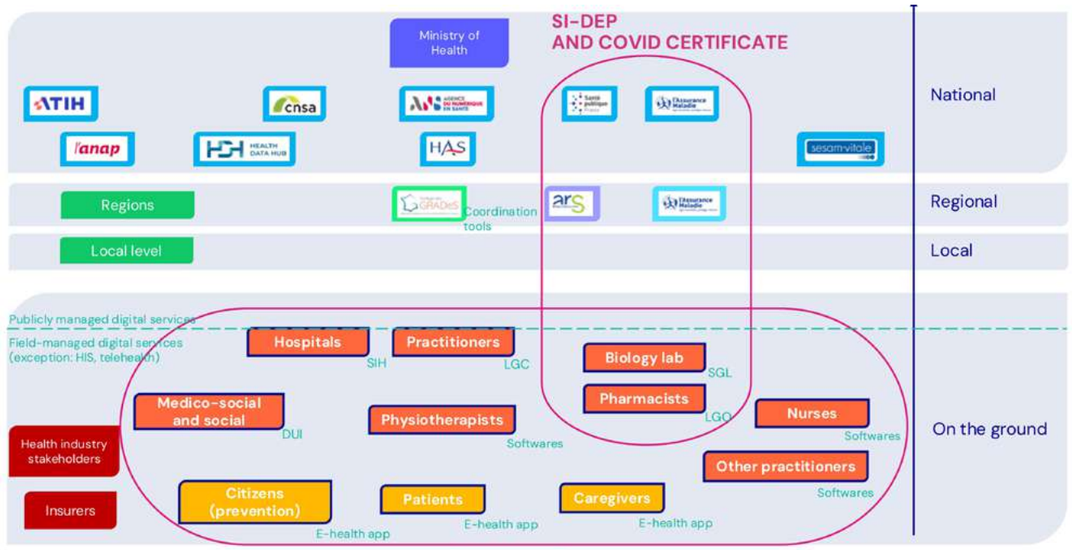
Philippe Vaillant and Guillaume Levieux of the National Housing Agency and the Ministry of Ecology

LEGEND OF THE ECOSYSTEM STAKEHOLDERS

For each infrastructure example are first introduced the public and private sector stakeholders who revolved around the infrastructure. The legend for the presentation of these stakeholders, as well as the digital services they use, is provided below.
A map or "urbanization diagram" of the sector's digital components is then presented in the form of a building, according to the logic of a public platform. The infrastructure in question is highlighted in red and briefly described. The use cases relating to the infrastructure are then discussed in general terms and then with specific concrete examples.



STAKEHOLDERS



MON ESPACE SANTÉ ET LE SÉGUR NUMÉRIQUE

CARTOGRAPHY

MON ESPACE SANTÉ AND SÉGUR DIGITAL

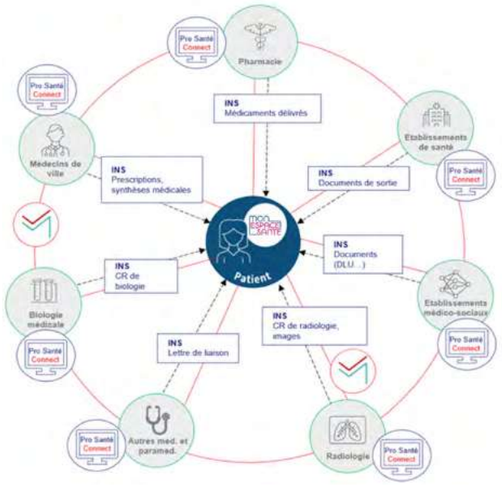
Mon espace santé is the French online healthcare record. It allows each person to store and share their health documents and data with their healthcare team in complete confidentiality. Launched in 2022, it is based on the modernized infrastructure of its predecessor, the *Dossier médical partagé* (DMP). Its connection to all healthcare and medico-social institutions and professionals is supported by the Ségur Digital program.

SI-DEP AND THE COVID CERTIFICATE

SI-DEP collects biological data on the COVID virus from hundreds of laboratory management systems, covering nearly 5,000 sites. It notably facilitated the issuance of the Covid certificate. Launched in 2020 during the first wave of COVID, it took over from a similar system for other infectious diseases, particularly dengue fever, which did not work. SI-DEP is being extended to other pathologies under its new version, "Laboé-SI".

USE CASES

MON ESPACE SANTÉ AND SÉGUR DIGITAL



IN GENERAL

- **Patients** must retrieve their own personal data in order to be actors in their own healthcare: understanding and taking action, seeking a second opinion, etc.
- **All healthcare and medico-social professionals involved** in a person's care team (attending physician, nurse, physiotherapist, pharmacist, hospital, nursing home, emergency services, etc.) must exchange data concerning the patient to provide them with proper care.
- **E-health industry stakeholders** need access to certain patient data in order to offer, both the patient and professionals, innovative digital services (sending reminders/alerts, personalized prevention services, diagnostic assistance, training AI, etc.).

FOR EXAMPLE :

- Patients automatically retrieve their hospitalization report to find out how the surgery went and share the document to their physiotherapist so they can adapt the rehabilitation program accordingly.
- Patients who have lost their prescription and need to go back to the pharmacy to get their prescription can find it in their health space and send it automatically, or via secure messaging, to the pharmacist before or when they go.
- Patients who have lost their proof of vaccination (Covid, yellow fever, etc.) required for international travel. They can find it in *Mon espace santé*, where it has been automatically inserted and securely stored.
- An app developed by the private sector (e.g., "understanding my lab results") can offer a service it could not otherwise have provided, and this without requiring the patient to upload their results but simply by asking for permission to access their structured lab reports in *Mon espace santé*

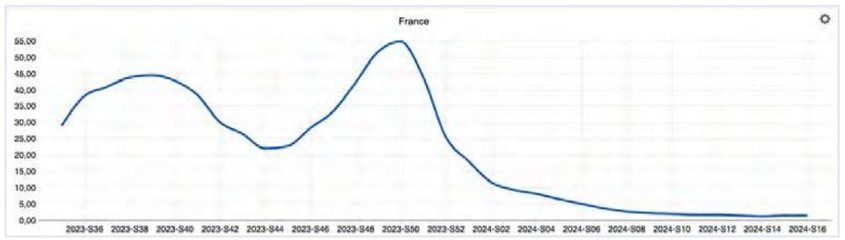
SI-DEP AND THE COVID CERTIFICATE

IN GENERAL :

- **Patients** must be able to access, and regenerate if lost, their test certificate (Covid certificate) produced by the SI-DEP infrastructure for the test portion and by *Covid Vaccin* for the vaccines portion. This allows them to print it or store it in an app (e.g., TousAntiCovid) in order to enter certain locations by presenting the certificate to those in charge of verification.
- **Stakeholders involved in epidemiological monitoring** (e.g., SPF, DREES, CNAM, ARS) need consolidated data to provide reliable figures (incidence rates, testing rates, etc.) for transparency (media, open data publication, etc.) and to regularly adapt policies (e.g., reinforced measures in a region, etc.)
- **Healthcare authorities** (e.g., ARS, CNAM, SPF) needed real-time contact information for people who tested positive, from nearly 5,000 testing sites in France, to carry out contact tracing (phone calls to encourage isolation and notify contacts).

FOR EXAMPLE:

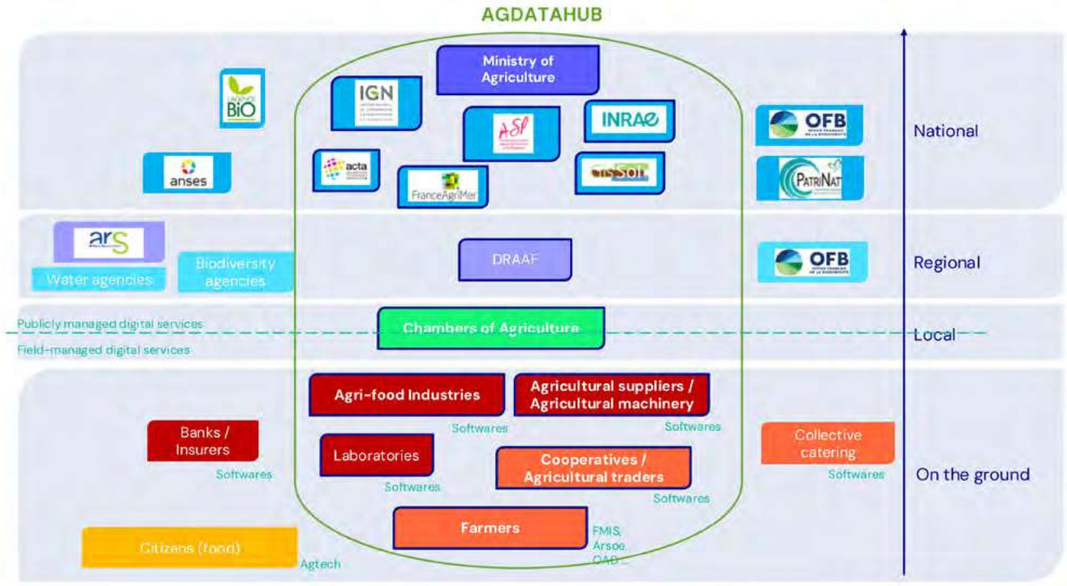
- The Ministry of Health can provide reliable incidence figures on television starting May 10, 2020, during daily press conferences.
- Health Insurance can call new COVID-19 cases for contact tracing, on which the rationale behind the first deconfinement in May 2020 was based.



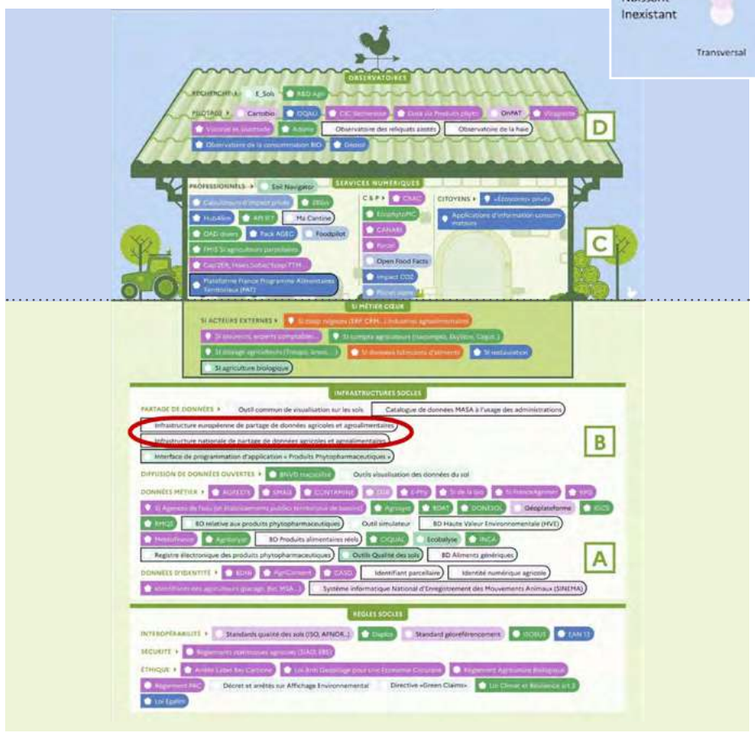
Covid-19 incidence rate in France 2023 Q36 - 2024 Q16 (source: SI-DEP / SPF)

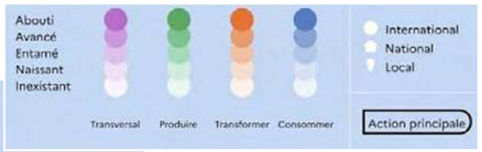
AGRICULTURE

STAKEHOLDERS



CARTOGRAPHY



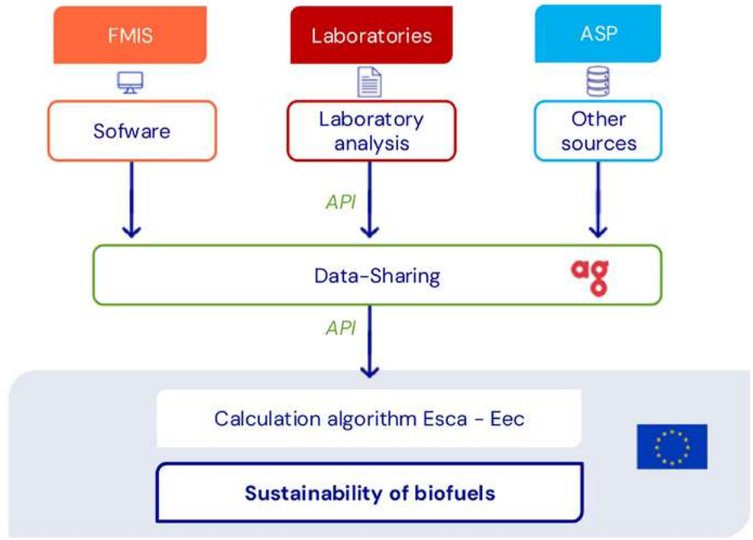


AGDATAHUB

Agdatahub is a secure data-sharing infrastructure operational since 2022, created from two projects supported by CASDAR. It aims to simplify the daily operations of farmers and their data exchanges with their public and private partners in the agricultural and agri-food sectors. Agdatahub also coordinates the consortium for the deployment of the European agricultural and food data space.

USE CASES

AGDATAHUB



Payment of a low-carbon bonus €€

Farmers

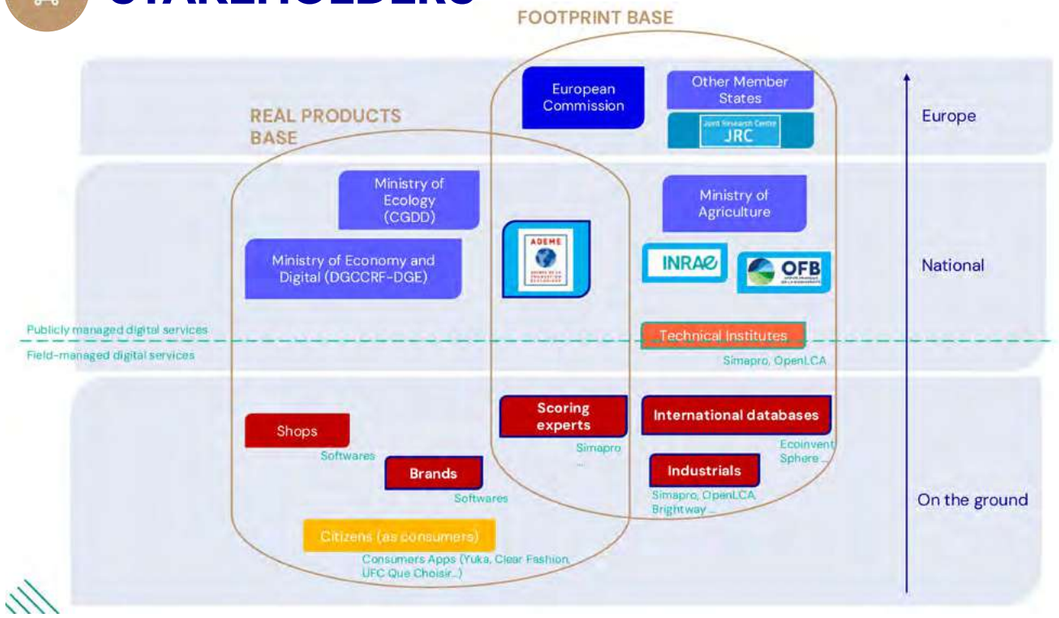
IN GENERAL:

- **Farmers** must share data such as their agricultural practices on their plots or farms, environmental data (water consumption, weather, etc.), and economic data (yield, prices, etc.) to benefit from personalized advice and/or better remuneration for their productions
- **Economic stakeholders (cooperatives, traders, agri-food industries, etc.)** must access farmers' data to offer them appropriate decision-making tools and develop approaches aiming to segment the sectors (low-carbon, health quality, organic farming, certified production).
- **Agricultural advisory stakeholders (agricultural chambers, livestock advisors, startups, distributors, etc.)** must access the farmers' data such as parcel data (TELEPAC, vineyard register) or livestock data (EDE), their technical itinerary data, IoT data (weather stations, etc.), or agricultural machinery data (tractors, combine harvesters, milking robots, etc.), or climatic data, in order do to provide personalized services to farmers.
- **The State and local authorities** must collect agricultural data to ensure that farms comply with current regulations and to support the management and deployment of European (CAP), national, and local public policies.

FOR EXAMPLE:

- Farmers producing cereal crops share their technical itinerary data, parcel data from TELEPAC, and energy consumption data with collecting organizations (cooperatives and trading) and other industry stakeholders in the supply chain, to certify the sustainability of biofuels and receive a low-carbon premium.
- Industry stakeholders in the biofuel sector (crushers, oil companies, methanizers, etc.) access data calculated by storage organizations to justify the integration of biofuels as a substitute for greenhouse gas-emitting fossil fuels.
- A winemaker shares data on their practices, parcel data, and analysis results to provide regulatory nutritional information on their wine bottles in a dematerialized form via a QR code.
- A farmer consents to automatically share data from their decision-support tools on the use of plant protection products to contribute to the State's ongoing statistical experiment.

STAKEHOLDERS



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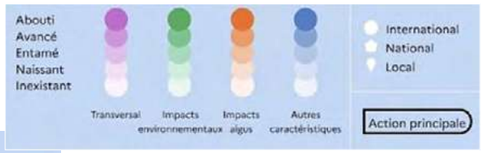
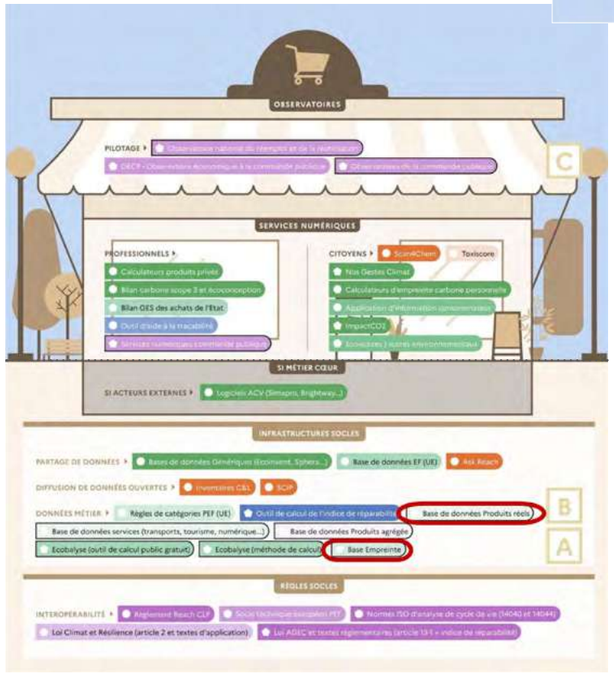




PRODUITS RÉELS DATABASE

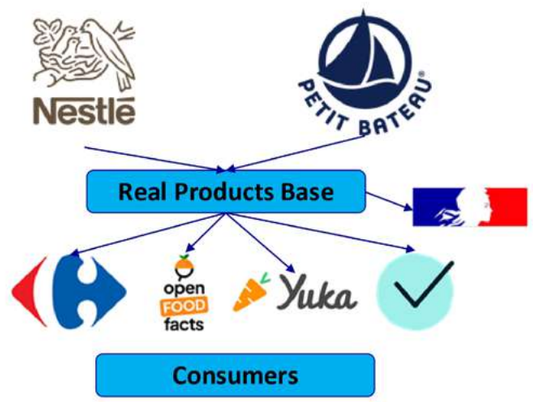
The *Produits Réels* database (Actual Product Database) aggregates the environmental impacts modeled by brands and various experts for all products sold in France (and subsequently in Europe): clothing, food products, furniture, cosmetics, etc. It is scheduled to be initialized in 2024 to implement environmental labeling for textile products. Complex data-sharing issues, sometimes involving sensitive information, will need to be addressed, particularly for food products.

EMPREINTE DATABASE

The *Empreinte* database (Footprint database) compiles environmental impact data from different components necessary to evaluate a product's impact. For example, for a garment: the impact of each material, the kWh of electricity depending on the production country, transport by plane, ship, truck, etc. Its ambition should be confirmed or reassessed, aiming for convergence with European-level efforts (EF 4.0).

USE CASES

PRODUITS RÉELS DATABASE



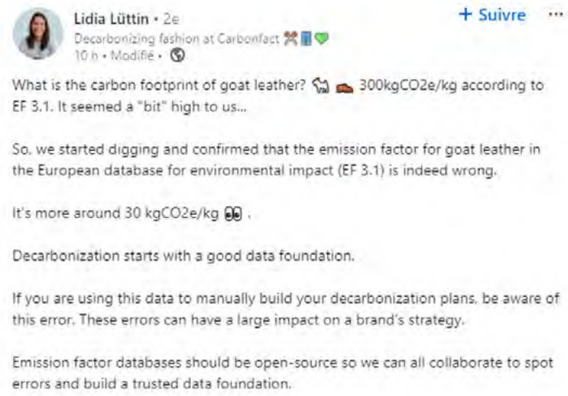
IN GENERAL:

- **Brands** that model the environmental impacts of their products want to ensure that these data will be accurately reflected by anyone communicating these impacts.
- **Retailers** need easy access to the environmental impacts modeled by brands to communicate them to consumers.
- **Consumer apps** (Yuka, Open Food Facts, Clear Fashion, etc.) also need easy access to the impacts modeled by various brands to better inform consumers.
- **Public authorities** (fraud enforcement) require effective tools to monitor the environmental impacts displayed to consumers.

FOR EXAMPLE :

- Public authorities facilitate the widespread deployment of environmental labeling by making the impact data calculated by brands accessible to everyone, including distributors, consumer apps, associations, citizens, and public authorities.

EMPREINTE DATABASE


Lidia Lüttin • 2e
Decarbonizing fashion at Carbonfact
10 h • Modifié •
+ Suivre

What is the carbon footprint of goat leather? 300kgCO2e/kg according to EF 3.1. It seemed a "bit" high to us...

So, we started digging and confirmed that the emission factor for goat leather in the European database for environmental impact (EF 3.1) is indeed wrong.

It's more around 30 kgCO2e/kg .

Decarbonization starts with a good data foundation.

If you are using this data to manually build your decarbonization plans, be aware of this error. These errors can have a large impact on a brand's strategy.

Emission factor databases should be open-source so we can all collaborate to spot errors and build a trusted data foundation.

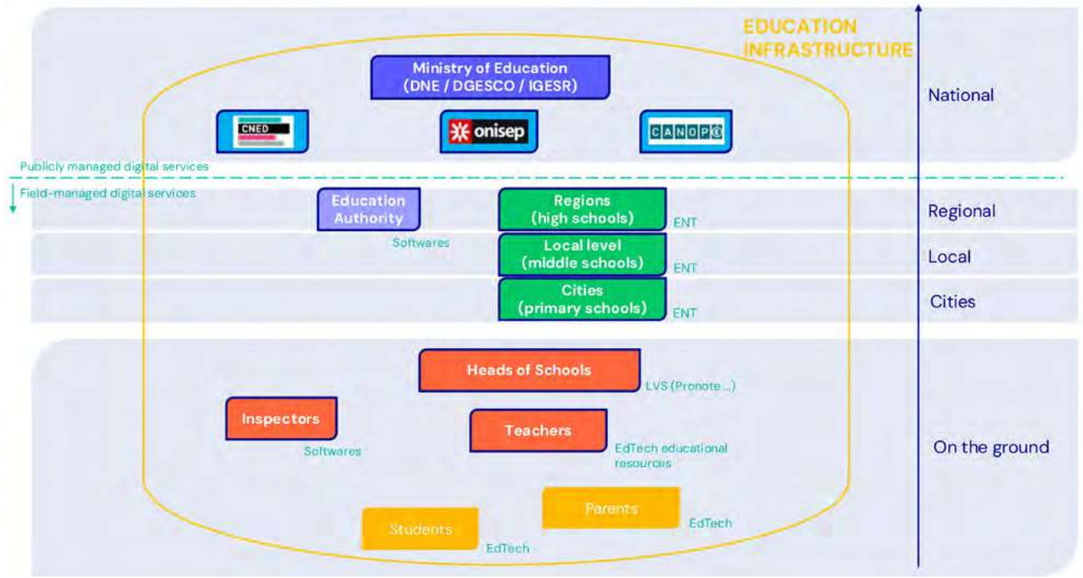
IN GENERAL:

- **Scoring experts** (e.g., Carbonfact) need reliable, verifiable shared data to quantify product impacts.
- **Brand** need to rely on stable signals for their eco-design choices, which involves having stable, shared data that scoring experts use.
- Industries need to showcase their innovations by declaring the impacts of their new productions (agricultural products, industrial processes, etc.) in a reference database that ensures verification of modeled impacts and their dissemination to all experts and brands that may use them.
- **Academic and institutional experts** (e.g., OFB, INRAE, JRC) seek to leverage their expertise by ensuring its reuse by the industry.

FOR EXAMPLE :

- Public authorities establish a reference methodology for evaluating the environmental impacts of textile products, relying on shared, transparent, and high-quality data.

STAKEHOLDERS



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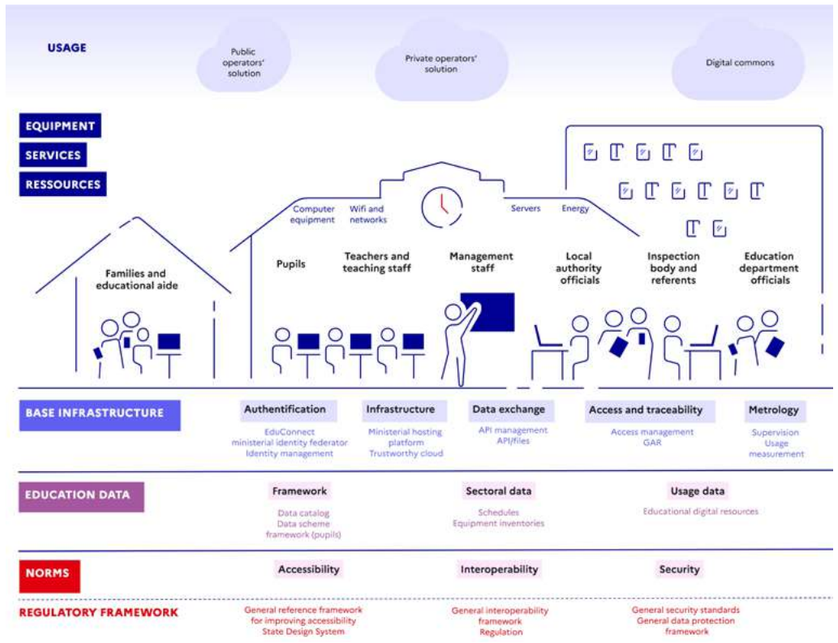
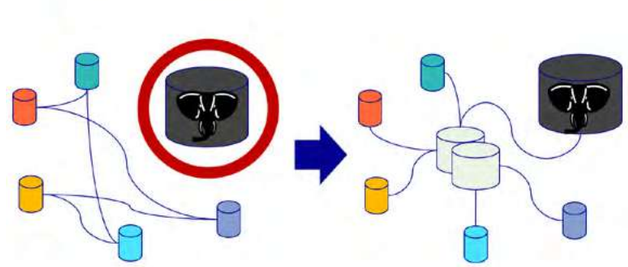


EDUCATION INFRASTRUCTURE

A shared, secure infrastructure for data sharing between education stakeholders to improve student learning and school management. The infrastructure and associated governance are currently being developed.

USE CASES

EDUCATION INFRASTRUCTURE



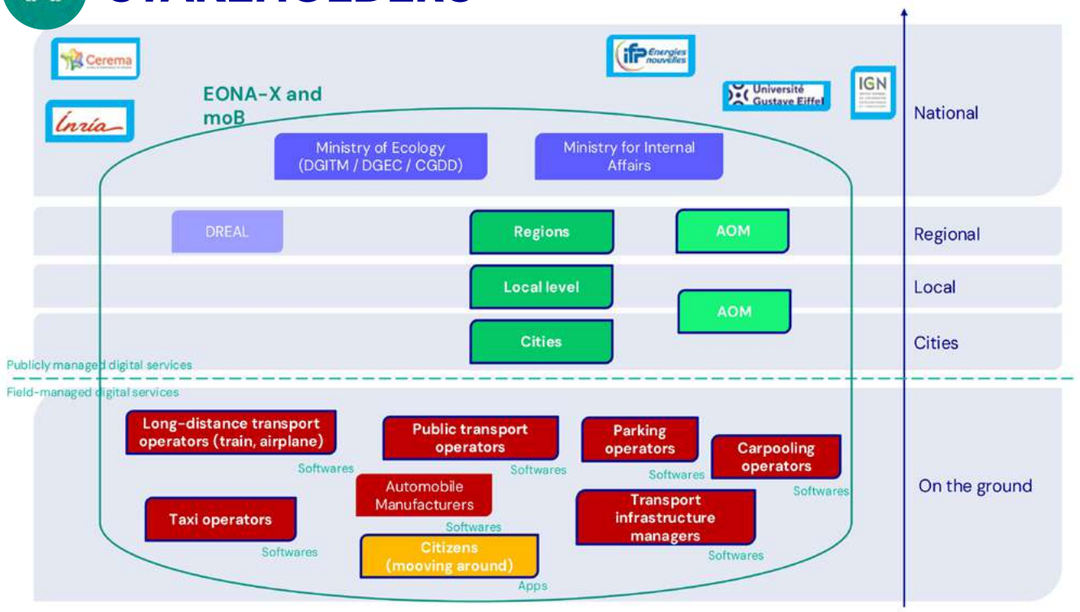
IN GENERAL:

- **Each education stakeholder (students, teachers, inspectors, local authority representatives, academic managers, or central administration)** needs access to relevant data to fully perform their roles, whether it involves learning, teaching, managing school transport, the cafeteria, facility maintenance, or teacher substitution.
- **Education professionals (teachers, school management, HR managers in academia, etc.)** must be able to exchange data within an institution to facilitate educational processes.

FOR EXAMPLE :

- A student, parent, or teacher can view the timetable information on a tablet or smartphone via a dedicated application, updated in real-time by the teaching staff.
- A teaching team utilizes learning analytics to identify concepts not mastered by students and adjusts the curriculum and exercises accordingly.
- A local authority accesses data on room usage to optimize cleaning and heating of facilities based on actual needs.
- A regional education office receives data on timetable changes to better organize short-term substitution and generate indicators for monitoring public policies such as the Pact.

STAKEHOLDERS



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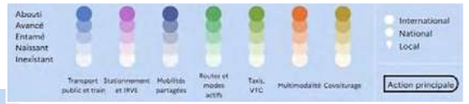
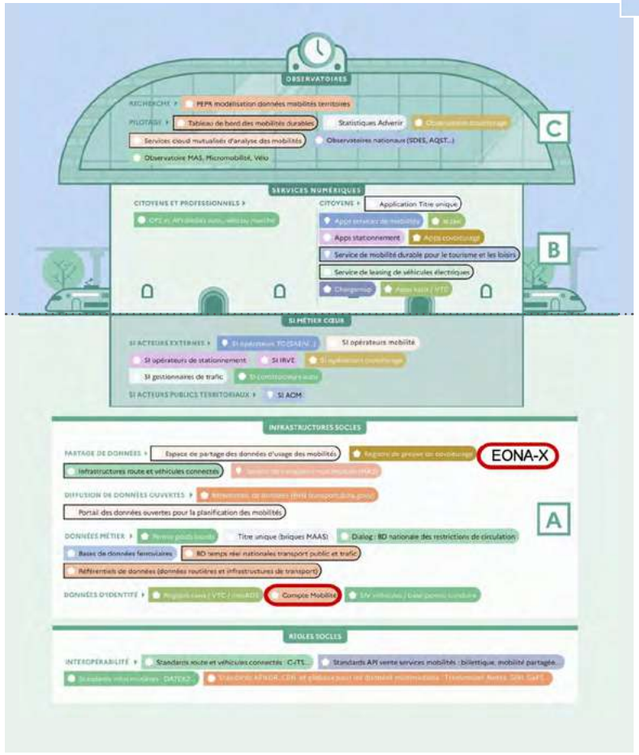




EONA-X

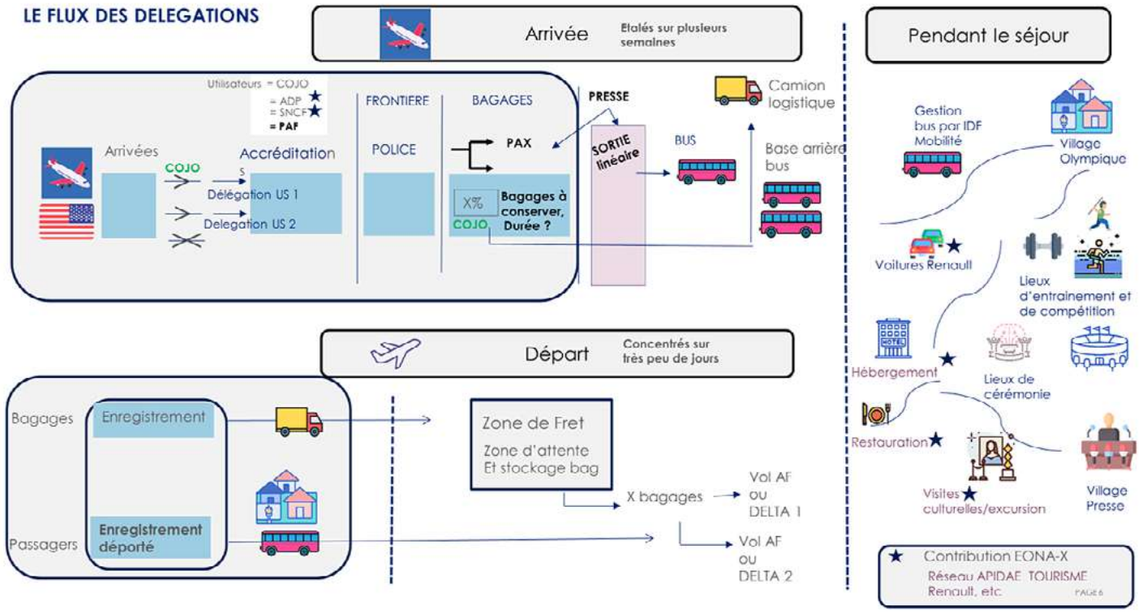
EONA-X is a decentralized and trusted data-sharing space for mobility, based on automated digital contracts according to predefined rules. This space is intended to operate with at least 200 private and public members within 5 years. The infrastructure is funded by France 2030. The first use cases will be deployed around the 2024 Olympic Games.

moB

moB is an individual identity wallet which provides access to all digital mobility services, both locally and nationally. It allows the verification of the user's identity, the use of *France Connect*, and certifies their eligibility for benefits or funding. The user controls their data, while the public entity manages the infrastructure. moB has been deployed in the Île-de-France region, Mulhouse, La Rochelle, and Nantes. There are plans to roll it out as part of the "Single Title" project.

USE CASES

EONA-X AND moB

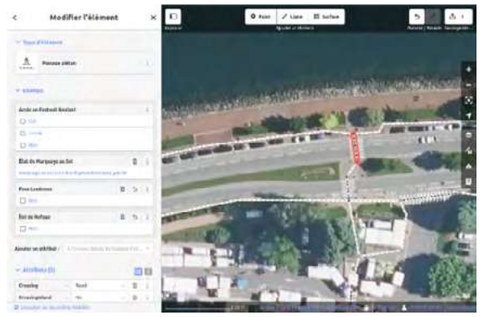


IN GENERAL, FOR USE CASES RELATED TO THE PUBLIC INTEREST:

- ACCESSIBILITY - **Mobility stakeholders (operators, station and airport managers), tourism entities, AOMs, local authorities, and the State** must assist people with reduced mobility in their travel. In order to make these modes of transport as carbon-free as possible, alternatives to private cars must be found.
- SAFETY - **Public authorities, in particular the Ministry of the Interior**, must receive information enabling them to respond effectively in the event of crises such as terrorist attacks.

FOR EXAMPLE:

- People with reduced mobility enter their accessibility requirements in the MyTravelConnect Travel File, and these are shared with all relevant parties without them having to re-enter the information, thanks to EONA-X. They receive recommendations for routes adapted to their specific needs based on road and transport accessibility data provided by local authorities and route calculations from public or private MAS apps.
- During the 2024 Olympic Games, public authorities receive necessary information (such as transportation connections, delays, etc.) to ensure the safety of delegations.



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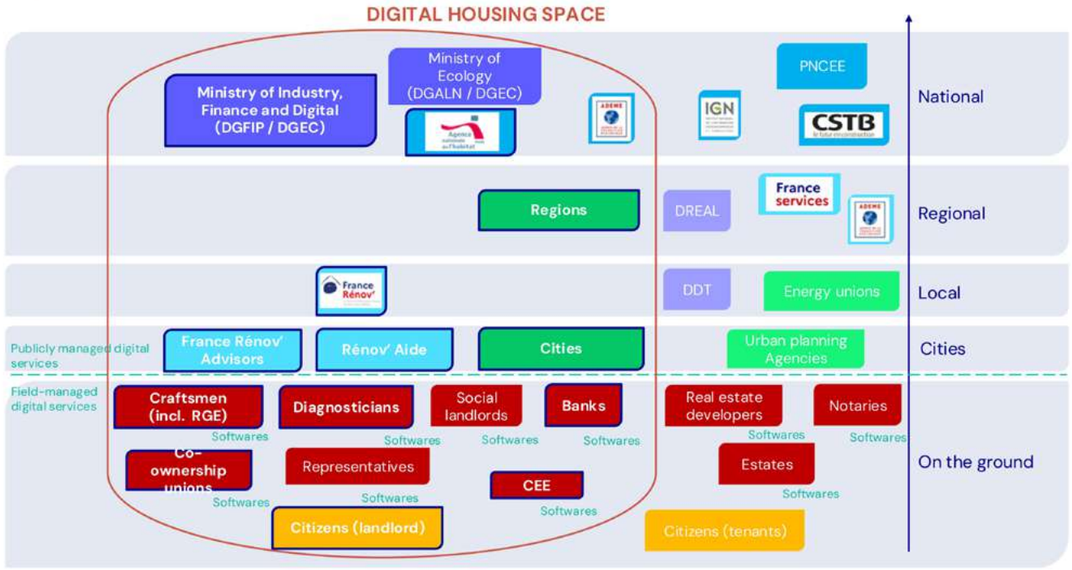

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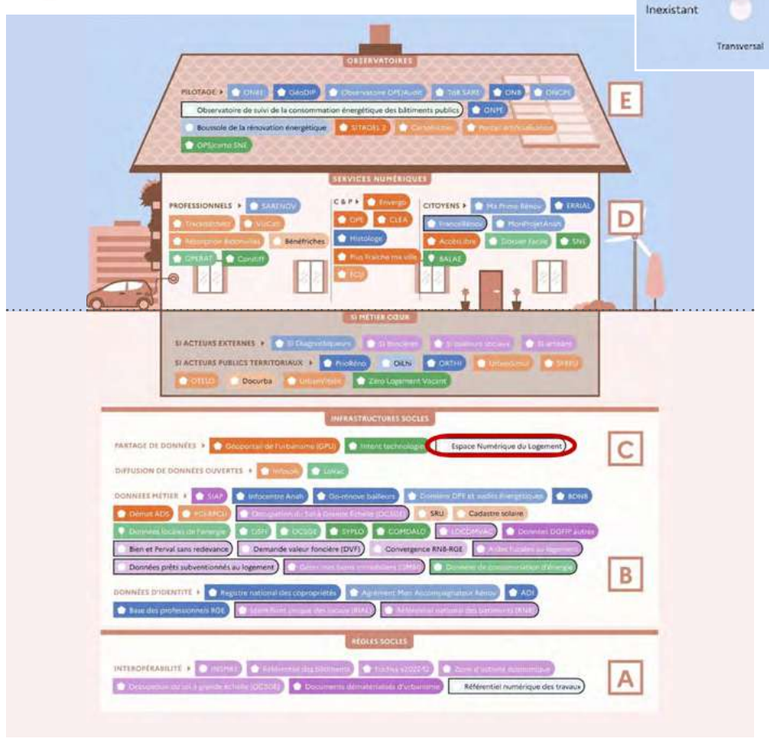
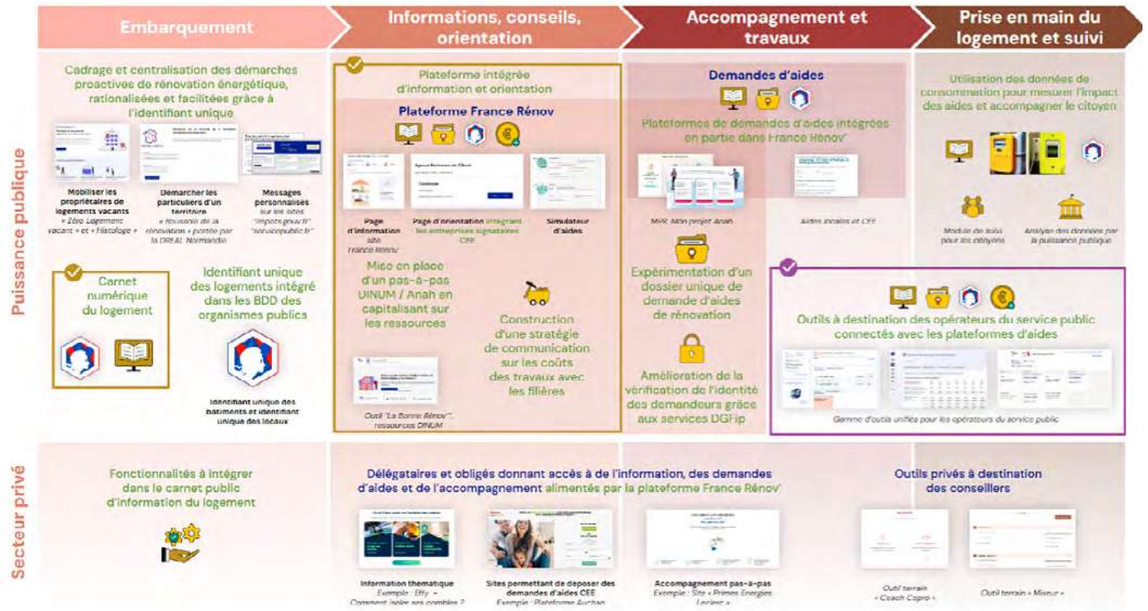


HOUSING INFRASTRUCTURE

The *espace numérique du logement* (Digital Housing Space) is a digital infrastructure designed to meet three challenges: informing citizens about their housing and its renovation potential, simplifying housing-related procedures, and strengthening the trust between citizens, renovation professionals, and the public sector. It is currently in the design phase and is benefiting from the introduction of unique building and housing identifiers, as well as the expansion of the France Rénov service.

USE CASES

HOUSING INFRASTRUCTURE



IN GENERAL:

- Citizens must collect and store information about their housing in a centralized location, which will enable them to better understand and take action regarding their housing, and to create pre-filled applications for renovation assistance. When purchasing, they should be aware of the property's condition and of any potential work that needs to be carried out.
- All professionals (craftspeople, advisors, etc.) must share information related to their services (quotes, technical analyses, etc.) and access certain data necessary for carrying out their tasks (work, support, etc.).
- The Administration must manage and evaluate public renovation policy by analyzing available data on construction work and consumption.

FOR EXAMPLE:

- A property owner is offered assistance via their digital housing space. They automatically retrieve their home's technical data sheet (DPE, past work, consumption, etc.), can consult various quotes for renovation work, and can easily complete a pre-filled application form for financial assistance.
- A property owner configures information sharing with their Rénov' advisor and the companies working on their property in order to receive the best possible advice. They specify whether they authorize the transfer of consumption data to assess the renovation's effectiveness.
- The *France Rénov'* advisor or *Rénov'* support professional communicates with a household to guide them through the next steps in their renovation project.

1

WHY?

Reorganising the mess in order to meet the challenges of the century

It is essential to approach this issue from the right angle by gradually zooming in on the purpose of this work. First, is digital technology really necessary to meet the challenges of the century? If so, in the digital realm, why focus on data-sharing infrastructure for public interest purposes? Finally, regarding the topic of infrastructures, what is the added value of this work?

Why go digital?

Why Not?

Two types of hesitations typically emerge in debates regarding the role of digital technology in addressing public interest issues:

“It’s Not the Issue”

Stakeholders in various fields– the Ministry of Health, Education, Ecology, or Industry, a senator, a professional union, or an NGO– are focused on advocating for flagship measures directly related to their sectors: promoting preventive healthcare, improving pay for healthcare workers and teachers, training professionals in building renovation, ensuring that the most vulnerable people are not left behind in the ecological transition, managing coastal erosion, etc.

While most are "in favor" of digital technology because they hear so much about it, in practice, they often view it as "nice-to-have" rather than a "must-have!," some even consider it a gadget. As a Ministry of Economy official once said about the “Digital and Data for Ecological Planning” roadmap: “Today, digital technology is not the issue; our priority is to decarbonize the industry.”

Since resources are limited, digital technology often comes last, after issues considered core business.

On a more meta level, some stakeholders closer to social sciences, philosophy, or politics in the noble sense of the term, point out that digital technology, like money or innovation remains a means to an end in the service of a social project. Digital technology does not answer the fundamental question: what do we really want? However, this overall vision is often poorly defined, or at least poorly shared. In ecology: what do we want our lives to look like tomorrow? What matters and what are we ultimately seeking to maximize? In other words, what makes us happy? In healthcare: what could the healthcare system look like, especially in order to cope with an aging population and future crises? What balance between prevention and after-the-fact care, home treatment vs. hospitalization? In education: how do we wish to educate and teach in the future?

Developing digital technology without this compass and framework of values is putting the cart before the horse. It means moving forward blindly without knowing what we are aiming to achieve, lacking free will and humanity.

“Worse: it’s Harmful”

For many, not only is digital technology not a priority, but it is also harmful, either directly or in more insidious ways.

The issue of data leaks or misuse of sensitive data is one of the main risks cited, especially in sectors such as healthcare, security, and justice. Personal data is particularly targeted, as it may be made public following a cyberattack or used by private stakeholders or states to profile or monitor us, especially in a context of rising right-wing extremism. Data subject to trade secrets are also regularly mentioned by companies, due to fears of economic espionage and unfair competition. This is particularly true in a tense geopolitical context and with increasing risks to individual freedoms.

Digital divides are also a significant cause for concern. These divides can be material (lack of internet access, although this has considerably improved in France in recent years) or human (lack of training and support for using digital technology). There is a fear of creating a two-tier society where digital inequalities might overlap with other inequalities, such as access to healthcare (overlap of digital and medical deserts).

An increasing concern in recent years is the environmental footprint of digital technology. This has gone hand in hand with a growing awareness of climate change and the exponential increase in the impact of digital technology on all fronts (see the ADEME-Arcep 2023 study): carbon footprint, resource use, energy consumption, metal and mineral consumption. The production of digital equipment is the primary environmental cost. The International Energy Agency estimates that energy demand for data centers might double between 2022 and 2026, driven by the rise of artificial intelligence and cryptocurrencies, reaching the equivalent of the electricity consumption of a country between Switzerland and Germany. Microsoft’s and Google's greenhouse gas emissions have jumped by 30% and 13% respectively in one year due to AI. These results are alarming, to the point that some private stakeholders are calling for ex ante regulatory measures. They are all the more disturbing given the great difficulty we have in reducing the environmental footprint of newly established behaviors: is the cost/benefit of AI really worth continuing down this path?

More indirectly, digital technology is one of the more or less conscious reasons for inaction.

On the one hand, it sometimes paralyzes action, in the fantasized expectation of a situation that would allow us to make perfectly informed decisions. We desperately seek to escape “watermelon indicators” (presented as “green” when they are actually “red” inside). We are unwilling to proceed without reliable numbers, forgetting qualitative aspects and common sense, and find ourselves trapped by the thermometer. For example, it is important to measure a company’s carbon footprint as reliably as possible, especially its scope 3 emissions. But given the complexity of the issue and the urgency of the situation, it is all the more important to push for the implementation

[1] Useful but not essential.

of effective measures without delay, even though we do not know exactly how effective they are: urgency still unfortunately means 80/20.

On the other hand, digital technology sometimes diverts attention from other key issues. Like technological innovation in general, it often creates exaggerated hopes of discovering miraculous solutions that would justify not tackling deeper issues, especially at the root of the problem. It is as if we tried to treat obesity solely with new treatments, without tackling junk food and sedentary lifestyles. This is a recurring debate in ecology. AI may well help to better manage smart grids and produce decarbonized energy on a larger scale. However, IPCC experts agree that technological innovation alone will not be enough and that it is essential to act simultaneously or even upstream on the " energy efficiency " lever (e.g., setting heating to 19°C/68°F instead of 20 or 21/70°F to consume less energy). Unlike many technologies, energy efficiency also has the advantage of being very easy to scale up!

Worse, Digital Technology Sometimes adds Fuels to the Fire.

On the one hand, optimization often undermines resilience, while crises will only increase and intersect with climate change, geopolitical tensions, and resource scarcity. Floods, storms, heatwaves, cyberattacks, energy or critical material shortages ("rare-earth element," oil and gas components, etc could shut down or destroy digital tools and the networks that power them. Today, everything depends on digital technology. When Microsoft experiences an outage like the one in August 2024, over 8 million computers are affected, causing significant disruptions for banks, airports, retail, government services, hospitals, etc. When a hospital experiences an IT failure, continuing to treat patients arriving in the emergency room while also ensuring the safety of patients undergoing surgery is a real challenge. In *Hypothesis K,* Aurélien Barrau states that "*entrusting more and more basic –even vital– tasks to particularly fragile electronic or computer systems is not just useless, it is highly irrational in the face of crises that will likely arise in the future*."

On the other hand, if the compass and framework of values mentioned above are not defined in advance, digital technology risks increasing the productivity of a system that is not the one we collectively desire. This is why the United States and China have had an exchange on the risks of applying AI in defense, particularly in nuclear weapons control, and on the ethical framework that should surround it. In China, digital technology is being used to create a surveillance society with social media and tools such as social scoring. Globally, digital technology fuels overproduction and overconsumption of goods and services by part of the population, even though they are partly responsible for the climate crisis. On the one side, digital technology increases our capacity and desire to consume: with e-commerce, everything is just a click away; social media bombard us with personalized ads and product placements. On the other side, digital technology helps increase productivity, which almost systematically leads to rebound effects: clothes are now produced much more quickly than before; resulting in French people buying nearly 50 new items of clothing per year. Digital technology is therefore actively contributing to the collapse it claims to be curbing. The report "AI: Our Ambition for France" estimates that "*AI could lead to a permanent increase in the economic growth rate. In other words, in addition to a temporary effect related to automation, AI could have a longer-term effect linked to the emergence of new innovations, new products, etc.*" Serving what kind of world?

Eventually, digital technology does not necessarily help us to collectively and peacefully address this already complicated issue. It can help create communities, build networks and engage more effectively. But it can also exclude people who are not familiar with these technologies (see above). Besides, it can drastically dehumanize, isolate, and weaken social ties: because of our almost uncontrollable addiction to screens at the expense of the physical world, through the closure of service counters due to digitization in areas where human contact is crucial… Finally, it can simplify complexity, polarize, or even spread false information, thereby harming social cohesion and our ability to collectively invent the world of tomorrow. Social media keeps us in a filter bubble, making it difficult to understand different points of view when we step outside of it. It is highly vulnerable to foreign interference and enables the spread of false information that might change the outcome of an election. AI is now disseminating a very homogeneous way of thinking. It mainly acts as a tool for global reaffirmation. In a way, digital technology has "*dried up and binarized the modes and worlds of being with others*" (*Hypothesis K*, regarding science).

Yes, but also:

These risks are not imaginary: dystopia is already unfolding before our eyes, often without us realizing it. It is therefore understandable that people might want to outrightly reject digital technology, or at least not to prioritize it. **However, now is the time to muster our courage, to embrace complexity, to demonstrate the nuance needed to clarify controversies and paradoxical injunctions, and to resolve them.**

Digital Technology is Essential for the Effective and Collective Implementation of Public Policies

Some issues require little to no digital technology and are often seen as prerequisites for any transformation, such as better pay for healthcare workers or teachers. **In many other cases, digital technology is not a secondary issue. While it is by no means sufficient on its own, it (unfortunately) remains an essential means of implementing core sectoral issues.** The same way money is necessary to deploy a public policy, digital technology is essential when multiple stakeholders need to work together and therefore exchange information i.e., data that circulates via digital tools—in a fluid manner. It is therefore not about prioritizing between core issues and digital topics; it is about putting digital technology at the service of sectoral objectives so that they can be effectively achieved.

For example, to decarbonize industry, it is necessary to know which activities have the biggest environmental impact, to estimate the effects of changing suppliers in order to reduce this impact, to implement mirror clauses so as to ensure that imported goods that do not comply with the same environmental rules as in Europe do not unfairly compete with locally produced goods, which requires measuring the environmental cost of a product… To target housing renovation assistance towards the most vulnerable citizens, it is necessary to consolidate information on available aids at the national and regional levels and to cross-reference it with data on household's level of vulnerability. The people must also be informed as to the assistance they are eligible for (the "reaching out" method), and we must ensure they do not have to fill out multiple forms in order to receive the information (the "only tell us once" approach)… To engage in prevention that goes beyond generic advertising for "no smoking month," we need to be able to send personalized reminders to people about their vaccinations, mammograms or colonoscopies, dental and ophthalmological care… To anticipate coastal erosion, we need to identify properties that are at risk, conduct simulations, and disseminate information. And simply to produce an IPCC report, it is necessary to collect, cross-reference, share, and utilize data. As mentioned, **digital technology increases productivity and enables the implementation of large-scale mechanisms: it would be a shame not to take advantage of it for virtuous actions!**

Beyond enabling the implementation of already established public policies, digital technology has the potential to trigger deeper structural changes. It has a real subversive power. It allows us to skirt around issues more or less consciously when subjects are difficult to tackle head-on. It sketches out models that were difficult to imagine or difficult to envision ourselves.

Digital technology disrupts the way information is produced and made accessible, for better or for worse. It has the capacity to break information imbalance and to empower people. This can change relationships between individuals: between company management and employees, teachers and students, doctors and patients… For instance, *Mon espace santé* helps us become more active in managing our own health. With seamless, secure access to our healthcare records, we are better able to understand our situation, which often increases our adherence to treatment, our ability to advocate for ourselves, and our proactivity. We can seek a second opinion from a professional based on our complete medical record, without fear of starting from scratch. Personalized reminders make it easier for us to take preventive measures. *Mon espace santé* also requires explicit consideration of the division of roles between different professionals in order to configure the data access authorization matrix: what are the advantages and disadvantages of a nursing assistant in a nursing home being able to consult the prescription of the elderly person they are treating directly online, rather than having to request it from the primary care physician or the person themselves? Some argue that direct access to these documents will save valuable time for both the caregiver and the doctor in areas with a shortage of medical professionals, while others argue it could be dangerous for professionals who have not received the relevant training to handle medical data directly.

In ecology, digital technology "can also help companies adopt a more responsible economic model" (see the Giverny Circle report). For example, it enables the shift from sales models to usage-based models through large-scale connections between carpoolers, between people selling second-hand goods and people looking to buy them, etc. Digital technology even helps us envision a world where we do not just encourage people to "consume responsibly," placing on individuals a burden that might be difficult to overcome, but a world where we also collectively structure the supply around the concept of "responsible production." This is the case in the textile industry. Databases and calculation tools have been developed to measure the environmental impacts of a clothing in order to implement the environmental labeling required by law. However, controversies over fast fashion, particularly with companies such as Shein or Temu, have prompted some ecosystem stakeholders to go beyond simply

providing information to consumers. In March 2024, the draft law aimed at reducing the environmental impact of the textile industry also included a penalty on the price of clothing with a significant environmental impact as well as a ban on advertising for fast fashion brands. Like any pioneering step, implementing these provisions to reach the desired goal is a real challenge. For example, overestimating the impact of wool in a database could lead brands to stop using this material altogether, thus weakening the underlying production tools. The digital tools currently being developed have been essential in giving the proposal more credibility and will be crucial in its implementation. The launch of a free, transparent and publicly available calculation tool has enabled all stakeholders in the sector to understand the methodological choices made (the potential impacts associated with each material, each energy mix, each mode of transport…). Providing transparent access to this method, it is effectively subject to rigorous critical scrutiny, and anyone can request improvements to the data on which it is based. The tool provides access to the method, which encourages people to contribute to the data, ultimately benefiting the method itself.

It must be deployed within an ethical, humanistic, and citizen-centered framework

Depending on how it is used, digital technology can be either a poison or a medicine. It can dehumanize healthcare, or conversely, free professionals from tasks that can be automated in order for them to devote more time to what a machine can never replace: human contact with patients and colleagues. It can enable rampant overproduction and overconsumption, endangering the planet's habitability, or, on the contrary, contribute to the collective development of a new framework that allows us to live harmoniously with each other and with the rest of the living world.

"To launch a ship is to also accept the risk of it sinking": like any technology, digital technology comes with its own share of risks, some of which are terrifying.

Our responsibility, as public authorities and/or digital experts, is first and foremost to clarify these risks. This requires us to avoid getting carried away by a techno-solutionism naivety in which our fascination with what digital technology could enable would cause us to unconsciously overlook its risks. This also means not glossing over risks for fear that the ecosystem might throw the baby out with the bathwater. To achieve this, it is necessary to establish a mature relationship among stakeholders by rigorously assessing the risks and opportunities, sharing them transparently and clearly, and by trusting the ecosystem to provide informed and nuanced opinions.

It is also our responsibility to clearly assess the cost/benefit ratio of digital projects. Is the ship still worth sinking? While it is always challenging to regulate a technology ex ante given that its use cases are still largely yet to be discovered, the question must be seriously considered in the case of technologies with particularly harmful potential. As with nuclear energy or genetic manipulation, in certain cases, artificial intelligence seems to either require very strict regulation or prohibition, given their highly unfavorable cost/benefit ratio to date. It is certainly necessary to go beyond "a few countermeasures to mitigate this or that harmful side effect" but to instead embark on "a genuine prevention strategy" (The K Hypothesis). In the cost/benefit analysis, the risk of Uberization should also be considered: if we do not launch the project, is there a risk that another stakeholder will do so without us having a say in the associated value framework? The risk of Uberization is often not just a fantasy: Apple's "Health" app is a non-sovereign equivalent of *Mon espace santé*; Google and Apple alert French citizens about air pollution with data that are not always deemed reliable by air quality monitoring associations, as their models are not always suited to France's specific characteristics. While the risk of Uberization should not justify a systematic rush forward, it must be taken into account as one of the risks of not launching the project.

When a project is launched, our responsibility is to fight decisively and effectively against the identified risks. It is not about pointing fingers, it is about proactively implementing actions to ensure an ethical, humanistic, and citizen-centered framework for digital development: organizing citizen committees to discuss the use of sensitive data for public interest, "AI cafés," eco-design rules, significant resources for supporting people who are digitally excluded, publishing code as open source… The best defense is a good offense!

Public policy by public policy, these elements must be summarized into a manifesto that can stand on two legs: the clarification of the core objectives that digital technology must serve so as to guide it towards finding solutions to our societal problems; the framework of values within which its development must fit in order to fight the identified risks as effectively as possible. The manifesto is the raison d'être of the sectorial digital strategy. It is the compass for all public or external stakeholders involved. It should regularly be checked and the course adjusted if it happens to drift. The compass should also be adjusted if our collective goal evolves.

In Digital Technology,

Why Public Data-Sharing Infrastructures?

Definition
of Public Data-Sharing Infrastructures

A "digital project" or "digital product" is an umbrella term that encompasses different realities. It is important to distinguish more precisely these objects in order to determine their characteristics: should they be public or private? Monopolistic or competitive? etc.

This is the purpose of the "public platform" approach. It proposes to draw inspiration from the governance of a city. In a city, public authorities enact rules (urban planning codes, traffic laws, etc.) and build or organize the construction of basic infrastructures that enable exchange and harmonious coexistence among residents (roads, sewer systems, water and electricity networks, etc.). However, most buildings are managed by external stakeholders (private sector, associations, civil society, etc.), with the exception of cases where there is no economic model (e.g., social housing). The public authority ensures that buildings comply with regulations (e.g., the urban planning code) and are connected to the infrastructures (e.g., the sewer network). It may also support stakeholders to ensure that buildings are as accessible and innovative as possible.

For digital technology, the logic is the same. In collaboration with external parties, public authorities:

- **Enact basic rules relating to ethics, security, and interoperability** of digital tools, notably to address all the risks outlined above (in brown in the building).
- **Build the necessary foundational infrastructures.** These infrastructures ("containers") allow the dissemination of identity or professional databases ("content") as open data or for sharing within a closed circle of stakeholders via "data sharing infrastructures," which define, among other things, data sharing obligations and access conditions—in orange in the building. External stakeholders can only help public authorities build these infrastructures under a white label; the State remains the owner of these infrastructures.

These foundations must be robust and pragmatic. Without them, everything else is built on sand.

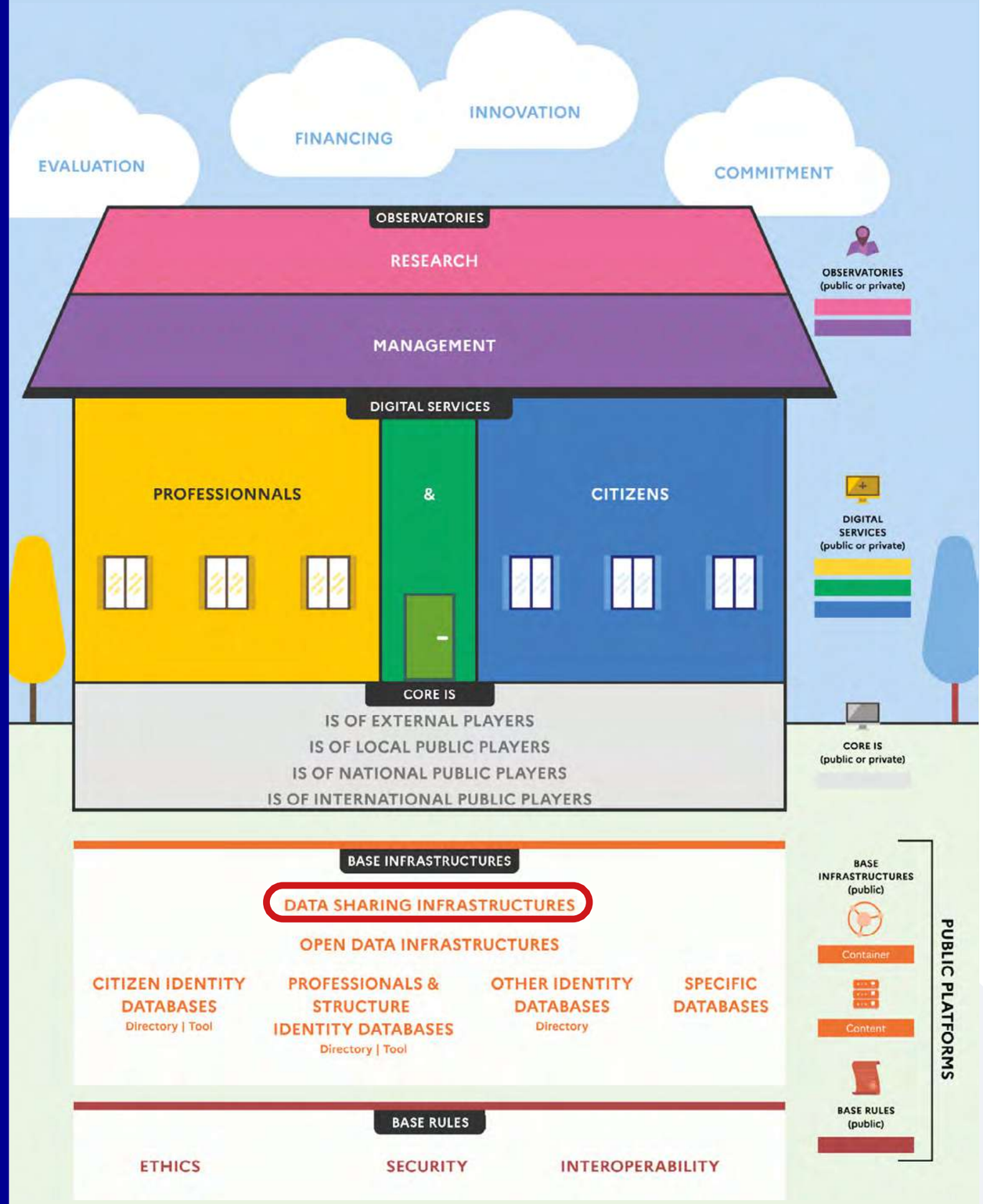
Most of the time, however, external stakeholders are the ones who build value-added digital services for citizens and/or professionals (e.g., doctors, farmers, manufacturers, public transport operators, teachers, etc.)—in blue, green, and yellow in the building. These digital services revolve around core sectoral information systems of these stakeholders, which form the tools' backbone (in gray).

- **Core sectoral business information systems of both public and private stakeholders and digital services must comply with basic rules and connect to basic infrastructure.** or example, a hospital's private information system must be ethical, secure, and interoperable. It must be able to access a patient's records in *Mon espace santé* and automatically feed them back into the system with the hospitalization reports.
- **The necessary data produced by these tools must also feed into observatories** for secondary uses, such as public policy management (in purple) or research (in pink). For instance, private software from medical laboratories must report Covid test results to SI-DEP, where they will be anonymized to feed into Covid crisis management dashboards and be published as open data.

In order to ensure compliance with this digital urban planning and support tools that best meet the needs of citizens and professionals, public authorities must activate their regulatory levers, "carrots" (clouds "financing" and "innovation") and "sticks" (cloud "evaluation"), and bring this collective adventure to life (cloud "commitment")

Far from a "public" or "private" approach, the public platform approach defines a third way where everyone plays their role in their own field for innovative, effective, and ethical public-private collaborations. This collaboration involves shared digital building blocks, which are public and have a monopoly within the relevant geographical area, to which digital services are connected, often from the competitive and private sectors.

The Public Platform Logic



Data sharing infrastructures are at the foundation of the building and play a pivotal role. On the one hand, each brick in the building rests on the bricks below it. Therefore, the proper functioning of a data-sharing infrastructure requires the existence of interoperability, security, and ethical standards; that databases are standardized and of high-quality, and that electronic identification and consent management tools are in place for each stakeholder in the infrastructure (e.g., patient, doctor, nurse, etc.). On the other hand, they are used to share data that can be useful both for the primary use of the data (the "walls" of the building) and for its secondary use (the "roof" of the building).

The infrastructure referred to in this note is described as being "of general interest" or, more specifically, serving use cases arising from public policy (health prevention, city-hospital coordination, the fight against Covid, substitute teachers, environmental signage, housing renovation, security at large gatherings, etc.). There is also similar infrastructure that serves purely private use cases, although in most cases the boundary between the two is blurred. For example, sharing data from industrial stakeholders in the same sector, such as Catena-X in the German automotive industry, aims to economically strengthen them—and potentially contribute to reindustrialization—enable more accurate calculation Scope 3's carbon footprint to accelerate decarbonization, etc. The recommendations in the "What?" section below have been developed for public interest use cases, although they (or parts of them) could certainly be adapted for use cases that are further removed from public policy.

The use case or set of use cases covered by an infrastructure is what defines the infrastructure, more so than the business sector or geographic area involved. As stated in question 8 of the "What?" section, for a given use case, the public infrastructure should be unique in nature.

At the European level, these infrastructures are called "data spaces." Their governance is either purely public (such as the European Health Data Space) or governed by "European Digital Infrastructure Consortiums" (EDICs).

At the UN level, they are referred to as Digital Public Infrastructures (DPIs). Their critical role was highlighted in a recent report by the UN Environment Programme (UNEP). An equivalent of the "building" presents the role of public digital infrastructures (see below). In March 2024, the UN Secretary-General's office and the UN Development Programme (UNDP) launched working groups working groups to establish the value framework associated with these infrastructures.

Presentation of Digital Public Infrastructures by the United Nations Environment Programme

Why Not?

The legitimate concerns about digital technology mentioned above (personal data breaches, surveillance, digital divides, dehumanization, environmental impact, etc.) are often exacerbated when it comes to data sharing infrastructures. That is because such infrastructure is often more visible than a standard digital tool, as it involves more stakeholders and is managed by public authorities. However, for the same reasons, it is often (legitimately) much more regulated (by the CNIL, ANSSI, Parliament, the Court of Auditors, etc.) and exemplary. For instance, although it is currently undergoing significant improvement thanks to government intervention, a hospital's information system is, on average, far less secure than *Mon espace santé*. It is often hosted by Amazon, Microsoft, or Google. Patients' rights regarding the use of their data, particularly for secondary purposes, are not always well-implemented. The involvement of the CNIL or ANSSI is rare, and there is still little patient support for using the hospital's online portal when applicable.

Beyond these concerns, the two counter arguments that consistently emerge are rarely explicit or even conscious, hence the absence of quotation marks in the titles below. The opposition is often weak: the issue is deprioritized or left unaddressed by stakeholders who lack the time or expertise to delve into this complex subject, which is detrimental.

It's not Sexy, and it's not Useful

◆ OBSERVATION

In 2016, when Clément Bertholet and I wrote "*Blockchain the State! Before others do it for you*" following the work of Henri Verdier and Nicolas Colin and that of Fabernovel and Sébastien Soriano, **we were told it was already outdated and that we should have written "Let's Blockchain the State".** Blockchaining did not seem particularly relevant—or marginal—for solving the identified problems. Eight years later, it does not seem much more relevant.

When Dominique Pon and I joined the Ministry of Health in 2019 to co-lead the digital transformation of the healthcare system, **we were told it was outdated to talk about the *Dossier Medical Partagé* (DMP), a long-standing issue since 2004 and the predecessor of *Mon espace santé*, that "with text mining, interoperability would soon be unnecessary."** Artificial intelligence (AI) topics, including the creation of the Health Data Hub, and open data were then taking a significant portion of attention on digital health issues. While necessary, their main purpose is not to address the priority problems identified by the Ministry of Health concerning city-hospital coordination, health-social care integration, patient empowerment, and health prevention. These issues require other digital projects, which were largely absent from the debate.

During the 2019 Tour de France des Régions, the first question asked was almost always about the sovereign cloud. This is obviously a critical issue, but as it is being handled by several ministries, it did not fall within the scope of the 30 actions outlined in the roadmap, all of which are equally important (cybersecurity, ethics, telemedicine, *Mon espace santé*, etc.).

During the early months of Covid, while public officials from the Ministry and operators worked around the clock to set up the numerous data sharing infrastructures needed for testing, contact tracing, vaccine logistics, traceability, managing potential side effects, sending masks and ventilators, identifying available hospital beds, and transferring patients, **they had to simultaneously address numerous questions from parliamentarians and external stakeholders about how AI and blockchain were being used to manage the pandemic.** The role these technologies could play in solving critical short-term and medium-term problems was minimal, if not non-existent. The urgency was to allow stakeholders to exchange information in order to coordinate effectively through data sharing infrastructures.

These examples might seem anecdotal, but they reflect the shared observation of digital stakeholders working in the public sector. **AI, blockchain, and the metaverse are topics that should be addressed within a rigorous ethical framework to get the best while avoiding the worst. However, these technologies play a relatively minor role in solving identified problems in the field compared to data sharing infrastructures and their underlying components.**

AI plays a proportionally minor role in solving identified problems in the field compared to data sharing infrastructures.

In ecology, AI could certainly help regional environmental agencies to process environmental projects—such as wind farm installations or urban development—more efficiently. Better management of energy systems, anticipating climate risks and, more generally, decision support are also regularly cited examples. While these use cases are certainly relevant, a significant number of other examples aimed at explaining how AI can contribute to the ecological transition seem far-fetched in order to justify the existence of AI, particularly its huge environmental cost. Overall, AI's use for the common good in light of its risks is now the subject of a very legitimate debate. Use cases are still few and far between, and in any case require access to high-quality data in order to be relevant.

This asymmetry in attention is problematic because attention pulls resources and time, which are unfortunately not infinite. In recent months, how many conferences on artificial intelligence have included discussions on data sharing? How much has been announced in terms of investment—particularly private investment—in AI compared to investment in data-sharing infrastructure? (see, for example, Contexte's article "*At the Choose France summit, a flood of money for artificial intelligence*" or the article in Le Monde "After the euphoria, fears of a bubble around AI", which mentions the $200 billion invested by Amazon, Microsoft, Google, and Meta in 2024, mainly in data centers necessary for AI?) Internally, how many rapporteurs worked on the report "AI: our ambition for France" compared to the number of rapporteurs who worked on the development of the "Digital and Data for Ecological Planning" roadmap (13 vs. 1)?

Digital business stakeholders are overwhelmed with problems, the vast majority of which do not require these technologies. They would like to be asked, "What problems are you working on?" rather than "What are you doing with AI?" **They would appreciate support to solve these problems rather than having to pretend that their project involves AI in order to have the opportunity to talk about it or obtain funding, or having to regularly justify why they are not focusing their efforts on AI at the risk of appearing to be outdated public officials.** These public officials are simply being rational: just as during Covid, no one asked to deprioritize infrastructure projects necessary for managing testing, contact tracing, vaccination, or patient transfer in favor of "innovative" projects. Common sense dictates that data-sharing infrastructure critical to managing current crises, particularly environmental ones, should not be neglected in favor of seemingly more glamorous projects.

◆ POTENTIAL CAUSES

As with any complex issues, both internal and external stakeholders share responsibility for the invisibility of data sharing infrastructures.

Internally, for years and regardless of the individuals involved, organizations that are directly or indirectly involved in data-sharing infrastructure are often not sufficiently convincing or convinced, mainly because they are judged on the wrong criteria. **The problem is systemic: it must therefore be described and then changed collectively.**

1. ON THE SIDE OF PUBLIC STAKEHOLDERS RESPONSIBLE FOR "SECTORAL" DIGITAL MATTERS RELATED TO PUBLIC POLICIES

Digital "operational" stakeholders (from the Ministry of Health, Education, Agriculture, Ecology, Interior, Economy, Defense, Justice, Culture, etc.) and the public operators who support them are the ones who absolutely need these infrastructures to fulfill their missions. **They are responsible for identifying the infrastructures needed to implement their public policies, explaining why to their ministers and the relevant interministerial stakeholders, and ensuring its successful development.**

Why do they often fail to do so, or sometimes even fail to recognize the need themselves?

Firstly, because the purpose of an infrastructure is difficult to describe. It is like answering the question, "*What is the Internet for?*" If you explain that it is a standardized set of data transfer protocols enabling people to exchange information, it might seem too conceptual. If you explain that it enables the emergence of Wikipedia, *Le Bon Coin*, or online tax payments, one might question why not develop only these specific tools without the hassle of building the entire network. Infrastructure advocates often oscillate between a very macro description of the need and a very micro description of the applications, when both are essential.

They rarely receive spontaneous help from external stakeholders, who are often unaware that they are beneficiaries or whose representatives are listened to less than those of other stakeholders (e.g., citizens wanting to stay healthy and patient associations vs. doctors' unions). Most of the time, the State must aggregate different needs and develop a vision so that these beneficiaries become true allies. Support from external sponsors is essential: use cases for open data were not easy to expose, but the existence of organizations and influential figures were key to advancing the issue (Open Data France, Paul Duan, Guillaume Rozier, etc.).

For this reason—and because infrastructure projects are not glamorous—digital operational stakeholders often struggle to gain political support. In the physical world, an elected official prefers to inaugurate a building (a hospital, a school, a startup incubator) rather than a sewage system or a road, as their use cases are more concrete and less diffuse. Even if they inaugurate a sewage system, they often cannot even take credit for having initiated the project, as infrastructure projects are such long-term endeavors. Similarly, elected officials often prefer to celebrate the launch of a digital service that addresses a specific use case rather than a digital infrastructure, which is

inherently less tangible than a physical infrastructure.

This work of clarifying needs is vital because everything else stems from it. By definition, the needs cannot be guessed by interministerial digital stakeholders; they can only be described by digital agents closely involved with public policies and their field stakeholders. The lack of a convincing initial description is often the main cause of subsequent blockages. Indeed, everyone must be convinced of the infrastructure's absolute necessity in order to have the courage to overcome the numerous difficulties that are bound to arise during its deployment. The answer to the "why?" must be effectively addressed and shared so that everyone can focus as quickly as possible on the "how" to successfully implement the change, whatever it takes.

2. ON THE SIDE OF PUBLIC STAKEHOLDERS RESPONSIBLE FOR "EXTERNAL" DIGITAL MATTERS RELATED TO ECONOMIC DEVELOPMENT

Public stakeholders responsible for "external" digital matters (General Secretary for Investments, Ministry of Economy, Caisse des Dépôts, BPI, etc.) taking a closer interest in the subject since the rise of AI and European work on data sharing (GAIA-X, data spaces, Digital Governance Act, etc.). This includes the distribution of funding from France 2030 to private stakeholders, for example through the 2024 "data space" project call.

Historically, these organizations had little or no knowledge of data sharing infrastructures.

This is primarily because their role is to support the development and innovation of private companies, not public administrations. By nature, public data sharing infrastructures are not part of the "startup nation" and the projects they seek to finance and promote. It is simply not their job.

Nevertheless, private companies could be vocal with these public bodies as service providers to the public stakeholders who manage the infrastructure. However, these infrastructures often consist of a mix of technologies provided by industrial stakeholders, which have only recently come together to form lobbies (GAIA-X, Association des Intermédiaires de Données) which are currently even less powerful than lobbies representing companies focused on a specific technology (the cloud, AI, etc.).

These technologies are also less spectacular than blockchain, the metaverse, or artificial intelligence. Public stakeholders behind the infrastructures are considered less glamorous than startups. Thus, infrastructure naturally attracts less attention from the public, the press, and politicians. How many political posts are there about a French startup raising funds compared to a public data-sharing infrastructure reaching a key milestone?

3. ON THE SIDE OF PUBLIC STAKEHOLDERS RESPONSIBLE FOR "INTERNAL" DIGITAL MATTERS RELATED TO PUBLIC TRANSFORMATION

Over the past decade, the State is also trying to switch to "startup mode" in order to achieve a level of agility and efficiency similar to that of private startups. This has led to the creation of the "beta.gouv" community, run by the Interministerial Directorate for Digital Affairs, with an interministerial incubator and several ministerial incubators. These incubators launch "state startups," whose method breaks from traditional IT projects characterized by urbanization plans, V-models, project management separated from project implementation, outsourcing often found to be excessive, and projects that are rarely satisfactory in terms of quality, cost, and timeliness.

This transformation is widely seen as beneficial for public digital initiatives. It has notably allowed for the dissemination of new working methods, put users back at the center, and made the public sector more attractive, sometimes even beyond digital issues.

However, it also needs to be supplemented with a more systemic vision. State startups mostly involve the development of digital services that add value to existing businesses (the "walls" of the building, sometimes constructed by public stakeholders depending on the sector concerned). Although some state startups have proven themselves at scale (e.g., PIX), unfortunately, very few have truly scaled up. Several reasons are frequently cited, including difficulties in getting a "side project" approved by the existing teams responsible for ramping up production, technical incompatibility with existing IT systems, difficulties in internalizing the largely external resources of state-owned startups, etc. One such reason is the lack of a global urbanization scheme designed using modern and modular IT architecture, which highlights a technical foundation (public platform) to which all digital services connect in order to enable scalability, sustainability and overall consistency of digital services built in small iterations and with a user-centered approach.

This is necessary for these services to move from start-ups to scale-ups, from beta to gamma. This systemic vision also allows for the pooling of investments, which is essential given the ecological challenges and pressures on the government's digital resources.

The 2023 Interministerial Council for Public Transformation (CITP) requested that operational ministries develop "Digital and Data" roadmaps under the Interministerial Directorate for Digital Affairs' coordination based on this dual model. **Work is underway and at varying stages of completion depending on the department, but needs to be further developed, particularly to clearly identify data-sharing infrastructure requirements.**

The topic of data sharing resonates with the Interministerial Directorate for Digital Affairs'historical focus on data circulation. The idea is to supplement current efforts—which are mainly based on open data or data sharing between administrations—with data sharing between public and private stakeholders, in line with the still under-implemented concept of "data of general interest." The lack of a dedicated team makes collaboration difficult as the issue concerns both everyone and no one at the same time: Etalab, because these infrastructures could also facilitate data opening; the operator of inter-ministerial products, since they are closely related to identity issues and linked with api.gouv.fr; the digital services incubator, due to the very sectorial dimension; and the "support, advice, and expertise" department, as they often involve major state projects, etc.

The state startup method also needs to be adapted in order to construct data sharing infrastructures. This method, modeled after private startups, is primarily designed to develop digital services (the "walls" of the building) rather than infrastructures (the "foundations" of the building). The method's general idea is to launch a digital product as quickly as possible to then confirm whether or not it is of interest by evaluating the results of its first use cases after six months. When applied to infrastructure, this poses several problems.

Firstly, as mentioned above, use cases for an infrastructure are challenging to describe.

We might present a few minor use cases (e.g., sending personalized information about their allergies to patients) but it is difficult to explain why they require building such an infrastructure (in this case, *Mon espace santé*). This can give the impression of "using a sledgehammer to crack a nut" or "building a cathedral" that will remain an "empty shell."

Alternatively, we could present the macro needs while struggling to anticipate all the uses that the infrastructure will allow: it is indeed the nature of infrastructure not to define all its applications in advance. Not all uses of the electricity grid or the internet were considered before their deployment. These infrastructures were put in place for specific needs, which were then considerably multiplied. Similarly, many use cases for the data sharing infrastructure will emerge with the arrival of new public policies, as these are very often accompanied by a need for data sharing. We often hear the argument that the infrastructure we want to deploy "is not a product."

Additionally, the indicators used to assess the value of a project are not appropriate. Indicators that evaluate digital services can be very concrete and sector-specific (e.g., the number of organic meals served in a cafeteria or the number of heart attacks detected). In contrast, the impacts of infrastructure on people are necessarily indirect: no one needs the Internet itself, we need the uses it enables (e.g., sending an email). It is therefore necessary to evaluate an infrastructure project based on more technical indicators, such as the number of API calls. This approach was used in the investment fund for the "Digital and Data for Ecological Planning" roadmap. These indicators should be supplemented by qualitative feedback to better understand the final uses enabled by the infrastructure.

Moreover, to ensure these indicators show positive results, it is essential to leverage network effects by adopting an infrastructure-based approach from the outset. The state startup method, however, recommends starting small with a "Minimum Viable Product" (MVP) that is sufficient to cover only the initial use cases envisioned. But what does an MVP mean when it comes to the internet? The infrastructure can certainly be tested within a given geographic area (e.g., three departments in the summer of 2021 for *Mon espace santé*). However, to break the vicious cycle of non-use and to achieve the desired systemic effect, it is often necessary to think big from the beginning and to deploy the infrastructure for a period of time longer than six months. For instance, the DMP, launched in 2004, had only 5 million accounts opened and almost no data entered by 2018. Few DMPs were created by patients, therefore, few were furnished by professionals, which ultimately meant there was little incentive to create a DMP. The automatic creation mechanism for *Mon espace santé*—unless the patient refuses—introduced by July 2019 has led to the opening of an account for more than 95% of social security beneficiaries, their data being entered by almost all the hospitals and the majority of private practitioners, and their effective use by more than 20 million French people just two years after launch. These figures could not have been achieved if *Mon espace santé* had been allocated a few million euros and a handful of people to prove themselves in six months.

Finally, it is not about "seeking the target" as a private startup might. Public authorities must address general interest problems they do not choose. If solving these problems necessarily involves more fluid and secure data sharing, then we cannot simply pivot when we encounter difficulties. It is possible to take another path, but the objective of data sharing must be achieved whatever all costs. Unlike digital services, when several infrastructure initiatives have been launched without complete success (e.g., the DMP, the housing information booklet, Agdatahub...), this is often less a sign of a bad idea than of a real need. If it did not work, it is because we did not try hard enough or well enough.

Talking about the urbanization of information systems and adopting methods that are not entirely aligned with private startups might seem outdated. However, it is necessary in order to develop public data-sharing infrastructure, which is a common good.

Talking about Urbanization is no longer in vogue.

The frequent absence of clearly identified external sponsors, the difficulty in convincingly introducing infrastructure's raison d'être, its somewhat outdated appearance, and unsuitable working methods often lead stakeholders to think—sometimes unconsciously—that such infrastructures are either unnecessary or not essential. When these obstacles are overcome, infrastructures face another challenge: discouragement.

It Will Never Work Anyway

Concerns about the realism of data sharing infrastructure projects are legitimate. Like physical infrastructure projects, they often result in an explosion of costs and delays beyond initial projections, if they ever get off the ground at all. These projects face a number of challenges. They involve multiple public stakeholders from different sectors or geographic levels who are not always aligned (e.g., for Agdatahub: the Ministry of Agriculture, the Ministry of Ecology, the Ministry of Digital Affairs, the Ministry of Economy, the SGPI, the Caisse des dépôts, and IN Groupe), as well as multiple private stakeholders, often competitors, who sometimes struggle to work with the public sector. They involve ethical risks, particularly related to the protection of sensitive data (e.g., health data or data subject to business secrecy) or the security of financial flows (e.g., payment of housing renovation grants). They entail significant political and governance issues through data access rules can change the balance of power or the economic model of stakeholders (e.g., between patients and doctors, between the Ministry of Education and schools, among competing private stakeholders, or for stakeholders relying on selling "quick fixes" services that mitigate data sharing difficulties). They require real sectoral expertise—technical, legal, and economic areas—and a true capacity to engage. They are often deployed over long periods of time which does not facilitate political support. They cost more than a typical digital project. If they malfunction, it will be noticed very quickly, and if they function, people may forget how they make our lives easier (think of water or internet outages).

Just like physical infrastructures, these projects face numerous challenges.

These difficulties and the inherent lack of gratitude discourage stakeholders. The time to address these complex issues—which is often limited—and the significant associated stakes exacerbate knee-jerking reactions, which are a consequence of the indicators used to evaluate them. This is particularly true for interministerial stakeholders, who often find themselves at the end of the chain in debates on data-sharing infrastructure. Either because the relevant ministries did not contact them beforehand—often out of fear that they would not be supportive and would complicate the governance of an already risky project—or because, due to a lack of time and sometimes expertise, they deprioritize these issues in favor of the core tasks for which they are directly responsible (e.g., cloud services on the DGE side; the digital suite for agents on the Interministerial Directorate for Digital Affairs side).

1. FROM THE PERSPECTIVE OF CROSS-SECTOR PUBLIC STAKEHOLDERS RESPONSIBLE FOR "EXTERNAL" DIGITAL TECHNOLOGY RELATED TO ECONOMIC DEVELOPMENT

Given these difficulties, these stakeholders often suggest leaving the infrastructure's development to private stakeholders. "Cf. the DMP, the public authorities are incapable of supporting *Mon espace santé*. French people's digital healthcare records should be left to French startups." "The Ministry of Agriculture will never be able to handle infrastructure in agriculture; leaving them its management is a doomed project. If Palantir were public, we'd know."

This opinion is rooted in several Ministry of Economy-based reflexes a liberal culture that has historically favored privatization over nationalization "for greater efficiency" and often prioritizes economic development over other issues (since it is its mission). There is the fear that funding such public infrastructure will further increase the government deficit (on which they are judged) but also the (opposite) fear of under-utilizing funds from the Future Investment Program (PIA) or France 2030 for "data spaces" intended for businesses if some of these data spaces ultimately have to be made public, thereby losing credibility.

This opinion is paradoxical because private stakeholders attempting to build general-interest data sharing infrastructures are struggling to find an ethical economic model, i.e one that does not exploit the position of "gatekeeper" these infrastructures inherently allow, one that remains neutral, and that effectively protects data (e.g., not charging patients or farmers, not selling their data, not advertising for medications, phytosanitary products, renovation tools, etc). In any case, they will not become unicorns generating growth and employment. **This opinion is also paradoxical because public governance is supported by the vast majority of private stakeholders themselves.** EThese infrastructures involve so many stakeholders that they very often lead to a blurring of roles, thus undermining trust between private stakeholders (e.g., "the manufacturer who builds the infrastructure is also my competitor; he is not a neutral third party"). Those who argue the opposite are often private stakeholders in prevalent positions who either have no economic interest in data sharing or who are themselves trying to become the infrastructure in question. After 5 years of existence and despite PIA subsidies, Agdatahub has not found a viable economic model. Digital industry stakeholders (e.g., Interministerial Directorate for Digital Affairs) also called for its governance to be made public in order to ensure that it defends the general interest and not special interests. **Finally, this view is paradoxical because these infrastructures help combat monopolies and accelerate innovation** (e.g., by sharing data collected in ProNote with EdTech startups).

This stance is often automatic and sometimes seems to go against the interests of most companies themselves. It irritates digital business stakeholders who often find it drastically lacking in vision. It is also somewhat harsh to assume that the private sector will necessarily be better at implementing these projects than the public sector given that many public funding initiatives distributed to private stakeholders have struggled to prove their worth (e.g., "*Territoires de Soin Numérique*" (Digital Care Territories), PIA3 data space projects, etc.).

This stance also stems from the fact that relevant ministries are not convincing enough about the vision they're proposing, partly because it is not officially endorsed at the interministerial and political level. **They particularly struggle to explain business issues, why it is crucial not to be "Uberized," and where the private sector should nevertheless play a key role.**

The underlying sectoral and ethical issues are evident in their eyes: we cannot leave the digital healthcare record to a private stakeholder—even a French one—any more than we can leave the management of the paper healthcare record to Big Pharma. **This raises issues of neutrality and continuity** (what if the startup managing an essential record for vaccination reminders goes bankrupt?), which are essential values, at the very core of public service. More generally, it is simply essential for public authorities to have control over an element critical in the implementation of a public policy it is responsible for (e.g., combating COVID, deploying environmental labeling, accelerating housing renovation…)?

It is the choice made by the European Union. The Board of the European Health Data Space is composed of Member States and co-chaired by the Commission and a Member State. The Commission also created the status of European Consortium for Digital Infrastructures ("EDIC"), which mandates a public majority governance. **These are also the recommendations of the United Nations Environment Programme** (UNEP) in its report on "Digital Public Infrastructures," which explains that "relying solely on private solutions will not address the challenges comprehensively and may lead to further fragmentation of data."

It is a matter of "democratic" sovereignty: public power must be able to fulfill its promises without being bound to a private stakeholder over which it has insufficient control. **It complements "technological" sovereignty**, on which economic development stakeholders work: not only does the private sector create value-added digital services in competitive areas ("walls" of the building), but public power also needs effective and sovereign industrial partners to help build white label infrastructure. The infrastructure is "monopolistic," but its providers are often put out to tender to select the best possible industrialists. The two sovereignties feed into each other: the state drives the industry through public procurement, and the existence of a French or European industry allows the state to have complete peace of mind.

2. FROM THE PERSPECTIVE OF PUBLIC STAKEHOLDERS IN CHARGE OF "INTERNAL" DIGITAL TRANSFORMATION

Given these difficulties, these stakeholders often express numerous reservations or even suggest not launching the project at all. The Interministerial Directorate for Digital Affairs (the French Digital Agency) did not believe in nor provide support for developing SI-DEP and the information system for managing vaccinations, despite significant tensions on healthcare resources. The ANSSI (French National Agency for the Security of Information Systems) indicated that SI-DEP risked being considered "*one of the most significant Big Brother systems ever implemented by the State*." The Interministerial Directorate for Digital Affairs has warned that the ANAH (National Housing Agency)—which needs to significantly improve on information systems—is not able to manage the digital housing space.

These projects are legitimately stressful for stakeholders who are primarily judged on their ability to de-risk public digital projects so that no new hundred-million-euro industrial disaster or a leak of sensitive data make the front page. This is especially true since de-risking an infrastructure is not the same as de-risking a digital service: it requires a different approach. They often lack the necessary resources, expertise, or authority to effectively support the operational ministries and take joint responsibility for launching these risky projects. Furthermore, if these projects succeed, the credit will go to the ministries, while if they encounter problems, both the ministries and the Interministerial Directorate for Digital Affairs, ANSSI, or the CNIL (French data protection authority) will be held accountable—sometimes even legally. It is therefore not uncommon for these stakeholders to play it safe.

This attitude is often unbearable for sectoral stakeholders. Yes, these projects are risky; stakeholders are the first to lack the means to carry them out properly and to lose sleep over the associated issues. But at the beginning of the COVID-19 pandemic, the data on COVID cases was unreliable: they arrived only once a week, were transmitted through unsecured emails, required biologists to spend time they did not have on administrative reporting, and did not allow for contact tracing. What else could they do then but muster their courage and do their best in order to deploy and secure SI-DEP? They would have preferred to have inter-ministerial stakeholders help them more proactively to resolve the numerous blockages they encounter rather than act like Cassandras: by helping them negotiate digital staffing within their ministry, intervening when the specific pay grid for digital profiles is not respected by HR or accounting services, ensuring project support at the highest level, helping counter the arguments of some corporatist unions that do not align with the public interest, and providing specialized expertise.

Conversely, if operational stakeholders were more convincing about the absolute necessity of the infrastructure and perhaps sometimes more proactive in addressing the associated risks, inter-ministerial stakeholders would likely be more able to support them officially in launching the infrastructure while helping secure the project (as is fortunately the case in many instances).

In opposition to soft resistance, a fierce support

Not only are infrastructures attractive, they are also indispensable

◆ DIRECT BENEFITS

These infrastructures are essential for several reasons

1. FOR THE SECTORAL AND BUDGETARY EFFICIENCY OF PUBLIC AUTHORITIES

-a. To Achieve Public Policy Objectives

This is the primary ambition of infrastructures; it is their *raison d'être*.

The seven examples provided illustrate this point: **hese infrastructures are essential for designing and implementing public policies.** In healthcare, for example, they are crucial for managing the COVID-19 pandemic (with SI-DEP) or improving city-hospital coordination and health prevention (with M*on espace santé*), as well as managing medication shortages or alleviating emergency room congestion (with the SAS for *Service d'accès au Soin*). In agriculture, they are vital for improving farmers' income, tracking pesticides, or decarbonizing agricultural production (with Agdatahub). In ecology, environmental labeling, mobility management, and building renovation (to effectively target thermal sieves, estimate the impact of renovations on energy performance certificates, or combat fraud) also require such infrastructures (including the *Empreinte* and *Produits Réels* databases, EONA-X and moB, and the digital housing space). In education, establishing a data-sharing infrastructure is necessary for replacing absent teachers or managing school buildings.

The needs are everywhere! To efficiently circulate companies' non-financial data in green finance; to make rail freight as efficient as more polluting modes of transport. There are needs in justice, for better coordination among stakeholders and a smoother process for litigants; in culture, to better understand both cultural practices and offers and improve public policies; to fight deforestation and ensure, for example, that Europeans do not purchase wood from deforested areas to support the transition to a fairer economy, such as taxing multinational corporations or the "super-rich," etc. **Whenever different public and private stakeholders from various geographical levels need to work together in confidence, they must be able to exchange information effectively and securely.**

These data exchange needs involve all types of stakeholders: local, national, and international public authorities (to manage and evaluate their policies); sector professionals (to do their jobs properly—a doctor to better care for their patient, a farmer to receive an environmental subsidy, etc.); academia and research (to access the data necessary for their work); businesses (see below); as well as associations/NGOs and citizens (to take control of their own health, to have easy access to their children's school schedule, etc.).

Inspection reports frequently point out data-sharing failures among stakeholders as factors that under public policies: Ithe *Cour des Comptes* in 2020 in agriculture, the OECD in 2022 in mobility, IGEDD (2017), the *Défenseur des droits* (2022), IGF (2023), and the *Cour des Comptes* (2022) in housing, etc. The latest report states, for example, that "*The State's capacity seems insufficient given the stated ambitions. In general, the available databases are difficult to access and poorly interoperable. The lack of a global architecture for these applications, their infrequent and uncoordinated updating, and the often overly broad territorial coverage of the data collected reduce their practical value.*"

For public stakeholders to effectively implement the public policies they have promised, it is essential that they establish and lead the necessary data-sharing infrastructures. If we continue to tinker collectively, asking everyone to individually install its own electrical lines and manage its wastewater and waste, not only will it be ineffective for everyone and we will not build a great city, but a health scandal could also erupt. **Data-sharing infrastructure is a sovereign issue, essential for governments to work effectively and for democracies to thrive.**

These recommendations are based on the assumption that public authorities guarantee the general interest. In situations where trust is limited, such as in non-democratic states or to prevent such situations, it is essential to implement mechanisms for transparency and third-party control (such as co-construction with stakeholders required by law, civil society participation in all decisions, open-source projects, audits by neutral third parties like CNIL, etc.), or even to build these infrastructures as digital commons that do not belong to the State (with real challenges in implementation).

-b. For Budgetary Efficiency

Although it remains often complicated to estimate precisely, **digital technology—and particularly data-sharing infrastructures—is an investment whose cost is often several orders of magnitude lower than the savings they generate.**

These savings are very positive and necessary externalities, but they are not the primary purpose of infrastructure (as presented above). Simply put, money—such as the budget or reduction of public debt—is not an end in itself: it is a means to an end, namely the implementation of public policies. It is important to present the savings generated by infrastructures as such to engage stakeholders and overcome obstacles.

In digital health, *Mon espace santé* contributes to significantly reduce redundancy in radiology and biology procedures, estimated between €600 million and €2.4 billion in radiology and €2.4 billion in biology(!) Initially, biologists' unions were reluctant to launch *Mon espace santé* for this reason. It was the return to the primary purpose of the infrastructure that made it possible to overcome the obstacle (providing better patient care, notably by avoiding having patients undergo the same examination twice simply because the report did not reach the right place at the right time). More generally, *Mon espace santé* is an essential tool for healthcare prevention (thanks to vaccination or screening reminders, personalized advice, etc.), which will massively limit the need for medical care.

According to a benchmark by the DG Trésor, the UK estimates that the digitization of the energy system provided for in their Energy Digitalization Strategy would reduce system costs by £30 billion to £70 billion. In green mobility, the company Neovya stated: "*We don't realize the thousands of man-days required to update Excel files and clean CSV files due to the lack of data sharing in mobility.*" The digital space for housing will help combat fraud with estimated savings of over €30 million per year. The introduction of public digital tools for calculating the environmental footprint of products will save approximately €10 million in support for companies to consult with consulting firms in 2024. Without digital technology, this figure would have to be multiplied by 2 or 3 due to the widespread use of environmental labeling. More generally, we know the substantial cost of climate inaction. Just as it would have been impossible to manage the COVID crisis without digital tools, the ecological transition cannot be implemented without effective digital infrastructures.

2. FOR ENVIRONMENTAL AND ECONOMIC EFFICIENCY OF BUSINESSES

For businesses, data-sharing infrastructures also offer several advantages, ranging from basic to highly strategic.

-a. For Simplification

Data-sharing infrastructure is the backbone of administrative simplification for businesses. It enables businesses to communicate their data once and for all, in a one-stop-shop logic. The infrastructure then redistributes the data to all public or private stakeholders who have a legitimate need for it.

As an example, during the pandemic and before the deployment of the SI-DEP infrastructure, biologists had to send COVID test results to several distinct entities via time-consuming and often unsecured channels (Gmail, etc.) so that they could determine the number of cases and implement contact tracing: the ARS, the CPAM, *Santé Public France*, etc. SI-DEP has made crisis management drastically more efficient by enabling biologists to send Covid test results to all necessary public entities via a single secure and automatic channel ("zero-click"). SI-DEP has also saved public officials a significant amount of time, as they no longer had to manually consolidate COVID results from different medical laboratories (previous point).

Similarly, *Mon espace santé* infrastructure means that pharmacists no longer have to send the results of vaccinations carried out in their pharmacy to the patient, their doctor, and their own software. Sharing the data "once and for all" with *Mon espace santé* enables automatic and secure sharing from the pharmacist to all relevant parties.

Administrative simplification was one of the main demands of the 2024 agricultural crisis. A data-sharing infrastructure is necessary so that farmers do not have to send similar documents multiple times to different public bodies in order to receive environmental subsidies when they adopt virtuous practices.

The same logic applies in culture, so that providers of cultural offerings do not have to repeatedly submit the same information to collective management organizations for copyright—to the Ministry of Culture for public policy management, to the Ministry of Economy for fiscal issues, to the National Music Centre, which finances and collects a tax, to regions or departments that are funders, etc.

This infrastructure therefore saves companies time and makes exchanges more secure.

[12] Estimations issues des études: The value of health care information exchange and interoperability; Improving safety and eliminating redundant tests: cutting costs in U.S. hospitals; What proportion of common diagnostic tests appear redundant?; Repeat abdominal imaging examinations in a tertiary care hospital; Trauma: the impact of repeat imaging.

-b. For Environmental Efficiency

Data-sharing infrastructures allow for better organization. **Therefore, they help minimize the resources used for a given activity.**

As explained, *Mon espace santé* helps avoid duplicate tests in biology and radiology acts and improves preventive healthcare, which reduces the need for treatment. This decreases the number of medications and medical devices produced—which accounts for the largest part of the sector's greenhouse gas consumption—and the kilometers traveled by patients to get to the hospital, for example.

In agriculture, data sharing helps reduce pesticide use. By superimposing the exact plot boundaries—obtained from public systems (Telepac) or private plot date management systems—onto the sprayer software from different brands farmers can be more precise, spraying the right amount at the right place and at the right time. This also allows them to spend less on plant protection products.

The Coalition for Reimagined Mobility also estimates that "*data sharing in freight can reduce the sector's emissions by 22% and eliminate 2.5 billion barrels of oil per year.*" However, unlike the two previous examples—which are not likely to suffer from rebound effects—this optimization of freight could potentially lead to overconsumption, making it overall negative for the environment (see previous section).

-c. For Reindustrialization

France and Europe must be in control of their industry so as not to depend on foreign stakeholders who could exploit this economic advantage to impose their foreign policies and values.

Data sharing is a key factor in the competitiveness of industries. Cap Gemini estimates that "*organizations engaged in data sharing within an ecosystem improve their customer satisfaction by 15%, their productivity by 14%, and reduce costs by 11% per year over the past two or three years.*" Aware of these challenges, China has recently changed its accounting rules to allow the recording of "data" as intangible assets on companies' balance sheets. This valuation of data within a company is a crucial first step to accelerating its sharing, as 20% of the efforts in a data-sharing project correspond to identifying data sources (IDC).

◆ INDIRECT BENEFITS

Beyond the advantages for "business" industries, these infrastructures are also indirectly essential in the digital sector to accelerate the deployment of the entire public platform and the creation of an innovative and sovereign digital sector. They are necessary because:

1. TO DRIVE THE DEVELOPMENT OF LOWER-LEVEL DIGITAL LAYERS

While data-sharing infrastructures are not glamorous projects, what can be said about other building blocks of the public platform such as electronic identification tools, directories, or interoperability rules?

To support change, it is useful to have a "flagship" project. *Mon espace santé* is only one project out of 30 on the e-health roadmap, but most publications about the roadmap's progress focus on it. It is the most visible and concrete component of the platform: it is less impactful to state that x hospitals now comply with interoperability frameworks, important as it may be, compared to saying that x hospitals now consult the medical history of patients arriving at the emergency room via *Mon espace santé*.

Beyond communication, the deployment of infrastructure requires prior installation of a large number of underlying components, which generates significant positive externalities. For example, certain cybersecurity rules must be followed to ensure that professionals have access to *Mon espace santé*. The overall cybersecurity of an institution is automatically strengthened, driven by a very concrete use case.

2. TO ENABLE THE DEVELOPMENT OF INNOVATIVE HIGHER-LEVEL DIGITAL LAYERS

As explained, data-sharing infrastructures are essential because they enable stakeholders to fluid and secure access to data. **But they also enable the data to be exploited by those responsible for developing higher-level digital layers.**

They enable the creation of innovative digital services ("walls" of the building) that would not have been possible otherwise. For example, the data collected in ProNote will enable EdTech startups to offer new services. Similarly, e-health industry stakeholders need access to certain patient data to provide innovative digital services (diagnostic support, AI training, etc.) to both patients and professionals. Thanks to *Mon espace santé*, an app developed by the private sector (e.g., "understand my biology results") can offer a service without requiring the patient to upload their results, simply by requesting permission to access their structured lab reports in *Mon espace santé*

They also facilitate the development of artificial intelligence by circulating data that is more likely to serve the public interest. According to Forbes, today "*60% to 80% of AI projects do not meet their expected goals due to lack of access to the necessary data.*" Data does not just appear out of thin air and does not float on rainbows. As indicated in the report "AI: Our Ambition for France," in healthcare: "*In France, digital and AI transformation in healthcare has seen significant progress in recent years, catalyzed by the Covid-19 pandemic. The digital health roadmap has clarified objectives, strengthened confidence in conventional digital tools, and invested in certain infrastructures—particularly common reference frameworks. To develop the interaction capabilities of AI-based tools in the healthcare sector, it will be necessary to provide rich data from dialogue between healthcare professionals and patients. Otherwise, these AI systems will only be trained on non-French data and different healthcare systems. This same data will help develop AI capable of handling some administrative tasks." Regarding education: "The hindering point remains the fragmentation of content formats (paper or digital textbooks) and platforms, both for students and teachers.*"

A slum does not spontaneously see robust and innovative houses emerge. PFor them to appear, they need to rely on water, electricity, and internet networks and be connected to roads, trains, etc.

3. TO AVOID LOSING THE DIGITAL SOVEREIGNTY BATTLE

Just like mastering our sectoral industry, mastering our digital industry is essential for our democratic sovereignty.

Regulating non-European digital stakeholders alone is often not enough to guarantee that the developed tools protect data, ensure the pluralism of sources used, use ethical algorithms, maintain neutrality, ensure an open market, fair taxation, etc. **It is necessary to build alternatives to be fully in control of our long-term destiny.**

Having control over the data-sharing infrastructures necessary for developing artificial intelligence models is essential. This will provide a tangible safety net for imposing our conditions and combating the concentration of the AI market due to vertical integration by existing stakeholders (see note from the DGTrésor). It may also provide more leverage to regain sovereignty over the lower layer of the cloud.

Data-sharing infrastructures are rapidly expanding beyond territorial or national boundaries. Indeed, the European level is often the most appropriate level for addressing issues of sovereignty, and some data sharing needs to be done at the European or international level: for example, for pandemic management, deforestation, plastic pollution of the oceans, methane emissions, the construction of an effective carbon market, or issues of loss and damage in the face of climate crises.

Data-sharing infrastructure faces a paradox: virtually all stakeholders need it but it does not deploy spontaneously. The state must aggregate different needs, crystallize a vision, and get stakeholders on board.

Questions 1 to 7 of the v0 guidelines aim to help infrastructure developers be more convincing in describing the need, in particular by presenting both macro and micro needs, by explaining classic counterarguments and the reasons for previous initiative failures—if any—by reassuring readers about the proactive management of risks associated with the infrastructure, and by explaining why the status quo is riskier than change, particularly because of the threat of uberization.

Urbanizing a slum retrospectively is laborious, but it's also very exciting! In the report on the digital health roadmap 2019-2022, the President of the French Federation of Pharmaceutical Syndicates stated: "*I feel like I'm participating in a renovation akin to what Baron Haussmann did in Paris under the Second Empire but transposed to the digital realm and the 21st century.*"

A data-sharing infrastructure structures, aggregates, links data, and through this, connects stakeholders who can then exchange, understand each other, and work together to change dysfunctional systems in the hope of moving together towards a common destiny. What could be more important?

It is about rediscovering our humanity and free will: what makes a digital project attractive is not the innovative nature of the underlying technologies but the objectives they serve.

They Can be Achieved: Most of the Time, We Just Haven't Really Tried

Public digital projects that make headlines are more often industrial disasters than successes. **However, the State has already managed to deploy highly complex data-sharing infrastructure projects** such as the Déclaration Sociale Nominative **(DSN)**, which allows companies to pay their social contributions and transmit data about their employees to France Travail, the CPAM or the Urssaf, or **impots.gouv.fr**, which makes tax returns and payments as smooth as possible for individuals, etc. **Many other examples could be given in interior affairs, education, culture, defense, etc.**

In healthcare, 3labo—the predecessor to **SI-DEP** for dengue or chikungunya—had not been operational for 8 years. SI-DEP was set up in 3 weeks, allowing reliable and real-time information on the number of COVID-19 cases, implementing contact tracing, and meeting the end of lockdown as announced by the President of the Republic. The DMP had been stagnant for 15 years. After only 2 years, ***Mon espace santé*** automatically collects medical documents from almost all the hospitals and most private healthcare professionals. More than 95% of accounts have been opened and nearly 20 million French people have already used it. This has led the specialized press to headline "*They Didn't Know It Was Impossible, So They Did It!*" (DSIH Magazine) and stakeholders such as the President of France Assos France to state (see the 2019-2022 roadmap report): "*The strategy has taken France from last place in Europe to first place in four years*". The Delegate for Digital Health at Numeum stated "*A real revolution, carried out at an unprecedented speed for the administration, which lays the foundations for the healthcare of tomorrow.*"

Skepticisms had to be overcome one by one, with determination and resilience: the development of *Mon espace santé*, including the technical challenge of updating the DMP up to date, the development of a secure messaging system for over 60 million French people, and the huge cybersecurity and resilience issues. The opening of accounts, a real obstacle to the rollout of the DMP; their management by health and medico-social institutions, thanks to the Ségur program which has enabled the "securization" of the sector (a term used by stakeholders themselves, such as was the scale of the upheaval). Of course, some skepticism still remains about the current and future phases (consultation by professionals, widespread use by French people, including those who are least familiar with digital technology, and innovation for the benefit of patients and professionals).

The "how?" section of the v0 guidelines outlines success factors. These include the internal transformation of the administration (organization and leadership, human and financial resources, work culture, and HR attractiveness) and external regulation for effective co-construction and deployment (commitment levers, coercive levers, incentive levers).

Most of the time, these projects are carried out in a makeshift manner, without any real method behind them: how can we then be surprised by the results? You do not build a water network through guesswork. It is necessary to take the identified factors and implement them one by one with determination: the water network will then be much more likely to be completed on time and within budget!

The most important element—to be implemented first and to which the most time and energy should be dedicated—is the identification of one or more brilliant, committed, and highly determined public officials who will take ownership of the infrastructure. Their ability to persevere despite fear and difficulties is particularly important. They will need to be courageous in the sense described in Violette Bouveret and Jérémy Lamri's book *Oser le courage* (Dare to be Brave): "*The courageous challenge the status quo without being certain of what to do. They have an inner strength that drives them to face challenges, uncertainty, fears, and difficulties with determination and resilience, in the hope of a better world. They defend what they believe in, even if it goes against the general opinion. They refuse to submit to conformity and the easy way out, and choose to fight for their convictions, even if it requires sacrifice. They show empathy, solidarity, and compassion towards those who suffer and need our help.*" These public agents are everywhere! Those who contributed to this report are a very good example. We need to attract more people by highlighting the immense significance of the projects we are working on, our effective and cheerful team culture, our links to the highest levels, and the new, attractive pay scales for digital profiles. Many people are eager to work for the common good as long as the working conditions are decent!

Why This Note?

Why Not?

“There Are Already Plenty of Related Works”

A wide range of strategic and operational, institutional and external initiatives deal directly or indirectly with the subject of public data-sharing infrastructure.

In France, several books have been published on **the concept of platform state or meta-platform state** such as L'*Age de la multitude* (2012, by Nicolas Colin and Henri Verdier), *Ubérisons l'État ! Avant que d'autres ne s'en chargent* (2017, by Clément Bertholet and Laura Létourneau), or *Des startups d'État à l'État plateforme* (2017, by Henri Verdier and Pierre Pezziardi). Many studies have also been conducted on **digital commons** by Matti Schneider, Sébastien Soriano, Joelle Toledano, Serge Abiteboul, Henri Verdier, the National Digital Council (CNNum), the National Agency for Territorial Cohesion (ANCT), or the *Fabrique des Mobilités*. Finally, reports have emerged on the more specific topic of **data-sharing**, notably by the Digital New Deal Foundation, such as *Partage des données et tourisme* (2020) or *Data de confiance : le partage des données, clé de notre autonomie stratégique* (2022).

On the institutional side, multiple French stakeholders are involved in this issue:

- **Sectoral stakeholders responsible for digital technology in their field, linked to public policy,** such as the “Digital and Data” unit of the SGPE, the Ministerial Delegation for Digital Health (DNS) at the Ministry of Health, the Delegation for Educational Digital (DNE) at the Ministry of Education, and the Digital Departments (DNUM/SNUM) in other Ministries… and the public operators supporting them. Each publishes its own **“operational” digital strategy** (currently being coordinated by the Interministerial Directorate for Digital Affairs within the framework of CITP/CIN for central administrations), sometimes accompanied by legislation establishing specific data infrastructures, such as the 2019 law on the organization and transformation of the health system **(OTSS)** for *Mon espace santé* and the Health Data Hub. Some operators also focus on specific work on commons, such as the IGN or the ADEME (digital commons creation, calls for projects on commons…).
- **Cross-Sectoral stakeholders responsible for "internal" digital technology linked to public** transformation, such as the Interministerial Directorate for Digital Affairs or the INSEE. Historically responsible for providing digital tools to public agents (Interministerial State Network, Digital Suite…), the Interministerial Directorate for Digital Affairs’ missions have gradually evolved towards more operational subjects, driven notably by state startups and the opening of sectoral data (and the associated 2016 law for a digital Republic – **LPRN**). The Interministerial Directorate for Digital Affairs has its own **digital strategy**.
- **Public Cross-Sectoral stakeholders responsible for "external" digital technology linked to economic development,** such as DGE, the SGPI, and associated operators or independent authorities (Caisse des Dépôts, BPI, CNNum, ARCEP…). Historically responsible for the telecommunication sector, the DGE and the ARCEP have gradually seen their missions evolve towards the "upper layers" of the internet with European regulations relating to digital platforms and data, and their transposition into French law with the 2024 law aimed at securing and regulating the digital space **(SREN)**. Beyond these increasingly sectoral “sticks,” the DGE, the SGPI, and their operators also play an important role in distributing “carrots” (French Tech, calls for “data space” projects, etc.) to support the economic development of private digital stakeholders, many of whom focus on sectorial use cases. The DGE has also published the French "**digital decade**" strategy in line with the European "digital decade" strategy.

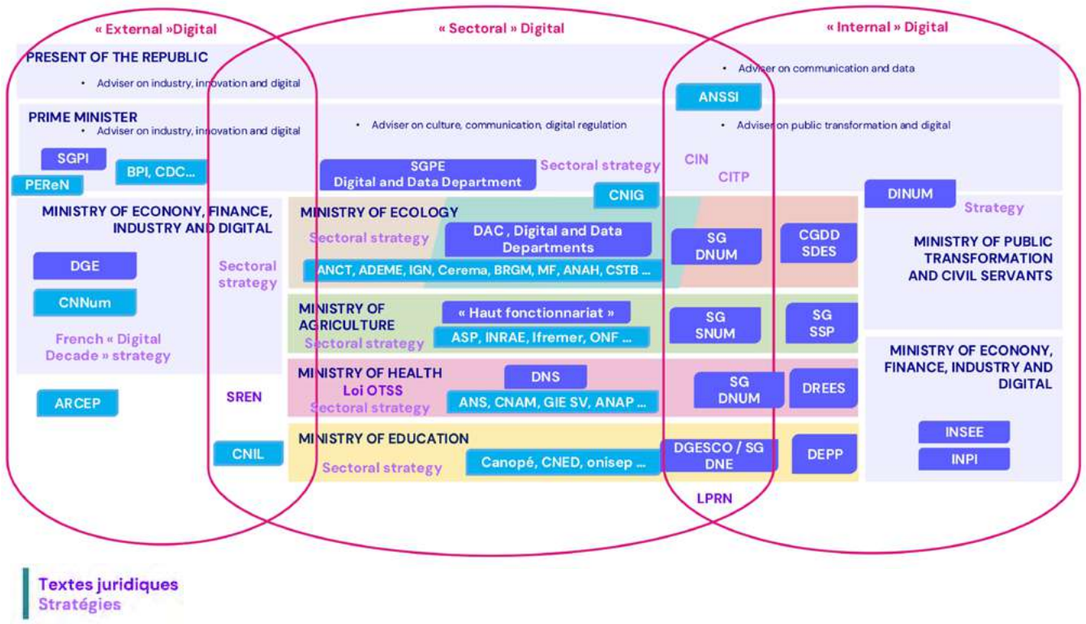
The course of history therefore dictates that these national stakeholders will increasingly work on overlapping digital projects specific to their fields.

Numerous data-sharing initiatives have emerged at the European level, such as the Data Act which facilitates the portability of data produced by connected objects, the **Data Governance Act** which established the status of "data intermediaries," the European strategy on "**common data spaces**," the first of these to be implemented in the healthcare sector with the associated regulation, and the creation of the status of EDIC (European Digital Infrastructure Consortium). Many public or private organizations also orbit around this topic, such as the EDIB, the DSSC, GAIA-X, Manufacturing-X… Germany has also launched a data-sharing infrastructure project in the automotive industry, Catena-X, with a budget of about €220 million over 4 years.

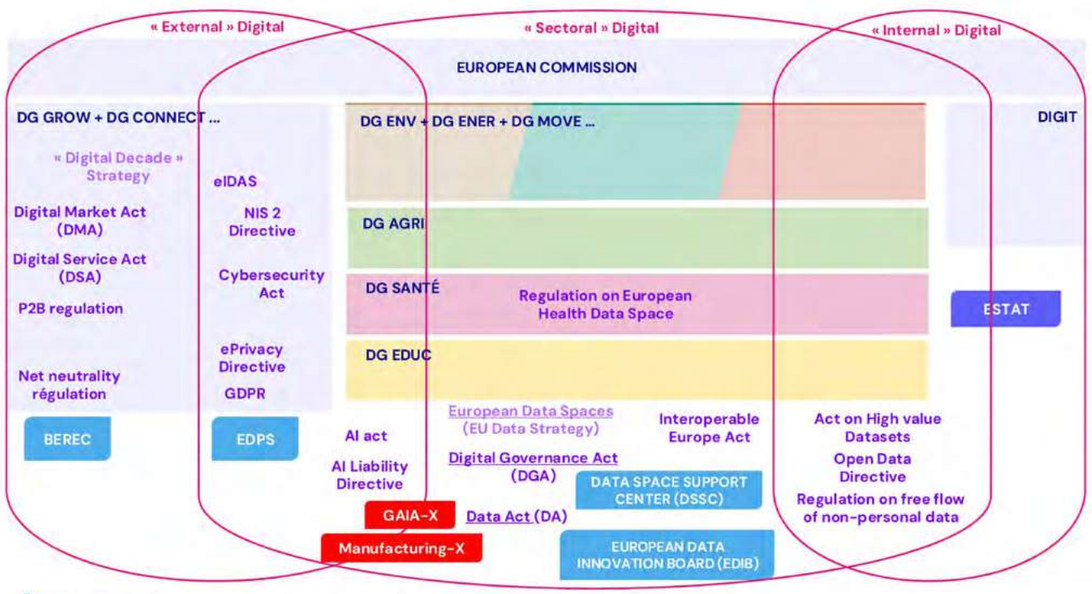
At the European level, although it can sometimes be challenging to navigate, the topic of data-sharing infrastructures is being addressed and funded much more extensively than it is at the national level (amounting to over €3 billion).

The topic of Digital Public Infrastructures (DPI) is also well identified at the UN level: by the Secretary-General in its Digital Compact, by agencies like the International Telecommunication Union (ITU) and the United Nations Development Program (UNDP) that have launched workshops on the subject, or by the United Nations Environmental Program (UNEP), which has written a report on DPIs in the service of ecology.

CURRENT NATIONAL GOVERNANCE



CURRENT EUROPEAN GOVERNANCE



“To live happily, let’s live hidden away”

This argument is what made us hesitate the most about undertaking this work. Why? Because while the central administration is an incredible concentration of individual talent, the likes of which few private companies have ever seen, our collective organization often suffers from serious dysfunctions that are a source of inefficiency and discontent (similar, incidentally, to those sometimes found in large private companies). **These problems are magnified tenfold in data-sharing infrastructures.** As previously explained, these projects face a number of challenges: they often straddle multiple ministries, require the mobilization of diverse expertise (technical, legal, economic, etc.), involve high short-term risks and only yield concrete benefits in the long term, and are little known and poorly understood. This makes project organization challenging to the point of envying “The Place that Sends you Mad” from The Twelve Tasks of Asterix.

It often takes seeing it to believe it. **However, feedback from project managers is unanimous: political support as it is often practiced today carries major risks.** In healthcare: “*If the cabinet had closely followed Mon espace santé and the Ségur du numérique in their early stages, we would have never been able to get the project off the ground.*” In responsible consumption: “*Once the issue became political, it remained deadlocked for six months and almost fell through.*” In agriculture, from an external stakeholder: “Raising funds is a piece of cake by comparison!” Indeed, despite the context of the agricultural crisis and strong support from stakeholders in the agricultural and environmental spheres, it took 9 months to arbitrate the need for a public data-sharing infrastructure that capitalizes on the work carried out by the ecosystem. In the public sphere alone, the decision involved convincing 49 (!) stakeholders in at least one bilateral meeting each, in addition to collective meetings. The project involves the ministries responsible for agriculture (senior civil servant, SNUM, DGPE), for ecology (CGDD), for economy (DGE, APE, CGE, DAJ), for digital technology, for public transformation (Interministerial Directorate for Digital Affairs), for the budget, as well as Matignon, associated bodies (SGPE, SGPI), the advisors at the Elysée, the Caisse des Dépôts, and BPI. Beyond the perhaps inevitable involvement of all these bodies, discussions are complicated by the lack of a clear interministerial vision on infrastructure. Furthermore, several teams are involved within each organization: the “digital” and “agriculture” teams at the SGPI and the SGPE, the “internal digital,” “external digital,” and “international” teams at the Ministry of Agriculture, the “digital,” “ecology,” and “simplification” teams at the DGE, the “investor” and “France 2030” teams at the Caisse des Dépôts... The absence of a single point of entry per organization complicates coordination. Finally—and this is by far the most problematic—among the 49 identified stakeholders, only 16 are public officials whose role is to produce or provide specific expertise. The remaining 33 (!) mostly belong to the ministries’ cabinets. They provide general—sometimes strategic—opinions which often has the power to block but not to validate a decision on its own.

The number of advisors is considerable. This is due to the number of ministries involved and the presence of deputy ministers and secretaries of state: before the 2024 parliamentary dissolution, digital technology had its own cabinet, distinct from the ecology cabinet to which it reported; housing had its own office, separate from the ecology office to which it reported; agriculture had a minister and a deputy minister, and two associated offices... It can also be explained by the hierarchical structure of the cabinets, which include the digital advisor (when identified, as the role sometimes overlaps with that of several technical advisors), the Deputy Director(s), and the Chief of Staff.

Their volatility is very high. Not only do advisors often rotate with ministers, who rarely stay in office for more than 2 or 3 years, but they also frequently change even when their minister remains in office. Not to mention the deputy directors and cabinet directors, the 2019-2022 digital health roadmap has seen seven digital advisors come and go (for 2 ministers). During the 9 months of negotiation in the agricultural sector, 3 different digital advisors were responsible for the issue on behalf of the Ministry of Digital Affairs and 2 on behalf of the Ministry of Agriculture. This turnover rate is exhausting for project leaders: often, as soon as they manage to convince and gain the support of one advisor, that person leaves.

Their impact is often limited. The cabinets are often made up of highly intelligent, dynamic people who are quick to understand, work hard, and fight to advance the issues that are important to their minister. Nevertheless, and regardless of how brilliant individuals may be, their role is minimal compared to the magnitude of the task: it consists of making strategic decisions about the project, which is necessary but amounts to a drop in the ocean for projects where the most complex and time-consuming task is the execution. Their experience is also often limited when it comes to digital issues. It is not uncommon for technical advisors to be under 30 years old: they simply have not had time to develop strong expertise and vision. While this sometimes makes it easier for project leaders to convince them, it also requires significant training time. Finally, even when advisors are convinced by the project, they are faced with a complex (multifaceted) decision that must be made in a short period of time among many other urgent issues (“*In the cabinet, we gloss over issues*,” said one interviewee), a risky decision in the short term and whose long-term benefits their minister will likely not see (and which receives little or no support from interministerial digital stakeholders—see above). This decision often leads to friction with administrations or operators who are required to undergo transformation (even though advisors often come from these areas or wish to return to them afterwards: the Health Insurance Fund for Health, the DGE for Digital or Economy, the Interministerial Directorate for Digital Affairs for Public Transformation, etc.).It is therefore not uncommon for advisors to block, deprioritize, or overwhelm project leaders with additional note requests, while the latter are often first required to follow the “Fake it until you make it” logic. The best way to help them is therefore not to ask them to answer all complex questions that are bound to arise in advance, but to give them the means or at least the authorization to work. When advisors do muster the courage to make these decisions, they still have to convince their bosses and set in motion organizations that wield considerable political clout (such as the French national health insurance system, often referred to as the “real Ministry of Health” and whose leaders have frequently held responsibilities at Matignon). These organizations sometimes prefer to play for time rather than moving in a direction that does not suit them on the orders of a young advisor who will likely no longer be there in a few months. This can also be understood given the chaos sometimes imposed by the political world.

This inertia is magnified when the project leader does not report directly to the firm but to several middle managers, as is still often the case.

The people behind data-sharing infrastructure are often engineers who are passionate about developing concrete projects. **Instead of taking the long and difficult road to political support, where the cost/benefit ratio is highly questionable, they often prefer to go "under the radar":** convincing the necessary internal and external experts of the value of the infrastructure and starting to work with them on a project basis, informally and with limited resources.

When making important decisions becomes unavoidable, such as securing a substantial funding or getting provisions included in legislation, they more or less consciously resort to the tactic of "reverse lobbying": encouraging as many external stakeholders as possible to appeal to politicians about the importance of the project, in order to obtain the necessary decisions. This is what happened with most of the decisive decisions related to *Mon espace santé*: the opt-out approach was pushed by a member of parliament; the innovative "open and non-selective system" allowing software providers to be directly subsidized for connecting to *Mon espace santé* was strongly advocated by healthcare professional unions and patient associations; the obligation for providers to connect to *Mon espace santé*—coupled with penalties for non-compliance—was pushed by the providers' unions themselves (!)... In agriculture, despite the strong support from the ministries responsible for agriculture and ecology, the shift to a public-majority governance of Agdatahub would not have been successful without the constant pressure from agricultural chambers, agricultural unions, and digital startup unions on the government officials. **Politicians make the final decisions but the impetus comes from outside, in support of a vision co-constructed with internal experts, in a kind of permanent system D.**

Infrastructure is often built "underneath," in a sort of permanent makeshift system.

It is true, but at the same time:

This is an unfortunate reality: we improvise, we lack consistency, and in many cases, we struggle or even fail.

Existing documents often remain conceptual, and their articulation is difficult to grasp

On the one hand, institutional work often remains fairly conceptual and is sometimes confusing.

It regularly overlooks the "why?": what is the purpose of the project and the associated values framework? Where is the "manifesto" mentioned above? For instance, in its January 2024 working document on common data spaces, the European Commission begins with the "how?" by discussing recently adopted regulations and allocated funding, without first presenting the vision these measures are meant to serve. When the report addresses the objectives of data spaces, it often focuses on economic issues, stating that these spaces are "*the basis for creating innovative products and services, improving productivity, and resource usage*" without going any further: what kinDof societal project does it serve? This compass is essential for aligning, engaging, and making the project a collective adventure involving public, private, and civil society stakeholders.

The description of the actions to be taken to achieve these objectives ("what?") does not always explicitly mention data-sharing infrastructures and/or may resemble a random list of actions or use cases. The French "Digital Decade" strategy mentions for instance telecommunications networks, quantum computing, edge computing, and cybersecurity but does not mention data-sharing infrastructure and does not always link these elements to specific use cases. Presenting the systemic vision is very important in order to understand the interdependencies between topics: digital services share their data through data-sharing infrastructures; they rely on identification tools, common standards, and physical hosting infrastructures that operate via the telecommunications network; the data they produce is analyzed for management, research, and innovation purposes, and in turn is used to create new services. This is the meaning of the urbanization model illustrated by a building in healthcare, education, and ecology sectors. This representation is also essential for clearly presenting the division of roles between the public and private sectors, and within the public sector between different geographical levels. It allows stakeholders to naturally situate themselves within the ecosystem by understanding where and with whom they operate.

More importantly, this work often lacks practical, up-to-date advice on "how ?" for those who are actually doing the work. A Fnac review of "Ubérisons l'État!" stated: "*A good book that was missing given the nation's stakes. It's regrettable that it says little about how the public sector should concretely tackle these issues. For a public servant, it is a little source of frustration*". Additionally, in national and European institutional work, it is often assumed that the work is done once the budget has been negotiated and a decree or regulation published. In reality, this corresponds to only 5% of the project: the bulk of a successful deployment method lies elsewhere.

On the other hand, the relationship between these different areas of work is very difficult to grasp from a practical perspective.

Several concepts overlap without being quite equivalent: the platform state, data-sharing infrastructures, digital commons, common data spaces, data intermediaries as outlined in the Data Governance Act... Without delving too rigorously into precise definitions (which do not always exist), we could consider that "data-sharing infrastructures" to be one of the components of the platform state (or, more accurately, the "public platform"). They rely on other components of the platform located below them in the structure (databases, identification tools, standards...). The various components of the public platform could be considered as somewhat special "digital commons." Commons usually refer to products like Wikipedia or Linux, defined as "*resources produced and/or maintained collectively by a community of heterogeneous stakeholders, and governed by rules that ensure their collective and shared nature.*" This definition is inspired by the definition of physical commons, where the challenge is to prevent depletion (forests, water, soils, etc.). In the digital realm, Matti Schneider distinguishes two types of commons. "*Those whose informational value can only be maintained by the continuous investment of a multitude of stakeholders,*" such as Wikipedia or Linux: the challenge is to "*prevent reappropriation and maintain the community's ability to contribute.*" These commons are digital services that do not benefit from being unique; they are in the competitive domain ("walls" of the building). The other types of commons, on the contrary, can "*exist without the active and continuous contribution of their users*". Data-sharing infrastructures are certainly closer to this second category, since the data shared does not correspond to the creation of new content but to an existing asset for the stakeholders involved. They also resemble "public goods"—in the sense of "the Public Administration's private goods"—governed as commons, i.e with rules shared within the contributor community, according to Matti Schneider. Since these infrastructures are a mandatory point of passage, the challenge is less about looting resources than about charging for their use (avoiding abuses associated with the "gatekeeper" position). Perhaps more accurately, data-sharing infrastructures primarily address the "*need to pool assets in the collective interest*" identified by the *Fabrique des Mobilités*, namely the general interest (i.e., living beings and not just a collective of private stakeholders), which justifies their public governance. "Data intermediaries" are stakeholders adhering to certain requirements (neutrality, transaction security, notarization of exchanges, etc.)

and contribute to the deployment of “shared data spaces.” These spaces do not necessarily and exclusively serve cases of general interest. Data spaces complement the requirements arising from the data intermediary status with governance rules, technical rules, etc.

Among all these concepts—which can sometimes be difficult to grasp—the term “data-sharing infrastructure” has emerged as particularly relevant. On the one hand, because it echoes the existing European and UN terms EDIC (European Digital Infrastructure Consortium) and DPI (Digital Public Infrastructure). On the other hand, because the term “infrastructure” is more concrete than “platform,” “commons,” or “space.” It reminds us of physical infrastructures (water network, sewage, etc.) whose characteristics are very similar to data-sharing infrastructure: they are multi-stakeholder projects, not very glamorous but without which everything would be built on sand, whose realization is complicated, expensive and time-consuming, but which enable the pooling of resources and services necessary for communal living.

At the national level, work to coordinate the various digital strategies for different sectors is recent and ongoing, led by the Interministerial Directorate for Digital Affairs. **At the European level,** real political impetus and significant resources have been provided, but it is not always easy to understand the complementarity between the various regulations, strategies, and organizations involved in this area.

These limitations can be explained in part by the relatively low level of maturity of the subject. To date, while some countries such as India have built very interesting data-sharing infrastructures, no country can really be considered a model for France or Europe to replicate.

After a legitimate phase of a rapid growth in initiatives, a phase of gradual structuring must now begin. As with previous digital topics (such as statistical analysis or open data), work on data-sharing infrastructures must be tackled head-on, aggregated, and lead to more operational publications and better-structured governance (like the ministerial statistical services coordinated by INSEE or the ministerial data administrators coordinated by the Interministerial Directorate for Digital Affairs).

It is necessary, healthy, and realistic to develop a shared official vision.

Data sharing infrastructures need to constantly challenge the status quo. Today, the makeshift system described above often seems unavoidable in order to get these infrastructures off the ground. **As demonstrated by projects that are already successful or well on track, this makeshift system works to a certain extent. There are far too many shortcomings to be satisfied with it.** At best, projects are progressing too slowly in relation to the stakes; at worst, they never see the light of day. In any case, project management is a source of unnecessary tension between stakeholders and is literally exhausting.

Project leaders often feel like they have to move mountains to secure minimal resources. In 2024, laborious negotiations were required to create a €250 million fund for the implementation of the 147 actions of the "Digital and Data for Ecological Planning" roadmap, of which only a dozen pertains to data sharing infrastructures. This fund was reduced to €20 million by the Ministry of Economy, even though it announced at the same time that the development and sovereignty of AI would rely on the European single data market, and that national infrastructures was an essential component. This amount is two orders of magnitude lower than the actual need. The numerous FTEs negotiated for digital technology for 2024 have been put into practice in existing digital projects or, in the vast majority of cases, redirected to non-digital positions. While these two needs are clear, the proportion of FTEs allocated to new data-sharing infrastructure projects is far too low given the challenges involved. This allocation has not been called into question by the interministerial committee.For the specific case of Agdatahub, it took 9 months of heated discussions among public stakeholders to shift the governance to a public majority, to secure approximately €1 million in budget and one internal FTE, which is a far cry from what is actually needed. Many external stakeholders involved in data sharing infrastructures report being "*exhausted from trying to engage ministries and secure funding*."

The distribution of roles among public stakeholders is unclear and even inconsistent, leading to contradictory instructions. The example of Agdatahub highlighted the huge number of people involved, most of whom have the power to block the project on grounds that are not clearly defined. What role does the Ministry of Agriculture play compared to the Ministry of Ecology, Economy, Digital Affairs, Public Transformation, SGPE, SGPI, and operators (e.g., Caisse des Dépôts, BPI)? Who is responsible for validating business needs, seeking public or private funding based on these needs, working on business connection levers, and being the public point of contact for Agdatahub’s management? Similar confusion exists for data sharing infrastructures in housing: who is responsible for answering the 17 questions in the guidelines between DGE—which receives funding requests from operators and private stakeholders—and the DGALN of the Ministry of Ecology, which is responsible for sectoral public policies? In education, due to insufficient investment, the Ministry cannot fully fulfill its role as a provider of digital services to its staff and other stakeholders, such as local authorities, who are eagerly awaiting a data sharing platform. To compensate for this lack of resources, the Directorate for Digital Education must rely on temporary budgets—such as PIA or France 2030—and convince funders of the value and impact of its policies. Decisions on digital investment in education are partly made by stakeholders other than the Ministry, who may not share the same policy objectives. This situation is common among ministries seeking funding, which tread a fine line when it comes to explicitly mentioning these shortcomings, as they risk losing access to their main source of funding if they do not obtain a transfer from existing pockets to the state budget. It is not uncommon to see reports from the Ministry of Economy’s general inspectorates criticizing ministries for failing to share data needed to evaluate and streamline public policy, even though the tools to improve the situation (funding aligned with sound governance, mandatory connection for businesses, etc.) have been blocked by departments within the Ministry of Economy itself, due to a lack of a common interministerial vision supported at the political level.

The co-construction with external stakeholders is not sufficiently transparent and representative of stakeholders. As explained, data sharing infrastructures can change the power dynamics among stakeholders by breaking major positions and information asymmetries. Private stakeholders or trade unions representing the corporation that feels aggrieved by the project will almost always escalate the issue to political figures to express opposition. If all stakeholders—particularly those who best represent the "general interest" (e.g., patients, students and their parents, the planet, citizens directly...)—are not represented to give their opinion, the project is likely to be blocked by those who shout the loudest. It is therefore essential that political opinions be informed in a rigorous and transparent manner by all stakeholders involved, including those who have fewer means to be heard. The development of an interministerial doctrine will greatly assist in arbitration: politicians will be able to counter opposition from the corporation by indicating that it is part of a doctrine that goes beyond its own sector, much like European politics sometimes help to advance issues blocked by corporations with little legitimacy at the national level

The current organization is a source of workplace discontent and even serious health issues for public agents. On the one hand, the dissonance between the fundamental nature of data sharing infrastructures—and at worst, the invisibility of the issue, or at best, the amateurish approach to it—is a source of anxiety for public servants. It is reminiscent of the feeling experienced by health ministry officials as the lockdown approached, when some media outlets were still referring to it as “a bad flu,” or the frequent sentiment among Ministry of Ecology officials when they are overruled on matters of vital importance. On the other hand, moving these projects forward largely relies on individual initiatives of courageous officials fighting to change a framework that no longer serves its intended purpose, often at the expense of their work-life balance and sometimes their careers. Overwhelmed by ineffective orders, unbearable working hours, and a lack of recognition, many end up resigning or falling ill. This HR disaster is the ultimate failure. It is unacceptable.

Unfortunately, this situation applies to many other areas beyond data sharing infrastructures, and even beyond the digital realm and the public sector. Nonetheless, it remains unacceptable. It is essential that we take a step forward and grow collectively. We must do better.

We can do better. The solutions to address issues of governance, of HR, political and administrative organization, deserve to be addressed in their own right. The "how?" part of the guidelines outline paths to explore. Without going into details here, it is essential to break the vicious cycle of distrust among administrations and between administration and politicians.

Central administration agencies are largely made up of smart public officials with a strong commitment to the general interest. Infrastructure providers need to be able to explain their needs to other public agencies in a clear, educational, and convincing way. When everyone takes the time to explain the underlying reasons for their opinions, to embrace complexity methodically, to listen to others with empathy, setting aside their preconceptions, demonstrating imagination, and going beyond their strict prerogatives—if necessary—**here is no reason why you cannot build a competent, united, and highly determined project team.** This is what was achieved in the successful examples mentioned above.

Between politics and administration, the blame is to share. To caricature the situation—which is of course more complex and highly dependent on individuals: political folly (wild turnover rates, short-term "political" orders in the wrong sense of the term, etc.) can lead central administration to protect itself. It then pushes its projects forward in a direction and at a pace that it considers rational. Some would say it is thanks to these civil servants who " keep the show on the road " that public services are not collapsing, while others argue that this "deep state" makes France unreformable. Cabinet members come out of this frustrated, which sometimes leads them to micro-manage and dive into issues in fits and starts instead of providing a strategic vision... and the administration protects itself from this. **However, most ministers are well-intentioned and capable of understanding that, while the project is certainly not short-term, it is nonetheless essential, and that the ecosystem will be grateful for the groundwork being laid.** For the project to work, they need to set the overall strategy, step up when internal or external political support is needed, and otherwise let us go on with our work. At the beginning of *Mon espace santé*, the Elysée asked: "*What will we see in 6 months?*". Dominique Pon, co-pilot of the e-health roadmap, indicated: "nothing," and explained. Minister Agnès Buzyn strongly supported the project in the National Assembly in 2019, and her successor Olivier Véran reinforced it with the Ségur du numérique in 2020. They were able to include the digital issue in their achievements, even though the years 2019-2022 were largely spent building "the foundations of the building" (see, for example, the article in Les Echos: "*Despite the crisis, the 2019 roadmap commitments on digital health have been fulfilled*"). A year and a half (and 5 ministers) later, Minister Catherine Vautrin introduced the two-year anniversary of *Mon espace santé* by saying: "*This project is brilliant, and I say that all the more simply because I had nothing to do with it!*".

The prerequisite is political in the noble sense of the term: to bring about a collective and ambitious vision based on reality.

Jean-François Caron, former Mayor of Loos-en-Gohelle, a model of a sustainable city, sums up this mindset: "*You have to go from the pebbles to the stars. A star to dream on and to inspire, and small pebbles to set things in motion and mark out the path.*"

This work attempts to contribute to this by proposing a first draft that is intended to be modified, supplemented, and, we hope, endorsed.

Field-based, illustrated by 7 real-life examples, so that the business stakes behind this seemingly "tech" topic are easily understood; so that we can easily imagine the concrete impacts and move beyond posturing; so that we can understand the basic obstacles encountered internally, beyond grand concepts; so that the examples given make an impression, help us put ourselves in the shoes of those who are carrying out the projects, and make us want to alleviate their struggles

Collective, even though, as French people—and especially as engineers and civil servants—it's not exactly our strong suit given how much we like to intellectualize, debate, play devil's advocate, nitpick, and explain why everything is more complicated than it seems. Each public or external stakeholder—whether focused on digital or specific sectors—holds a piece of the solution. It is necessary to consolidate our contributions, make them consistent, and propose an additional consolidated building block. It is also necessary to break through the sound barrier and finally reach beyond the specialists in the field. We no longer have the luxury of squabbling over details between public digital stakeholders and private stakeholders. We must be united, stick together, bring out the 90% of guidelines that unite us, and work on the remaining 10% as we go along. Otherwise, we will once again be uberized within a framework of values that do not reflect who we are.

Ambitious, despite its consensual nature. To rise to the ecological emergency and the social and societal challenges of the century at the national, European, and international levels. This requires not giving up on the systemic vision—however overwhelming it may seem. The building that presents the structure of the projects, the questions covered by the “why,” the “what,” the “how”... Like the ecological transition, everything is interconnected, and there is no magic solution that would justify not doing everything else. It also requires moving forward with determination with quick steps in an evolutionary and agile approach. By agreeing to publish these v0 guidelines—even though they are not perfect—we hope to put something on the table and encourage others to dive into the subject and make progress.

2

WHAT?

For each data-sharing infrastructure, set the winning machine in motion

These guidelines are a version 0 produced by a small group of public and private stakeholders particularly committed to this issue. **They are intended to be adapted and supplemented with feedback from all relevant internal and external stakeholders to produce a version 1.** They will then be updated on an ongoing basis as the subject matures.

The answer to each question is rarely unique. **More often than not, it consists of an analytical framework that must be examined through a range of indicators.** While answers are frequently evolving and dependent on the sector, history, and operational as well as relational context, it is crucial that they be clear at a given moment.

Firstly, the guidelines aim to help infrastructure develop a convincing argument for the "why," i.e., the infrastructure's *raison d'être* and the value framework that should be associated with it. **This is a challenging but essential step to ensure that all stakeholders are fully convinced of the need and are determined** to find solutions to the problems that will inevitably arise in the future.

If the need is confirmed, then the "what?" helps to arbitrate the questions that systematically arise regarding the characteristics of the infrastructure. If this infrastructure is essential for implementing a public policy, it must be unique and lead by the public within the scope of the relevant use cases. **The economic model and the centralized/decentralized nature are obviously important questions but often monopolize the debate to the detriment of the other 15 questions in the guidelines, which are just as necessary.**

The concept of a "public platform" includes a technical part, defining "who builds what" between the public (infrastructures) and the private (digital services). It also includes an organizational part, defining "how we work together". **This latter part is the most important, the most complex, and the most frequently overlooked.** It corresponds to the "how?" of version 0 guidelines. The six criteria developed pertain to both the internal transformation of public organizations and their way of co-constructing and regulating the external environment. They should permit the winning machine to be set in motion. In short, it is about introducing methods and humanity to make democracy much more pleasant and lively.

In reality, the three parts are not sequential. It is particularly the co-construction described in the "how?" that should lead to answers to the previous two parts. Moreover, beyond the elegance of theory, the characteristics of the infrastructure defined in the "what?" must be decided pragmatically based on the "how?": what is most likely to work?

Guidelines v0

Why?

Is a data-sharing infrastructure necessary? What should be the associated values framework?

1. [Macro needs] From a sectoral point of view, what does each stakeholder need to do and with which data?

2. [Micro needs] What are the first envisioned use cases?

3. Are there any internal or external initiatives already set to build such an infrastructure? From which stakeholders?

4. What are the reasons behind the failure of existing initiatives, and/or the arguments against constructing the infrastructure?

5. What is the relevant geographical level (local, national, European, international)?

6. What are the risks associated with this infrastructure, and what values should govern it?

7. If this infrastructure does not exist, what are the alternative scenarios and what are their risks?

What?

What should the technical, economic and governance characteristics of this infrastructure be?

8. Should there only be a single infrastructure, or can there be several?

9. How should this infrastructure be governed in terms of public/external roles?

10. What should the economic model for this infrastructure be?

11. Should this infrastructure be centralized or decentralized?

How?

What are the criteria for the successful development and deployment of this infrastructure?

Internal transformation:

12. What organization and support?

13. What human and financial resources?

14. What work culture and HR attractiveness factors?

External regulation for effective co-construction and deployment:

15. What levers of stakeholder commitment?

16. What coercive levers ("sticks")?

17. What incentive levers ("carrots")?

1. [MACRO NEEDS] FROM A SECTORAL POINT OF VIEW, WHAT DOES EACH STAKEHOLDER NEED TO DO AND WITH WHICH DATA?

HEALTHCARE INFRASTRUCTURE

Patients must be able to retrieve their own personal data in order to take control of their health (understand and take action, seek a second opinion, etc.).

All healthcare and medical professionals on a person's healthcare team must exchange data in order to provide the patient with proper care: general practitioners, nurses, physiotherapists, pharmacists, hospitals, nursing homes, emergency services, etc.

E-health industry stakeholders need access to certain patient data in order to offer innovative digital services (e.g., sending reminders/alerts or training AI).

Several unexpected uses of *Mon espace santé* have emerged. For example, a bariatric surgery service used the infrastructure to send follow-up photos of obese patients and support them in rebuilding their self-confidence. Another example: beyond the data that Withings can retrieve from *Mon espace santé*, the startup saw strong interest in feeding it with ECG data from its connected watches so that cardiologists could access it more easily and use it for preventive care. Many such use cases are continually added, such as providing information regarding end-of-life wishes.

AGRICULTURE INFRASTRUCTURE

Farmers need to share data such as their agricultural practices on their land or livestock, environmental data (water consumption, weather, etc.), and economic data (yields, prices, etc.) in order to benefit from advice and/or better remuneration.

Economic stakeholders in different sectors (cooperatives, traders, agri-food industries, etc.) need access to farmers' data in order to offer them appropriate decision-making tools and develop sectoral segmentation approaches (low carbon, health quality, organic farming, production under specifications).

Agricultural advisory stakeholders (chambers of agriculture, livestock consultants, startups, distributors, etc.) need access to farmers' data such as plot data (TELEPAC, winegrowers' register) or livestock data (EDE), technical route data, IoT data (weather stations, etc.), agricultural machinery data (tractors, combine harvesters, milking robots, etc.),or climate related data to provide personalized services to farmers.

The state and local authorities need to collect agricultural data to verify that farms comply with current regulations and to support the management and deployment of European (CAP), national, and local public policies.

Many use cases are regularly added, such as those related to simplifying procedures for farmers following the agricultural crisis.

HEALTHCARE INFRASTRUCTURE

Patients must be able to access—and regenerate in case of loss—their test certificate (Covid certificate) produced by the SI-DEP infrastructure for tests and by *Vaccin Covid* for vaccins. This allows them to print it or store it in an application (e.g., *TousAntiCovid*) so they can access certain locations by presenting their certificate.

Epidemiological monitoring stakeholders (SpF, DREES, CNAM, ARS primarily) need consolidated data to provide reliable figures (incidence rates, screening rates, etc.) for transparently (media, open data publications, etc.) and to regularly adapt policies (e.g., enhanced measures in a region).

Healthcare stakeholders (ARS, CNAM, SPF) needed real-time contact information for people who tested positive—through nearly 5,000 testing sites in France—to conduct contact tracing (phone calls to encourage self-isolation and notify people they have been in contact with).

CONSUMER INFRASTRUCTURE

Scoring experts need to rely on shared and verifiable data (i.e., reliable data) in order to assist brands in quantifying the impacts of their products.

Manufacturers are looking to promote their best practices and innovations by sharing their impact modeling so that it can be adopted, particularly by their customers.

Brands want relevant and stable signals on products' impact to guide their investment decisions and inform their customers.

Distributors and applications need easy access to the impacts of products modeled by brands.

Public authorities (fraud prevention agencies) need to be able to easily control environmental claims, especially the impacts brands declare about their own products.

EDUCATION INFRASTRUCTURE

Each education stakeholder (students, teachers, inspectors, local authorities' representatives, school administrators, and central government officials) must retrieve data about themselves or data useful for fulfilling their role (learning, teaching, providing school transport or meals, cleaning, maintaining and heating premises, replacing absent teachers, etc.).

All education professionals (teachers, administration staff, academic HR managers, etc.) within an institution must exchange data to facilitate teaching.

MOBILITY INFRASTRUCTURE

General interest use cases:

Accessibility - Mobility stakeholders (operators, station and airport managers), tourism stakeholders, AOMs (Organizing Authorities for Mobility), local authorities, and the State must assist people with reduced mobility in their travel. To ensure these transport modes are as low-carbon as possible, it is essential to find alternatives to individual cars.

Safety - Public authorities—especially the Ministry of the Interior—need to receive information that enables them to effectively respond in the event of crises such as terrorist attacks.

HOUSING INFRASTRUCTURE

Citizens must be able to retrieve and submit information about their housing in one centralized location, enabling them to better understand and act on their housing situation, and to prepare pre-filled applications for renovation assistance. Upon purchase, they should be aware of its condition and any potential work that needs to be carried out.

All professionals (contractors, advisors, etc.) must share information about themselves (quotes, technical analyses, etc.) and consult certain necessary data for their tasks (work, support, etc.).

The Administration must manage and assess public renovation policy based on the analysis of available data on work and consumption.

It is crucial to consider this project as an infrastructure from the beginning. Otherwise, projects are done sequentially as new roles/data arise (advisors, consultants, etc.), leading to tensions because the need for this infrastructure was not established from the start.

DOCTRINE

Several elements signal the need for a data-sharing infrastructure:

- **A large number of stakeholders are involved in the infrastructure, as producers and/or users of the data shared.** Typically—as with water or electricity networks—these stakeholders are both public (several ministries, operators, geographical levels, etc.) and external (private sector, civil society, etc.).
- **It is not advisable for these stakeholders to use a single business tool; rather, they need the data produced by others to carry out several of their missions.** Thus, their business tools, "workflow tools" ("digital services" in the home), need to connect to a digital hub that aggregates necessary data ("core infrastructure" in the home).
- **This data is identifiable, i.e. linked to objects or people** (object or individuals): a patient, a building, an agricultural plot, a weather station, an animal, etc. These entities must be identified by a unique identifier. The infrastructure is either linked to the entity (e.g., *Mon espace santé, Espace Numérique du Logement*) or is more general (e.g., agriculture or education infrastructure).
- **Data sensitivity: All or part of this data is often sensitive for various reasons** (personal data, data subject to trade secrets, data with significant governance implications, etc.). Its exchange needs to be secured and guaranteed by a neutral trusted third party.
- **There are many use cases for the infrastructure.** Some have already been identified, others will emerge unexpectedly, and many will be added with new public policies that are very often accompanied by a need to share data: it is inherent to infrastructure to enable agility and innovation; it does not define all use cases ex ante. Not all use cases for electricity and the internet were thought of before these infrastructures were deployed. They were put in place for specific needs, which were then multiplied considerably.
- **Despite this uncertainty, the infrastructure must be conceptualized from the start precisely to allow for agility in future use cases** (e.g., the lack of Digital housing space hinders the implementation of highly evolving public renovation policies). The deployment of the infrastructure will be guided by the initial use cases imagined but must be constructed with an overall vision to achieve the desired systemic effect.
- **The description of macro needs is essential alongside the description of micro** needs (question 2). The two are complementary.

2. MICRO NEEDS: WHAT ARE THE FIRST ENVISAGED USE CASES

HEALTHCARE INFRASTRUCTURE

Patients can automatically retrieve their hospitalization report to find out the details of their surgery and share the document with their physiotherapist so they can adjust the rehabilitation program accordingly.

Patients who have lost their prescription and need to go back to the pharmacy to get their prescription can find it in their health space and send it automatically, or via secure messaging, to the pharmacist before or when they go.

Patients who lost their proof of vaccination (Covid, yellow fever, etc.) required for international travel can find it in *Mon espace Santé*, where it has been automatically inserted and securely stored.

Without asking the patient to download their results but simply by asking for authorization to access their structured biology reports in *Mon espace Santé*, an app developed by the private sector (e.g. "comprendre mes résultats de biologie" [understanding my biology results]) can offer a service that it would not otherwise have been able to offer.

HEALTHCARE INFRASTRUCTURE

The Ministry of Health can provide reliable incidence figures on television starting May 10, 2020, during daily press conferences.

The Health Insurance can call new COVID-19 cases for contact tracing, which was the basis for the first easing of lockdown restrictions in May 2020.

AGRICULTURE INFRASTRUCTURE

Farmers producing field crops can share their technical itinerary data, parcel data from TELEPAC, and energy consumption data with collecting organizations (cooperatives and trading companies) and other industry stakeholders to certify the sustainability of biofuels and receive a low-carbon bonus.

Biofuel industry stakeholders (crushers, oil companies, methanizers, etc.) can have access to data calculated by storage organizations to justify the integration of biofuels as substitutes for fossil fuels that emit greenhouse gases.

Wine producers can share data on practices, parcel information, and their analysis results to provide regulatory nutritional information on wine bottles via a QR code.

Farmers can consent to automatically share phytosanitary product usage data from their OADs in order to contribute to ongoing state statistical experiments.

CONSUMPTION INFRASTRUCTURE

Public authorities can establish a reference methodology for evaluating the environmental impacts of textile products based on shared, transparent, and high-quality data (*Empreinte* database).

Public authorities enable widespread deployment of environmental labeling by making product impact data calculated by brands accessible to all, including distributors, consumption apps, associations, citizens, and public authorities (*Produits Réels* database).

EDUCATION INFRASTRUCTURE

Students, parents, and teachers can retrieve schedule information on their tablet or smartphone (in the calendar app and not a third-party app) updated in real time by educational teams.

Educational teams can activate learning traces to better identify concepts that their students have not mastered and address them with new personalized courses and exercises.

Local authorities can access information regarding room booking to organize and adjust cleaning schedules or optimize heating based on actual usage.

The school district can have data on schedule changes to better manage short-term substitution or produce indicators for public policy tracking, such as the *Pacte*.

MOBILITY INFRASTRUCTURE

People with reduced mobility can indicate their accessibility needs in the MyTravelConnect's Travel Folder, which is shared with all relevant professionals—without the need for re-entry the information—thanks to EONA-X. They receive adapted route recommendations based on road and transport accessibility data provided by local authorities and route calculations from public or private MAS apps. Using moB, they access all French mobility services from a unified Connect. It also offers third-party payment services for transportation: employees do not have to pay the employer's share of public transportation passes, the ZFE subsidy for changing modes of transportation, or local government assistance for solidarity-based transportation.

During the 2024 Olympic Games, public authorities received necessary information (transport connections, delays, etc.) to ensure delegations' safety.

INFRASTRUCTURE LOGEMENT

Homeowners can be offered assistance within their digital housing space. They automatically retrieve the technical specifications for their home (DPE, previous work carried out, consumption, etc.), consult various quotes for the work and easily complete a pre-filled application for financial assistance.

Homeowners can set up data sharing with their Renov' advisor and the companies involved in their housing renovation to receive optimal advice. They can specify whether they authorize the transfer of consumption data to evaluate renovation effectiveness.

A *France Rénov'* advisor or Renov' assistant can exchange with a household to guide them through the next steps in their renovation journey.

DOCTRINE

- **It is necessary to be very precise in describing the first use cases considered even if they seem very specific compared to the overall ambition.** In addition to describing the macro needs, these use cases will help to demonstrate the value of the infrastructure, prioritize its deployment, and build confidence in its ability to meet broader needs.
- **Some use cases are more convincing than others when:**
  - **They use data for primary rather than secondary purposes**. Using data to enable better patient care, for communities to reduce energy consumption in schools, or for farmers to easily obtain environmental subsidies is very often widely accepted — unlike using data for health research (who retrieves the data), for identifying schools struggling with teacher substitution (fear of micromanagement), or for monitoring the reduction in pesticide use (concern about agribashing). Far from deprioritizing secondary use over primary uses, data collected for primary use cases will still serve secondary uses when deemed legitimate.
  - **This is especially true since the primary use case involves managing a financial flow and/ or makes it possible to improve the reliability of a process for individuals or professionals.** For example, payment of *Ma Prime Renov* to individuals or environmental bonuses to farmers. In these cases, it is necessary to be able to easily identify a trusted third party, especially in case of problems
  - **They are related to highly visible current events.** Such use cases can significantly boost the deployment of the infrastructure. For instance, the organization of the Paris Paralympic Games (2024) is accelerating data sharing to ensure smooth travel for people with reduced mobility.
  - **They help reduce public spending** by avoiding redundant medical procedures or combating renovation fraud.

3. ARE THERE ANY EXISTING INTERNAL OR EXTERNAL INITIATIVES TO BUILD SUCH AN INFRASTRUCTURE? BY WHICH STAKEHOLDERS?

HEALTHCARE INFRASTRUCTURE

The public predecessor to *Mon espace santé* is the *Dossier Médical Partagé* (DMP), initially launched by ASIP *Santé* (now the *Agence du Numérique en Santé*, ANS) and later taken over by CNAM. It has been a long-standing issue since its launch in 2004 (nearly €1 billion spent and several reports from the Court of Auditors), and its use was struggling to take off.

Private stakeholders have launched their own digital healthcare records, such as Apple (the health app), Doctolib, and several small startups.

HEALTHCARE INFRASTRUCTURE

SPF had created an initial project for a centralized data monitoring system from laboratory management systems (project 3labos). In reality, many epidemiological reports were done using simple tables requested by ARS, which did not ensure completeness and ran the risk of double counting.

Laboratories have sometimes set up result servers to transmit said results to patients. Some providers have pooled these infrastructures among multiple clients (e.g., bioserver).

AGRICULTURE INFRASTRUCTURE

Between 2014 and 2018, numerous initiatives emerged around agricultural data: European Code of Good Data Sharing Practices (COPA), two CASDAR research projects (API-AGRO on open data and Multipass for consent), reports commissioned by Minister of Agriculture Stéphane Le Foll (AgGate and then Innovation 2025 by Jean-Marc Bournigal, President of IRSTEA).

In 2018, 30 agricultural organizations created the company API-AGRO to develop and operate this data-sharing infrastructure, joined between 2020 and 2022 by Caisse des Dépôts, INVIVO, and Avril to accelerate the industrial development of the Agdatahub platform, with support from PIA3 and then France2030.

In 2022/2023, the first use cases were being deployed with lead organizations in France (*Chambres d'Agriculture* France, interprofessional organizations, etc.). Agdatahub is a flagship Gaia-X project which coordinates the European AgriDataSpace consortium, in a context of gradual implementation of the new regulatory framework on data (DGA, Data Act), including data intermediation.

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

Public sector: Initial French (Ademe impact base) and EU (EF3.0) databases but with limitations leading to their cessation. For food products: Agribalyse base backed by a GIP Ademe/INRAE. A relevant model but limited to food products.

Private sector: Ecoinvent is the world's largest life cycle inventory database. It is a Swiss association initially created by Swiss universities. With the development of use cases, the structure is growing (around 60 employees) and evolving towards service provision with databases dedicated to specific clients (e.g., partnership with IKEA).

***PRODUITS RÉELS* BASE:**

Public sector: INIES database, limited to the construction sector, on which RE 2020 regulations are based.

Private sector: Open Food Facts, Yuka, but relying on a simplified methodology (Eco-score) that is not sustainable.

EDUCATION INFRASTRUCTURE

The principle of an "Education Data Hub" was explored during an investigation that brought together education stakeholders (ministries, operators, local authorities, EdTech companies) and was led by MENJ and Inria. Following the consultation phase, the platform has emerged as a "*multiform object, a source of varied imaginations, and presenting risks of dispersion of efforts and future disappointments*."

Furthermore, some needs were soon met by initiatives such as the IDEE program from DEPP or the Edupilote product for educational digital management.

Some private software used in institutions do not allow data sharing.

The ministry preferred to refocus the project towards a mature use case: data sharing between the State and local authorities.

MOBILITY INFRASTRUCTURE

EONA-X is an association created in April 2022 by major transport and tourism stakeholders (AF KLM, Amadeus, Groupe ADP, SNCF, Renault, Accor, Marseille Airport) to set up a decentralized trusted data-sharing space based on automated digital contracts governed by predefined rules and free or paid access depending on the data sets. This space aims to operate with at least 200 members (both private and public) within 5 years to ensure sufficient data representation. It is funded by France 2030. The first use case will be operational for the Paris Olympic Games (management of JOP delegations' journey from the airport to the Olympic village). Use cases are defined by the members themselves, EONA-X manages the member community and ensures the provision of the open-source platform and the federated catalog of members' datasets.

moB is developed by the association La Fabrique des Mobilités, with financial support from Ademe (and previously from a CEE program). It is the first initiative of its kind—still incomplete—to build a national Mobility Connect, tailored to each territory, and shared tools to target public funding.

HOUSING INFRASTRUCTURE

On the public sector side, a call for projects was launched in June 2016 by PTNB (Plan *Transition Numérique dans le Bâtiment*) to test, develop ideas for exploitation, and come up with concrete solutions. 12 winners tested solutions until 2018, but the legal texts that followed this experiment, such as the decree of December 22, 2022—related to the Housing Information Booklet—did not establish a digital component for the centralization of information to be kept about a property.

On the private sector side, several stakeholders have clearly positioned themselves on digital housing information booklet solutions such as Leroy Merlin with Hommy, EDF and Docaposte with Monha, and the association Qualitel with Cléa. While only the latter solution is in production, Monha and Cléa are extensions of award-winning solutions tested under the PTNB framework. External stakeholders are emphasizing the need and sending out “messages in a bottle” to the public to ensure a service offer matching the stakes of renovation, via a digital housing space. An association of private CIL operators is currently being discussed and structured.

DOCTRINE

As with physical infrastructure, building data-sharing infrastructure is extremely complex and often faces execution difficulties in terms of deadlines, budget, quality, etc.

Repeated previous failures is more often the mark of a real need rather than that of a bad idea (e.g., DMP, predecessor to SI-DEP 3labos, Agdatahub, housing information booklet). This is especially true if the initiatives were taken by stakeholders close to the field—whether public (operators with a concrete public service mission, etc.) or private (professional unions, industry stakeholders, etc.)—who need said initiatives to carry out their business missions (e.g., managing the epidemic, enabling farmers to easily access environmental subsidies, distributing renovation aids).

More often than not, it was not about the idea being bad, but simply about us not trying enough or well enough!

4. WHAT ARE THE REASONS FOR THE FAILURE OF EXISTING INITIATIVES AND/OR THE ARGUMENTS AGAINST BUILDING INFRASTRUCTURE?

HEALTHCARE INFRASTRUCTURE

After 15 years of failure with the DMP, *Mon espace santé* faced much ridicule and skepticism at its inception regarding the public authorities' ability to deliver ("*You've just given the DMP a lick of paint*"; "*It's impossible to create a public app store for healthcare*"; "*Just leave it to Doctolib*"). Personal protection issues were also raised ("*The Data Protection Agency will never approve it*").

Public authorities did not have control over private tools, which prevented them from using said tools for public policy purposes (promoting personalized prevention messages, gathering information on medical deserts, etc.), ensuring that data was shared securely (hosting, encryption), or that the tools were based on ethical economic models (no data sales or advertising for medications). Additionally, the multiplicity of physical healthcare records prevented professionals and patients from communicating through a single channel.

AGRICULTURE INFRASTRUCTURE

Several difficulties were encountered:

Lack of financial security: the energy spent on securing the structure's finances hinders fundamental work and prevents medium/long-term planning.

Risks to the sovereignty of the infrastructure: significant funding is required to develop and operate the infrastructure. Large international private stakeholders taking over is a real risk.

Criticism over the lack of neutrality pointed out by some digital companies, who refuse to "hand over the keys to data sharing" to a private infrastructure; non-compliance with European criteria requiring majority public governance in order to become a reference infrastructure at the European level.

The private nature of the structure also prevents the use of regulatory incentives or coercive measures, to encourage the ecosystem to connect to it, even though this is essential for scaling up secure data sharing.

HEALTHCARE INFRASTRUCTURE

The predecessor of SI-DEP 3labos did not succeed in terms of coverage, merely creating a sample of a few groups of laboratories and failing to establish a unique data reporting format.

One of the difficulties was the scale of the task, with over 5,000 laboratories covered by hundreds of different IT systems (laboratory management – LIS) from various suppliers, with differing IT systems. The interoperability format defined by the state at the time was not being followed, with multiple other formats (*H' médecin, H' santé,* HL7, etc.) existing alongside each other and were not directly interoperable.

No sufficient use case had necessitated the construction of a data infrastructure, compounded by concerns over data centralization and the lack of financial incentives for the stakeholders involved.

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

Initial French (Ademe impact base) and EU (EF3.0) databases: the reference base is established through a call for tenders on a given date. It cannot evolve and therefore has a limited lifespan. It does not offer complete transparency on assumptions which raises questions about its legitimacy as a basis for public policy and makes it difficult to challenge or expand upon.

Ecoinvent: the base operates well and serves as an international reference for LCA experts. However, access to data requires a license, and the enrichment process lacks public legitimacy.

***PRODUITS RÉELS* DATABASE:**

Open Food Facts, Yuka: these are based solely on simple data displayed on packaging. They are limited to food products and do not allow for accurate calculation of environmental impacts, particularly as they do not include data held by brands. Their legitimacy is disputed. Limited reuse.

EDUCATION INFRASTRUCTURE

During a consultation of education stakeholders to build a national "Education Data Hub" platform, very different—but legitimate—expectations were expressed, making implementation particularly difficult. However, some of these expectations are being addressed by other initiatives currently underway.

The DEPP offers the IDEE program to enable researchers to access and use the data necessary for their work.

The DNE is working with local authorities to develop an Edupilote dashboard to manage the rollout and impact of digital technology in education at the local level.

Private software may want to limit data sharing to force users to remain within that software, thereby avoiding any risk of competition. Indeed, the implementation of interoperability standards can be seen as a way of facilitating the emergence of competitors. This stance is not legitimate, as it eliminates competition and stifles innovation.

Nevertheless, access to data remains a major legitimate issue in education.

MOBILITY INFRASTRUCTURE

EONA-X is an emerging Data Space initiative still under construction. There is therefore no failure yet, but there are risk factors or arguments against it, such as the complexity of the technology and the entry cost, which might be too high for some stakeholders to get on board or disproportionate in relation to the use case to be deployed. One of Data Spaces' strengths is their ability to build and manage trust between stakeholders who are either competitors or unaccustomed to cooperating together. EONA-X is initially driven by large private stakeholders. Initial use cases with public stakeholders are being developed but are still recent, and the integration of smaller stakeholders remains to be demonstrated.

The moB program is funded by public money (Ademe), and led by an association (FabMob), but is not an official national program, which limits its adoption. Deployment is carried out on a project basis, with voluntary local authorities and operators. The governance/financing structure is not suitable for widespread implementation (Public Procurement Code, etc.). moB was developed as an infrastructure capable of supporting a large number of users, making the tool complex and less agile when it comes to deploying new use cases. The value proposition sometimes seems too vague.

HOUSING INFRASTRUCTURE

One of the main reasons for the failure of the housing information booklet relates to the principle of free ownership and the constraints a digital booklet could impose on property owners. A 2020 opinion from the State Council refers to a "strong presumption of unconstitutionality" and points, on one hand, to the lack of clearly defined general interest objectives, broad and costly obligations, and, on the other hand, to poorly defined obligations imposed on property owners.

Other reasons why an optional digital space has not been created include development and hosting costs and fear of performing worse than private solutions, the absence—until 2024—of clearly identified key data (unique housing identifier) that facilitates the retrieval of all relevant data for the same property, and the difficulty of aligning the ecosystem of digital tools from increasingly diverse stakeholders for renovation (Renov' Advisor since 2024). This predominance of private solutions poses a risk of lack of neutrality in information booklets, with, for example, a Leroy Merlin booklet that would give priority to work by partner tradespeople.

DOCTRINE

Several elements characterize the difficulties encountered by a data-sharing infrastructure:

- Discussions about the infrastructure are often fragmented and do not take place at the appropriate level given the stakes. **Essentially, it is ineffective.**
- This lack of dynamism is paradoxical considering that all stakeholders need this infrastructure and most recognize it, but project ownership rarely occurs spontaneously. **It is necessary for the state to drive, aggregate, and catalyze interests so that the infrastructure can actually be built.**
- **When objections to building a public infrastructure are explicitly formulated, they rarely involve questioning the need.** More often, they emphasize concerns about proper execution, whether operational (*"we don't know how to do it"; "we can't afford it"; "we'll do much less than the private sector"*) or legal (*"such-and-such a text prevents us from doing so"; "it won't get past the Data Protection Agency"*). When similar public initiatives have already failed, these fears are exacerbated (e.g., DMP, predecessor to SI-DEP 3labos, housing information booklet, etc.).
- **When stakeholders have a better understanding of the issues at stakes, they may also fear corporatist reactions** *("such-and-such a professional union will oppose it")***, be afraid using a sledgehammer to crack a nut** (building infrastructure when simple information exchange by email or with a basic API would suffice), **or argue that other projects are necessary prerequisites for building the infrastructure and that it is urgent to wait** (e.g., a certain identifier or the API-ization of a database for the digital housing space).
- **Existing external initiatives pose several problems for both public authorities and private stakeholders who do not support the infrastructure themselves**:
  - **Continuity**: the project is struggling to find a satisfactory and/or ethical economic model (e.g., one that does not charge patients or farmers, or sell their data or advertise medications, pesticide, or renovation tools). The only options for raising private capital that does not fluctuate wildly are often for these infrastructures to be financed by ancillary activities (e.g., digital consulting for the agricultural world), through exclusive partnerships (e.g., Ecoinvent), or at a loss by a financially strong stakeholder seeking to take a controlling position (e.g., Google or John Deere in agriculture), to the detriment of the necessary neutrality.
  - **Neutrality**: private stakeholders who are not involved in the infrastructure criticize the access control position taken by one of their competitors (e.g., La Ferme Digitale's criticisms of Agdatahub). Without neutral governance, the infrastructure serves specific interests (economic interests of the stakeholder behind it) before serving the general interest. Furthermore, without a neutral arbitrator, the stakeholders behind the infrastructure struggle to agree on standards, methodologies, data access rules, etc., that are essential for its proper functioning.
  - **More generally, democratic issue**: the governance does not allow public authorities to control one of the critical elements in implementing their public policies (e.g., providing personalized health prevention, deploying environmental labeling, reducing pesticide use, accelerating housing renovation). Furthermore, it does not allow—or make it difficult to guarantee—the security of sensitive data, the reliability of information provided to citizens and professionals, and/or the risk of fraud (e.g., regarding housing renovation aids)

5. WHAT IS THE RELEVANT GEOGRAPHIC SCALE (LOCAL, NATIONAL, EUROPEAN, INTERNATIONAL)?

HEALTHCARE INFRASTRUCTURE

- Most healthcare is provided locally, so the most pressing need for healthcare data exchange is at the regional level. Prevention is more of a national concern. Some exchanges are also necessary at the European or international levels (e.g., French citizens abroad, tourists in France, pandemics, rare diseases).
- Stakeholders are often familiar with each other at a very local level, but the regulations governing healthcare professions build trust at the national level. Distrust tends to exist between different healthcare professionals (e.g., doctors vs. medico-social workers).
- Public health policies vary from region to region (via ARS) but those related to *Mon espace santé* are largely consistent across France.
- The foundational rules and infrastructures needed are (and must be) at least national. A small portion of these are European (e.g., GDPR, e-IDAS, SNOMED CT, etc.).
- The ability to deploy the service to the French population and negotiate with software providers and professionals/institutions is much stronger at the national level.
- *Mon espace santé* is a national infrastructure. Regional tools—which must include more advanced features than a simple record—must be connected to it. It relies on the rules and infrastructures available at the European level. The European Health Data Space federates national infrastructures. France has played a leading role in its emergence and in the development of the underlying rules (e.g., SNOMED CT, ethics).

AGRICULTURE INFRASTRUCTURE

- There is a pressing need for secure data exchange at the local level (department/region) between farms and their direct partners (cooperatives, traders, agri-food industries, agricultural chambers, startups, banks, insurers, etc.). These needs are generally "reassured" by sector-specific projects led by national inter-professions
- Public policies associated with the infrastructure are consistent at the national level due to the involvement of the relevant ministries and ASP (TelePAC), and at the regional level for territorial policies.
- The European level defines the regulatory framework (DGA, Data Act) and interoperability standards (Gaia-X, ISO/CENELEC), which are being deployed within the Agricultural Data Space currently under development until 2028. The foundational rules (ethics, interoperability, security) and foundational infrastructures (identifiers) necessary for the infrastructure are consistent at the national level due to the actions of the infrastructure operator, in conjunction with those of other Member States (notably through the ongoing EDIC Agrifood).
- Network and/or pooling effects will have the greatest leverage (communication, bargaining power with stakeholders who need to connect to the infrastructure, etc.) at the national level thanks to industry clusters and public policies.

HEALTHCARE INFRASTRUCTURE

It is essential to cover the entire national geographic scope and the different types of laboratories (private, public) that actually carry out the screening (PCR, etc.), followed by pharmacies conducting testing (antigen tests, etc.).

Indicators from SI-DEP are published on a national, regional, departmental, and local scale (IRIS level). The European level (ECDC) used data from SI-DEP published by SPF.

CONSUMPTION INFRASTRUCTURE

The relevant scope is international, at the least European.

With the Citizen Convention for Climate and the Climate and Resilience Law, France is effectively in a pioneering position. It is the first country to make environmental labeling mandatory.

However, it is important to enable and prepare for the convergence of these French works with the European framework (PEF, ESPR, Green Claims). Work on the *Empreinte* database should therefore be coordinated with European reflections on the future EF 4.0 base (starting in 2026). Moreover, the calculation method—which determines the environmental costs reported in the *Produits Réels* database—must be consistent with future updates to the PEF framework (2026) and category rules (PEFCR).

EDUCATION INFRASTRUCTURE

- Education is a local mission, so the most pressing need for data exchange is at the regional level. Management is more national. Some exchanges are also necessary at the European or international levels (e.g., Erasmus).
- Stakeholders know each other at the local level but national educational policy builds trust at all levels, from national to very local. There is more distrust among private stakeholders offering turnkey management tools.
- Public educational policy is applied at the local level (through regional educational authorities) but could be largely standardized across France with a national infrastructure.
- The infrastructure and rules should be national. A small portion of them is European (e.g., GDPR, e-IDAS).
- The ability to deploy the service to students and teaching staff is stronger at the national level. While scattered, the ability to negotiate with software providers is fairly strong at the regional level.
- The education data infrastructure is national in order to facilitate access to data for all national and local stakeholders.

MOBILITY INFRASTRUCTURE

Mobility can be both very local and very international, with roles overlapping in a very structured way. At the European level: financing major infrastructure, standards and rules for organizing interoperability and the European transport system (particularly cross-border routes). At the national level: digital tools and infrastructures for interoperability (e.g., Single Title, PAN, Carpooling Proof Register), adaptation and promotion of standards, national-scale projects, organization of major road, rail, or airport infrastructures, public safety, and major events. At the regional and local levels, with AOMs: organization of daily transport (infrastructure, services, financing, applications, data), with a "leading" role for regions. At the local level, many responsibilities handled by different local authorities overlap and create additional needs for data cooperation.

For example, in terms of accessibility: in La Rochelle, 4 services cooperate with their tools and databases (roadways, green spaces, buildings, and mobility) and work with *Nouvelle Aquitaine Mobilités* (regional level) to disseminate information to users via MaaS tools. The state provides the National Access Point for the dissemination of accessibility, transport, stop base data, etc.

HOUSING INFRASTRUCTURE

A lot of data (e.g., DPE, audits, RGE companies, building data) are consolidated at the national level, and rules and best practices are also framed nationally. Some aid is national. Data-producing stakeholders are often at the national level (e.g., energy companies).

Stakeholders involved in housing (e.g., France Rénov advisory spaces, *Mon Accompagnateurs Rénov'*, RGE companies) are at the local level, as do some of the assistance programs. However, the accreditation or certification of these stakeholders is carried out at the national level.

➧ Therefore, the relevant scope for this space is national.

DOCTRINE

Several elements must be taken into account:

- Where is **the need for data exchange** most pressing?
- Within what scope do infrastructure stakeholders work with **confidence**?
- To what extent are **public policies** related to infrastructure consistent?
- Within what scope are the **core rules** (ethics, interoperability, security) and **core infrastructure** (identifiers) necessary for the infrastructure consistent?
- In which areas will **network and/or pooling effects** have the greatest leverage (communication, negotiating power with stakeholders who need to connect to the infrastructure, etc.)?

- **As with physical infrastructure, each geographical level has advantages and disadvantages** (e.g., electricity grid, water supply, roads, etc.).
- **The principle of a public platform is fractal**: Ithe regional platform relies on the national platform, which itself relies on the European and international platforms (Russian dolls). **It is particularly essential to use the foundational rules and infrastructures of the higher level as soon as they exist** (e.g., interoperability standards, electronic identification tools).
- It is important to determine at which geographic level the visible interface of the infrastructure for users ("front") will be located, even if several intermediate collectors remain (e.g., *Mon espace santé* and the European Health Data Space, SI-DEP, or the *Empreinte* database). Sometimes, multiple interfaces from different geographic levels may coexist, especially while developing strong interoperability between tools (often necessary to avoid placing complexity on the user). The more mature a subject is, the more likely it is to be addressed at a higher geographical level. These decisions are often evolving, but **it is necessary that the urban planning rules between similar infrastructure at different geographical levels are clear at all times and provide visibility on possible future developments.**
- **It is often advisable to prioritize—early on—efforts at the national level** in order to meet the Pareto of stakeholders' needs and avoid complicating governance with diplomatic issues. It is also important to gain credibility and enhance our ability to convince at the European or international level (e.g., *Empreinte* database).
- **It is nevertheless essential to be involved or even lead work at the European level or higher** by contributing to key decisions on standardization, urbanization, and methodology (e.g., *Empreinte* database, Covid certificate, *Mon espace santé*) and, in some cases, by offering to lead emerging structures (e.g., European Health Data Space, AgriDataSpace). This is necessary because these elements will eventually be imposed at the national level, since Europe is the right level to achieve digital sovereignty, and because some use cases are at the European or international level (e.g., rare diseases, CAP, mobility, carbon border tax...). This may involve pragmatic collaborations with countries most inclined to move forward, for example within the framework of the European Digital Infrastructure Consortium (EDIC) at the European level. Such collaboration could also lead to the networking and/or pooling of all or part of national infrastructure between countries.
- **If specific data-sharing infrastructure is necessary at the regional level, it is often essential to pool underlying technical solutions between regions in order to reduce costs and maximize chances of success.** This is because such infrastructure is complex and requires a critical mass.

6. WHAT ARE THE RISKS ASSOCIATED WITH THIS INFRASTRUCTURE AND WHAT VALUES SHOULD GOVERN IT?

HEALTHCARE INFRASTRUCTURE

The most pressing risks associated with *Mon espace santé* include personal data breaches, concerns about a big brother state ("health dictatorship"), undermining equal access to healthcare due to the digital divide, and to a lesser extent, the dehumanization of healthcare and the increased impact on the environment due to this digital tool.

The associated framework of values was established at the outset for the entire digital health roadmap, with a commitment to developing digital technology that is ethical, humanistic, citizen-centered, and sovereign. This has resulted in numerous general measures on ethics and data security, which have been applied in particular to *Mon espace santé* (co-construction of the tool with patients and associations via annual "citizen committees," early involvement of the Data Protection Agency and ANSSI, data hosting in France, establishing a network of ambassadors to train digitally marginalized individuals, eco-design criteria for the catalog, etc.).

AGRICULTURE INFRASTRUCTURE

One of the main issues is gaining farmers' trust, who might be reluctant to share data for general or public interest if they do not have functional and legal means to control the use of their data (preservation of economic value) and defend themselves against misuse (combating "agribashing"). European legislations—particularly the Data Governance Act (DGA) and the Data Act—regulate data intermediation (trusted third parties, transparency, and data transaction security), the unlocking private data sets, and the generalisation of consent/permission principles prior to any data exchange, specifying in particular which partners use the data, for what purposes and for how long.

Another issue is the digital divide with farmers who are less inclined to use digital technology, which requires a support network dedicated to digital inclusion, such as that provided by the Chambers of Agriculture.

The *France Nation Verte* roadmap, which includes agriculture infrastructure, includes ethical measures aimed at proactively regulating the creation and use of digital infrastructure.

HEALTHCARE INFRASTRUCTURE

Due to its centralized form, SI-DEP raised concerns about security and was perceived by some as a potential "big brother" state (data controller).

To address this, data processing was exceptionally regulated by legislation, with very limited purposes, data types, and data recipients. Data retention periods were kept very short (a few months).

Hosting was provided by the ministry's trusted subcontractor (the Île-de-France University Hospital, AP-HP), which is HDS certified, worked closely with ANSSI, and has undergone several CNIL audits. A risk analysis and extensive intrusion tests were carried out, and access (for professionals and patients) was via multi-factor authentication.

A data breach occurred in September 2021, involving a file extracted from SI-DEP in 2020 and placed on a transfer platform (without an expiration date due to an error), on which a software flaw appeared with an update a year later.

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

Risk (limited) of sensitive data breaches: in order to be presented transparently, life cycle inventories must be accompanied by all the assumptions made (quantity of chemicals used in agricultural production, electricity consumption of an industrial process, etc.). If this data is average, it is not sensitive. If a production or industrial process is controlled by a single stakeholder, sharing the life cycle inventory could expose sensitive data. However, this seems to be a marginal case and could be addressed specifically.

***PRODUITS RÉELS* DATABASE:**

Risk of leakage of data subject to trade secrets: some of the data used to calculate the environmental cost may be covered by trade secrets (e.g., food product recipes). It is therefore important to treat such data with caution and store it in a secure infrastructure.

EDUCATION INFRASTRUCTURE

The main risk is related to students' leakage of personal data—since they are largely minors. The second risk is the perception of the data infrastructure by teachers as an extension of a big brother-type ministry.

The main value of the education data infrastructure is the development of useful, ethical, humanistic, citizen-centric, and sovereign digital solutions. This has been reflected in numerous general actions on ethics (establishing a data ethics committee for education) and data security (early involvement of the CNIL and the ANSSI, data hosting in France).

MOBILITY INFRASTRUCTURE

The main risk is that users/travelers will perceive the infrastructure as a means of locking them into an offering provided by a closed oligopoly of stakeholders seeking to increase or secure their market share, rather than providing solutions truly tailored to users' needs. The infrastructure also risks maximizing the business performance of a few stakeholders at the expense of collective interests (e.g., environmental issues, inclusivity, etc.). These risks align with question 9.

The values the infrastructure should promote are neutrality toward private stakeholders, openness to small stakeholders (SMEs, startups, local stakeholders, etc.), environmental considerations, and inclusivity.

France Nation Verte's roadmap, which includes mobility infrastructure, contains actions on ethics aimed at proactively regulating the creation and use of digital infrastructure.

HOUSING INFRASTRUCTURE

The main risk is that the infrastructure could be perceived as a means of controlling occupants and disciplining them regarding how they use and transform their homes (too much mandatory information, monitoring of consumption, etc.). For example, consumption data and work records—even with environmental goals and for the benefit of households—can be seen as a form of "green dictatorship," similar to how Linky meters were initially perceived.

Data breaches are another major risk associated with this infrastructure.

Eventually, as many market stakeholders are very far removed from digital tools (small tradespeople), there is a risk of centralizing and rigidifying supply.

The values that must govern this infrastructure should be citizen protection, the autonomy of those involved in renovation, the beneficial nature of the features offered, and the impartiality of the advice provided. *France Nation Verte*'s roadmap, which includes the digital housing space, contains ethical measures aimed at proactively guiding the creation and use of digital infrastructure.

— DOCTRINE —

- "To launch a ship is to also accept the risk of it sinking!". **As with all technology, digital technology comes with its own set of real risks:** sensitive data breaches, big brother state, significant environmental impact, techno-solutionism, paralysis of action awaiting a perfect understanding of the situation, fake news, digital divides, dehumanization, democratic issues posed by models and artificial intelligence, etc.
- **For digital technology to be a potion rather than a poison, it is vital to guide it within a framework of ethical, humanist, civic, and sovereign values**, and even to refrain from using it when the cost/benefit ratio is negative.
- Depending on the public policy and the data involved, some risks are more significant than others. It is essential not to hide or minimize them. On the contrary, **controversies and paradoxical injunctions should be analyzed** by explaining and illustrating the risks and publicly comparing them to the benefits provided by the infrastructure in order to assess whether the endeavor is worthwhile. Note: some risks can be greater in the absence of infrastructure, when information systems are left underdeveloped and there is also a risk of being uberized (see question 7).
- **This work must be carried out collectively with all relevant internal and external stakeholders, including citizens, from the outset, as a prerequisite**. This is essential to build trust between stakeholders and get everyone on board, and quite simply to work intelligently and democratically.
- **It is then crucial to proactively address the identified risks**: this value framework must be reflected in a rigorous set of concrete actions related to the infrastructure (measurement of overall environmental impact and eco-design, support for digitally marginalized individuals, accessibility, third-party monitoring, open source, etc.). These actions should not be deprioritized in favor of business functionality.
- **Transparency** (co-construction with civil society, open source, etc.) **and the establishment of counter-powers** (controls by the CNIL, the ANSSI, legal appeals, etc.) **are especially essential** in the context of rising far-right extremism in France and Europe, and for any infrastructure development in non-democratic countries.

7. IF THIS INFRASTRUCTURE DID NOT EXIST, WHAT WOULD BE THE ALTERNATIVE SCENARIOS AND WHAT WOULD BE THEIR RISKS?

HEALTHCARE INFRASTRUCTURE

During conferences, we often talk about "patient care journey," but in practice, data does not circulate—or does so poorly and infrequently. For example, there is a 30% redundancy in biological and radiological tests because results do not reach the right professional at the right time. Patients struggle to quickly and securely retrieve their data. Data is often sent via unsecured messaging (e.g., prescriptions to pharmacies) or stored with foreign entities. Prevention is ineffective and patients receive poorer care. Healthcare professionals waste medical time dealing with administrative tasks.

The risks of uberization are enormous: Apple's "Health" app, Doctolib, etc.

In the example above, redundancies in radiological tests are estimated between €600 million and €2.4 billion, and in biological tests at €2.4 billion (biologist unions were initially opposed to the project, arguing that it would cause them to lose a significant amount of revenue). Early diagnosis through personalized prevention via *Mon espace santé* also makes it possible to avoid many medical and paramedical procedures.

Regarding simplification, *Mon espace santé*'s infrastructure means, for example, that pharmacists no longer have to send the results of vaccinations carried out in their pharmacy to the patient, their doctor, and their own software. Sharing data "once and for all" with *Mon espace santé* enables automatic and secure sharing between the pharmacist and all parties who need to retrieve the data.

AGRICULTURAL INFRASTRUCTURE

Individual exchanges between one farm and one partner (1-to-1) would continue for each use case. The farmer would depend on their partner's technical choice: they would need to subscribe to their system (increasing subscription costs), their data would be duplicated in each system (digital environmental impact), without overall visibility on usage and security, without portability (proprietary data formats), and without interoperability. They would also have to justify their practices to several different stakeholders in order to receive payment for environmental services or obtain a label.

For partners, public operators, and local authorities, investments and operating costs for each system would be exponential, mobilizing funding on the technic rather than on the deployment of use cases and connection to the national infrastructure, increasing the difficulties of public (macro) and private (micro) governance of the agroecological transition.

A major advantage would be left to major stakeholders—particularly outside the agricultural sector—who can offer data capture solutions through multinational companies (including GAMAM) that provide global services, capturing all the added value created at the expense of farms (market asymmetry between 10 million European farmers and certain oligopolies). This risk of uberization is not unfounded.

A report from the Cour des Comptes mentioned these shortcomings.

HEALTHCARE INFRASTRUCTURE

Without SI-DEP, authorities would not have been able to limit chains of contamination through contact tracing, and the hospital system would have been even more overwhelmed, affecting the lives of many patients.

It would not have been possible to implement the Covid certificate to limit new infections in public and communal areas.

Healthcare authorities would not have been able to base their decisions on figures, and the press and public would not have had the necessary transparency.

Before SI-DEP, biologists had to send test results to several distinct entities via different channels (e.g., ARS, CPAM, SPF, etc.), which was time-consuming and often unsafe (e.g., Gmail) so that they could know the number of cases and implement contact tracing. SI-DEP made crisis management more efficient by allowing biologists to send COVID test results to all the necessary public entities via a single secure automated channel, saving public agents—who no longer had to manually consolidate COVID results from various medical laboratories—a significant amount of time.

CONSUMPTION INFRASTRUCTURE

The calculation of environmental costs requires the acquisition of a license and will be (all the more) subject to technical controversies. Environmental costs may be used by brands that calculate them, but they will be difficult to mobilize by third parties, thereby limiting their value.

More broadly, the *Empreinte* database and the *Produits Réels* database are technical conditions for implementing widespread environmental labeling, moving away from the current model with few products involved, significant costs, and public funds mobilized to reduce these costs.

The implementation of public digital tools for calculating the environmental footprint of products will save around €10 million in 2024 in support for companies to use consulting firms. Without digital tools, this figure would need to be multiplied by 2 or 3 due to the generalization of environmental labeling. More generally, the cost of inaction on climate is substantial.

EDUCATION INFRASTRUCTURE

There is much discussion in conferences about differentiated “student pathways” to personalize learning for students and make learning more didactic, etc. However, in practice, the data needed to implement these measures is not shared or is shared poorly. For example, there is no system for consolidating learning records and extracting useful information for teachers. Another example is that teacher absence data is re-entered between the ministry's management tools and school administration software.

In the example above, a student dropping out of school will cost the community an estimated €300,000 over their lifetime. That is €3 billion for 10,000 students. Early diagnosis through personalized learning can help limit or even prevent dropouts. Another example: 15 million hours of teaching are lost each year. By improving the management of substitute teachers, students benefit from better support.

If the infrastructure does not exist, stakeholders will not have access to the information needed to accomplish their mission, effectively hindering any improvements to schools. One possible alternative would be to implement a monolithic national solution that does not allow for the integration of innovations from stakeholders.

At least two reports have mentioned these shortcomings: the Esther Mac Namara & Philippe Chrisman Report, and the Cour des Comptes. Furthermore, the risks of uberization are enormous: Pronote, the Google Education program, etc.

MOBILITY INFRASTRUCTURE

In the absence of infrastructure, the current situation would worsen.

The inability of national stakeholders to provide a consistent user experience, paving the way for major tech stakeholders capable of offering services to disintermediate them (Big Tech, generative AI, etc.) and capture the value of the sector.

A silo of large national private stakeholders in an oligopoly locking down the market and preventing smaller stakeholders of the sector and local stakeholders from existing.

The creation of silos both private and public prevents the optimization of end-to-end multimodal journeys (often a mix of public and private) and significantly impairs the end-user experience.

Most use cases could be fully managed at the regional level, with strong requirements for resource publication, interoperability, and standardization. In practice, state action at the national level is often necessary, as illustrated by the Single Title. An OECD report has highlighted gaps in mobility in terms of data sharing.

HOUSING INFRASTRUCTURE

There is a risk of having as many digital housing spaces as there are private stakeholders. These tools would not be neutral and would be disconnected from the public renovation service professionals' tools (France Rénov' advisors or guides).

This disconnect means that any new device or stakeholder creates new complexity because they must be taken into account in all existing private information log systems.

Furthermore, the fragmentation of communication, information, and data entry channels exposes citizens to greater risk of fraud and complicates the preparation of aid applications.

Improving digital tools for housing renovation assistance—with the goal of creating a digital housing space—will enable better fraud prevention and reduce the cost of processing renovation applications. The ANAH estimates that this will generate savings of more than €30 million per year.

Numerous reports have highlighted shortcomings in data sharing: IGF in 2023, the *Défenseur des droits* in 2022 and 2023, the Cour des Comptes in 2022, IGEDD in 2017, etc.

DOCTRINE

<u>In terms of public authorities’ operational and budgetary efficiency:</u>

- **Without this infrastructure, it is not possible to properly implement the public policies that have been adopted** (e.g., personalized prevention, reducing the use of phytosanitary products, ensuring teacher substitution, etc.). These policies require effective information sharing (without development redundancies, double entries, etc.) and security (protecting sensitive data, adhering to ethical standards, etc.). There is a sort of democratic sovereignty deficit.
- **We are cobbling point-to-point connections that place a heavy workload on everyone involved and are rarely secure enough** (e.g., unsecured emails, point-to-point APIs). It is like asking every building owner to build their own sewer, water, electricity, and internet networks. Infrastructure allows for pooling resources, thereby professionalizing operations and enabling exponential growth.
- **In terms of efficiency, this is all the more essential when public policies need to be deployed very fast,** for example in response to the COVID-19 or environmental crises. It is therefore vital to anticipate the development of these infrastructures in preparation for future crises (e.g., LABOé-SI to replace SI-DEP, new environmental crises, etc.).
- **In terms of "security": beyond the risks of unsafe cobbling, the risk of uberization is significant.** The access controller position that the infrastructure allows is sought after by many tech stakeholders, often non-French or non-European, and in any case, not public one. To leave it to them is to surrender our values and tie our hands when it comes to implementing our public policies. The best defense is attack: it is essential that we develop these infrastructures ourselves before they do.
- **The lack of infrastructure also generates significant direct and indirect additional costs for the State and external stakeholders** (e.g., *Mon espace santé* helps to avoid duplication of laboratory and radiology tests estimated at between €1 and €5 billion/year, while the digital housing space helps to combat renovation fraud estimated at €30 million per year, etc.). While it is often difficult to estimate precisely, digital investment often costs significantly less than the savings it enables.
- **Data sharing dysfunctions have been highlighted in numerous reports** (IGF, IGEDD, Cour des Comptes, OECD, etc.).

<u>In terms of businesses’ environmental and economic efficiency:</u>

- **Without these infrastructures, the backbone of administrative simplification is missing.** It is not possible to adopt the "Tell us only once" logic and the single-window approach, leading ground stakeholders to fill out numerous forms with various public entities (e.g., farmers to receive their aid, biologists to report results, etc.).
- **Just as these infrastructures help save money, they also minimize the environmental cost of human activities** (e.g., *Mon espace santé* enables much more effective personalized prevention and thus a reduced need for medical care).
- **Without these infrastructures, businesses lose competitiveness,** which hampers reindustrialization. According to Cap Gemini, “*organizations engaged in data sharing within an ecosystem improve their customer satisfaction by 15%, their productivity by 14%, and reduce costs by 11% per year over the past two or three years.*”.

<u>Indirectly and transversely, in the digital sector:</u>

- **The lack of data sharing infrastructures hinders the proper development and innovation of higher-level layers (digital services, AI).**
- **It also makes it impossible to achieve total sovereignty over these layers.**

8. SHOULD THIS INFRASTRUCTURE BE UNIQUE OR CAN THERE BE SEVERAL?

HEALTHCARE INFRASTRUCTURE

Despite the existence of several private digital healthcare records, the question of quantity has not really arisen: just as there was only one paper healthcare record and one DMP, there should only be one *Mon espace santé*.

Otherwise, the number of connections each professional and healthcare facility would need to make would be multiplied by the number of records. Conversely, having multiple records does not offer significant advantages, as their functionality is relatively limited. As soon as a new need for data sharing emerges (advance directives for end-of-life care, new screening tests, etc.) and when it is achievable within the necessary timeframe, the *Mon espace santé* infrastructure evolves to meet this need. If *Mon espace santé* had existed at the time of Covid, SI-DEP might not have been developed.

Public digital services developed by ARSs for city/hospital/mixed health coordination and private digital services (e.g., online appointment booking in the city, hospital-patient communication interfaces) can add a "document storage" dimension to their value-added services. However, in terms of urbanization, the master reference record is *Mon espace santé*.

AGRICULTURE INFRASTRUCTURE

The principle of a single infrastructure for the agricultural sector is justified by:

- Feedback from partners, public operators, and local authorities, who face skyrocketing investment and operating costs of their platforms related to the development of uses, regulatory compliance (GDPR, DGA), and cybersecurity (ISO 27001), without meeting farmers' demands for a single identity, one consent/permission system, and the guarantee of retrieving their data easily.
- Since a farm manages up to 30 different data sources, the need for data standardization (to avoid multiplying the "data cleaning" phases) will be exponential if not shared.
- The national infrastructure must be interconnected with the infrastructures of other Member States to form the new European Agricultural Data Space, being deployed between 2025 and 2028, in connection with the EDIC Agrifood.

HEALTHCARE INFRASTRUCTURE

Due to its purpose, this infrastructure must be unique, unless a Level 2 infrastructure is created to coordinate and aggregate data from Level 1 infrastructures, which would have been far too complex to implement.

Mon espace santé could have been the platform for this initiative had it been fully functional in 2020.

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

The reference infrastructure must be unique at the national level and, as soon as possible, at the European level. However, it does not prevent other databases from existing, particularly to further improve the accuracy of modeling beyond what is provided for in the regulatory framework provided.

***PRODUITS RÉELS* DATABASE:**

The reference infrastructure must be unique at the national level to facilitate subsequent data access. This data can be reused by other databases, both public and private, allowing for cross-referencing with other data (e.g., nutrition). See the Open Product Facts project by Open Food Facts, which would be a user—and not a competitor—of the *Produits Réels* database.

EDUCATION INFRASTRUCTURE

Despite educational paths in different institutions, sometimes in different regions, a single infrastructure for educational data is necessary to organize access to educational data throughout students' school journeys, teachers' mobility across the national territory, etc. The infrastructure provides a consolidated view of the data available at national and local levels.

For example, "real-time" schedule data—which is useful for students to be informed of last-minute changes and does not have national relevance—are made available to school management software solutions, respecting national or international interoperable formats, without needing national-level processing. However, end of day timetable data is of national interest for managing the education system.

This ensures consistency, a relevant organization of the educational system, and monitoring of students' school journey.

MOBILITY INFRASTRUCTURE

Ideally, there should be a single infrastructure. If multiple interoperable infrastructures exist (federated and based on common standards), it is crucial to avoid excessive proliferation that would hinder achieving real economies of scale.

The presence of multiple infrastructures could, for example, be explained by disjointed use cases with specific needs that lead to greater efficiency, speed, and practicality by building appropriate infrastructures.

HOUSING INFRASTRUCTURE

The infrastructure must be unique to enhance the *France Rénov'* service offering.

There is no need for competition as no significant innovation is expected. Innovation can take place in the services offered on top of this reference infrastructure, which will be fully integrated into the France Rénov' service offering.

Connecting different services to multiple infrastructures, even if standardized, would be too complex and costly.

DOCTRINE

- The infrastructure must be unique within the scope of the intended use cases, in a monopoly. This is inherent to the "why?" mentioned earlier: an oligopoly or a proliferation of infrastructures would negate the benefits of network effects, multiplying the number of connections required by the number of infrastructures for each stakeholder that needs to connect. A multiplicity of stakeholders would not bring the expected benefits of competition: these infrastructures are low-level layers with very few service elements. Innovation is therefore limited. In fact, this issue did not even arise for a large part of the presented infrastructures (*Produits Réels* database, SI-DEP, education infrastructure).
- It follows the same logic as physical infrastructures: one does not build multiple roads or sewer networks in the same place*.
- When the question arose, it was often not by choice but by facing a fait accompli from an unconscious situation of *laissez-faire*. It is because one or more external stakeholders launched such infrastructures that we now wonder whether to let them compete, regulate them, and/or choose only one (e.g., Agdatahub, Housing Digital Space). It is important to establish the doctrine as soon as possible and to re-urbanize third-party tools accordingly.
- If an infrastructure needs to be unique within a given scope of use cases, it is certainly also important to strive for a unique infrastructure per sector, for the same reasons. This is also the choice made by the European Commission, which supports a single common data space per sector. When new data sharing needs emerge, the infrastructure should evolve to meet them by default rather than creating a new one (e.g., "simplification" issues and Agdatahub).
- In practice, initially, multiple infrastructures often emerge because the sector is not yet mature, some data sharing needs to be addressed urgently, and the target infrastructure is not ready (e.g., SI-DEP vs *Mon espace santé*), or because it is too complicated from an operational and governance perspective to cover too broad a range of use cases (e.g., both primary and secondary uses of data or both public and private use cases). These decisions are therefore often evolutionary, but as with the geographic scope, urbanization rules must be clear at each point in time and provide visibility on possible future developments.
- An exceptional situation seems to justify the existence of multiple infrastructures: when the deadlines are too short for a single stakeholder to develop the infrastructure and connect the entire ecosystem on its own. This was the case, for example, during the COVID-19 crisis, when the online appointment booking infrastructure for vaccinations had to be created in just one week. Because no public or private white label stakeholder could provide the service on such short notice, three companies were selected to equip vaccination centers (Doctolib, Keldoc, Maia). The burden of integration then fell on citizens themselves: instead of being able to see all their appointments in one place on the same interface, they had to go to sante.fr, which listed the centers and then redirected them to the service chosen by the center for booking. This burden on citizens was deemed acceptable given the context, as vaccination centers were the bottleneck, but it would not be acceptable under normal circumstances. A civil society service even scraped data from the three platforms to address this (*ViteMaDose*). If sharing the burden among multiple stakeholders is necessary and time allows, it is better to set up a consortium of industrial stakeholders.
- It is also necessary to define the right level of resource sharing between sectoral infrastructures, as well as the role of cross-cutting infrastructures (e.g., on geolocated data, spatial data, etc.). Similarly, the overall urbanization plan may be subject to change, but it must be clear at a given point in time.

*In this respect, mobile and fixed telecom networks in dense areas are an exception. The decisions might have been different if discussions on digital sobriety had been more advanced.

9. WHAT SHOULD THIS INFRASTRUCTURE'S GOVERNANCE BE IN TERMS OF ROLE DISTRIBUTION BETWEEN PUBLIC AND EXTERNAL SECTOR?

HEALTHCARE INFRASTRUCTURE

Mon espace santé is managed and implemented by the Ministry of Health (Ministry's Delegation for Digital Health) and the French national health insurance system with the support of several other operators (Health Digital Agency, GIE Sesam Vital, HAS, ANCT, etc.) and regional authorities (ARS, CPAM, etc.).

It is essential that public authorities oversee this infrastructure to ensure neutrality and ethics (the paper healthcare record was not managed by Big Pharma), in order to ensure that its functionalities align with public policies (flu vaccination, endometriosis detection campaigns, etc.), and to ensure a sound economic model (no sale of patient data, no advertising for medications, etc.).

In 2021, a consortium of industrial partners was selected for the development of the infrastructure, and the contract is currently being renewed.

Data access rules are co-designed with professionals and citizens and established in an "authorization matrix" mandated by decree. The Data Protection Agency conducts regular checks. The initial plan to make the data open source has been delayed on the advice of the ANSSI in order to conduct a detailed study of the impact on data security.

HEALTHCARE INFRASTRUCTURE

This strategic infrastructure has been managed by the Ministry of Health, which entrusted its implementation to AP-HP.

A broad governance structure has been established throughout the treatment process. In addition to data recipients (SPF, Cnam, ARS, etc.), it involved professionals and their representatives (orders, unions, etc.), patients (via coordination and liaison committee), and professionals' software providers.

Users of open data were regularly invited to working sessions to discuss their needs.

AGRICULTURAL INFRASTRUCTURE

To address the issues mentioned in question 4, it is essential that Agdatahub be managed by public authorities in consultation with stakeholders—including agricultural organizations and industry representatives.

Today, Agdatahub is an SAS (a simplified joint-stock company) owned by agricultural stakeholders (55%) and by a public entity—Caisse des Dépôts and IN GROUPE— (45%). It is financed by PIA3 and France2030 funds managed by SGPI in France, and by European funds from the Digital Europe Program. At the European level, Agdatahub is the only operator that is not majority-owned by public authorities, which poses a problem, particularly when it comes to contributing to the Agrifood EDIC (majority-owned by Member States). A governance evolution is underway to make Agdatahub a truly neutral digital common that is majority-owned by public authorities and legitimately able to represent France at the European level.

Agdatahub is and will continue to be co-developed with external partners. It also relies on several industrial partners (Dawex, Orange, IN GROUPE), in compliance with Gaia-X de facto standards and ISO 27001 principles.

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

In the Agribalyse model, the database is governed by public experts (ADEME and INRAE in the case of Agribalyse) and involves private sector expertise in various sectors (agricultural technical institutes in the case of Agribalyse).

It would only concern reference data for a subset of all environmental data necessary for the implementation of an initial calculation method. Private experts (data providers, consulting firms, technical institutes, industries, brands, etc.) play a leading role in continuing to develop more accurate data and, if they wish, gradually integrating more accurate data.

***PRODUITS RÉELS* DATABASE :**

Public governance of this base seems appropriate, with close collaboration with economic stakeholders to identify the data structure and the sensitivity of the various data to be shared on this infrastructure.

EDUCATIONAL INFRASTRUCTURE

Data sharing is managed and implemented by the Ministry of Education (DNE, DGESCO) with the support of several operators (Cned, Onisep, *Réseau Canopé*), public interest groups (Renater, Pix), and local authorities (municipalities, county, and regions).

It is essential that public authorities oversee this infrastructure in order to prevent any risk of uberization of education by a private stakeholder. It would ensure neutrality and ethical data use, that data usage aligns with public policies (schooling, dropout, teachers' substitution, etc.), it would also ensure a sound economic model (no sale of student data).

Data access rules are co-designed with EdTech companies, professionals (teachers, school administrators), students, parents, and established in an "authorization matrix" to be defined in a decree. The CNIL is involved in the process. The technical infrastructure is made open source in accordance with ANSSI recommendations in order to study its impact.

MOBILITY INFRASTRUCTURE

The state and local authorities cannot depend on purely private infrastructure for public interest use cases covered by EONA-X and moB. Governance changes should be considered around hybrid statuses that allow the State to manage use cases of general interest, while allowing the external ecosystem to be autonomous for use cases of private interest.

EONA-X could, for example, be considered a meta-infrastructure with distinct governance for public versus private use cases. Technically, its data mesh architecture allows for the establishment of domains with more specific governance while remaining interoperable. For instance, public sector-related data could be listed in an *ad hoc* catalog and technically accessible to other stakeholders only if public governance allows it.

moB could be managed by the state and local authorities, enabling AOMs (Organisms for Mobility) to implement use cases independently within their territory.

HOUSING INFRASTRUCTURE

The Digital Housing Space must be managed by the Ministry of Ecology (DGALN) and implemented by the operator of private housing improvement (Anah), with the support of several other operators (ADEME, ANCT, etc.) and regional authorities (ARS, CPAM, etc.).

It is essential that public authorities oversee this infrastructure to ensure neutrality and ethics (the digital space should not be managed by Leroy Merlin), to ensure that its functionalities align with public policies (combating vacancy, reducing the number of energy-inefficient buildings, lowering greenhouse gas emissions, etc.), and to ensure a sound economic model (no sale of citizens' data, no advertising for medications, etc.). The public authority could rely on existing solutions and establish a consortium of industrial partners.

Data access rules must be co-designed jointly with professionals (FFB, CAPEB, etc.).

DOCTRINE

Data sharing infrastructure managers are inherently in a position of access control. In line with the net neutrality regulation—which ensures telecom network operators do not abuse their position to prioritize one content over another on the internet—it is necessary to regulate these infrastructures ex ante to guarantee equal access for their users. This is what the European regulator has done with the Data Governance Act regulation, which mandates non-discriminatory access to the infrastructure and prohibits tied sales, etc. **This regulation is useful for private use cases but does not go far enough for public interest infrastructures (vs infrastructures serving private use cases).**

The regulation makes sure everyone is treated the same, but it doesn't guarantee that the rules will be in the public interest. Since these infrastructures are essential for the deployment of a democratically established public policy, it is crucial that their roadmap be established and in accordance with that policy, and that the economic model chosen be at its service. **It is therefore essential that public authorities—responsible for implementing public policies—oversee public interest data sharing infrastructures.**

This was the approach chosen by the European Union. The Board of the European Health Data Space is composed of Member States and co-chaired by the Commission and a Member State. The Commission has also created the European Consortium for Digital Infrastructures (EDIC) status, which requires a public majority governance. **This is also the recommendation of the UN Environment Programme** (UNEP) in its report on "Digital Public Infrastructures," which states: "Relying solely on private solutions will not comprehensively address the challenges and could lead to further data fragmentation.".

This is also the governance model advocated by the vast majority of private stakeholders themselves. Indeed, these infrastructures involve so many different stakeholders that they very often lead to a mixing of roles, thus undermining trust between private stakeholders (e.g., "the manufacturer who builds the infrastructure is also my competitor; they are not a neutral third party"). Those who oppose this view are often major private stakeholders who have no economic interest in data sharing or who seek to become the infrastructure itself—if they are not already.

This does not mean that the private or non-profit digital sectors do not have a key role to play: not only do they create value-added digital services for the competitive sector (the "walls" of the building, i.e. the visible, glamorous part), but they also often act as service providers for public authorities, helping to build white-label infrastructure of general interest (the "foundations" of the building, the submerged part of the iceberg).

In this respect, the strategy of state control over key infrastructure for public policy (democratic sovereignty) and the strategy of building a French or European private digital sector (technological sovereignty) must be mutually reinforcing. The state drives the sector through public procurement, and the existence of a French or European sector allows the state to be fully sovereign.

This does not mean that professional stakeholders, associations and citizens are not essential, quite the contrary. Co-constructing the rules of this infrastructure with the ecosystem must be sincere, effective, and continuous, particularly in regard to data access (see question 15). Public authorities then do what they are meant to do: consult and arbitrate in favor of the public interest, working hand in hand with stakeholders.

In practice, this can result in different statuses: the infrastructure may be internalized within the Administration managed by one or more public operators, whether they are EPA, EPIC, GIP, GIE, GIS, etc., or may even take the form of a SCOP, NGO, SAS, etc., as long as the State is the driving force. It is important to be as pragmatic as possible, taking existing conditions into account and adopting a "small but quick steps" strategy to gradually move towards the most appropriate status, rather than perfectly resolving administrative aspects before starting work (see question 12).

The status chosen must prevent competition in order to guarantee continuity. This is the case when the infrastructure is managed by the Administration or one of its operators (direct allocation or among "siblings," quasi-regulation, etc.) or via a mechanism such as "unilateral devolution of authority," for example. Competition then takes place below this level, in the selection of external service providers who help build the infrastructure. In the physical world, EDF is responsible for building nuclear power plants and then puts industrial firms in competition to assist with this.

When the infrastructure also serves private use cases that are not relevant for public management, mixed statuses need to be developed. In the case of private uses, the state then simply lays down the underlying ethical, interoperability, and security rules.

These recommendations are based on the assumption that public authorities ensure the general interest. In situations where trust is limited, such as in non-democratic states or to prevent such situations, it is essential to implement mechanisms for transparency and third-party control: legal obligations for co-construction with stakeholders required by law, civil society participation in all decisions, open source, audits by neutral third parties (the CNIL, etc.).

Sometimes—in the absence of a clear initial doctrine—the infrastructure was initiated by private stakeholders, and its governance needs to be modified to become majority public (e.g., Agdatahub). Several elements may be useful:

- To convince internal stakeholders—especially with the Ministry of Economy, who is often not in favor of "nationalization" approaches—we need to explain the logic of a public platform by drawing a parallel with physical infrastructures, and **stating that this doctrine allows and accelerates innovation from external stakeholders—** especially private ones**—in terms of services** ("walls" of the house) **and that it also generates substantial savings.**
- To negotiate externally with private stakeholders who manage the existing infrastructure: **we must explain the logic of the public platform** and try to find a satisfactory partnership. If necessary, we can:
  - **> Explain that transitioning to a predominantly public governance can be a legal-political argument for the public authority to be able to finance the infrastructure without competitive bidding** (e.g., through the mechanism of public service devolution).
  - **> Use the threat of national or European regulations:** public authorities are powerful! They can impose databases and reference infrastructures and/or automatically designate certain public service operators. It is therefore better to find common ground.
  - **> Adopt the "small and steps" strategy:** when possible, anticipate and facilitate future governance changes by acquiring stakes in the structure via the CDC, BPI or APE, encouraging non-profit status, etc.

10. WHAT SHOULD BE THE ECONOMIC MODEL OF THIS INFRASTRUCTURE?

HEALTHCARE INFRASTRUCTURE

Mon espace santé is financed by public funding—European funding for the investment phase.

Citizens/patients are not asked to contribute for reasons of equal access to care.

Nor are healthcare professionals, even though *Mon espace santé* is supposed to save them time and enable them to provide better care for their patients, as this is in the public interest.

The apps listed in the catalog could be used at a later stage. This seems justified as they can easily access data from all citizens who have agreed to synchronize their apps with *Mon espace santé*, creating new economic models. The first phase, however, is to make the service attractive to citizens—and therefore to professionals and apps—by feeding *Mon espace santé* with data.

If the data from the infrastructure becomes accessible for research or innovation purposes, the service could also be monetized.

HEALTHCARE INFRASTRUCTURE

Full funding has been provided by the Ministry of Health, based on the "whatever it takes" model.

Not only have external stakeholders not contributed to its funding, but laboratories have been paid for data provision, and IT interconnections have been financed directly to providers (total construction/deployment cost of about €8.5 million), so that deployment aligns with the lifting of lockdown measures announced by the President of the Republic.

Patients should not pay for access to their Covid certificate or to retrieve their health results.

AGRICULTURE INFRASTRUCTURE

To date, funding is split 50%–50% between the agricultural sector and the public funds (Caisse des Dépôts, IN GROUPE, PIA3 / France 2030, Digital Europe Program, CASDAR), totaling €12 million for the 2017–2023 period.

In the agricultural sector, stakeholders are subscribed to the infrastructure's 3 levels: one free freemium subscription (including open data) and two paid subscriptions based on usage. Stakeholders can also benefit from a team of data experts to help them define and frame their use cases through a paid consulting service.

Farmers, out of concern for digital inclusion and support in the face of the agricultural crisis, should not have to pay for access to the electronic wallet that manages their digital identity and their consents/permissions.

Economic model changes are planned in connection with the change in governance (question 9). to stop confusing objectives and means: the objective is for the infrastructure to enable the sharing of data necessary for the implementation of public policies, and to do this it needs to be financed. Agdatahub does not need to be profitable for its private and public investors, as long as it sometimes serves the general interest.

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

reference data enabling initial calculations, which must be freely accessible to all, with maximum transparency, and more accurate data whose access and use could/should remain subject to licensing conditions that provide the necessary revenue for the economic robustness of the private stakeholders on whom the construction of life cycle inventories (Ecoinvent, etc.) depends. The economic model largely depends on the development of environmental scoring… which also depends on the economic model that will be proposed. If demand explodes and 10% of users are willing to pay for access to more accurate data, this could already represent revenues higher than those currently generated in a primarily pay-per-use model.

***PRODUITS RÉELS* DATABASE:**

To facilitate data sharing, the (limited) cost of establishing the infrastructure could be fully covered entirely by public authorities.

EDUCATION INFRASTRUCTURE

Data sharing should be financed by public funds or even by French or European economic stimulus funding for the investment phase (e.g., France 2030). The work to be carried out should be undertaken by the Ministry.

The service is free for students, teachers, and education professionals.

Digital services may be offered by private stakeholders provided they comply with the data usage framework (including ethics and protection of minors' data) and the standards adopted.

MOBILITY INFRASTRUCTURE

EONA-X is financed by its members through annual contributions, both financial and in-kind (staff, expertise). Access to the infrastructure for building use cases requires a membership. Investments in the infrastructure are co-financed by membership fees and external public funding (France 2030, European projects).

For moB, the Ademe provides initial funding, while FabMob operates the service, explores new use cases, and supports regions that are rolling out the service. Some mobility operators (carpooling) finance usage when this enables them to unlock funding (carpooling subsidy certification). User communities (La Rochelle, Nantes Metropole) finance service usage in accordance to their size, possibly through their service providers (via public procurement). Additional investment should come from cooperation between users, third-party innovation funding, and even sponsorship. This is already happening on a small scale. Changes are needed, in line with decisions on governance (question 9), such as direct state funding.

HOUSING INFRASTRUCTURE

These digital spaces must be financed as part of the *France Rénov'* service offer, potentially with co-financing from local authorities under territorial pacts. with potential co-financing arrangements for local authorities under territorial pacts. This component is considered an essential link in the information, advice, and support offering provided by *France Rénov'* across France.

The service should be free for citizens so as not to create access inequality and to raise awareness about energy renovation.

Professionals such as advisors, support workers, or tradespeople are not expected to pay for the service, but this needs to be assessed, as some support workers are currently starting to purchase digital home packs from private companies.

As with *Mon espace santé*, complementary apps could be offered at a later stage, in a freemium model.

DOCTRINE

The entity that decides is the one that controls the financial reins. **The economic model and associated financing must therefore be aligned with the governance decided in advance.**

Given that public authorities are responsible for managing infrastructure (question 9), they must finance it entirely or at least to a significant extent. This is only logical, as this infrastructure is essential to the implementation of their public policy: they should fund it just as they fund school buildings and teachers. It is also logical because general interest infrastructures cannot find a purely private economic model (see Agdatahub, Digital housing space, *Mon espace santé*) except by abusing their position as gatekeepers, which is not desirable.

In a context of strained public finances, mixed models may be considered with great caution, with users paying all or part of the cost of data sharing for public interest purposes or other activities (see next slide).

Financing models are also de facto mixed when the infrastructure serves both public and private interests (e.g., EONA-X). This issue is complex and still underdeveloped. **Policy guidelines need to be developed at the French, European, and international levels through effective coordination between public authorities, industry, and researchers** (see, for example, the work of Paris-Dauphine University and the EONA-X initiative with the Toulouse School of Economics).

These additional sources of income often remain minimal and come with their own set of side effects, including:

- **Creating entry barriers for stakeholders,** to use the infrastructure, when the aim is precisely to accelerate their connection and, in some cases, even paying them to do so (see question 17).
- **in some cases, diverting the team managing the infrastructure and its governance from the primary purpose of the infrastructure,** i.e., data sharing for general interest. The compartmentalization between public and private use cases is often complicated in practice. Furthermore, both private and public stakeholders may confuse means and ends, making decisions to ensure that the infrastructure is profitable above all else, when its *raison d'être* is to enable the implementation of public policies that require data sharing, and that it certainly needs to be financed in order to do so (see Agdatahub).
- **Create confusion and mistrust towards a stakeholder** who needs to be a trusted third party by competing with or favoring certain users through ancillary activities.
- **It is therefore certainly not ideal to activate these additional sources of revenue as soon as the infrastructure is launched for use cases that are not exclusively private.** It would seem wiser to start with a largely free model that is attractive to stakeholders in order to achieve network effect, prove its added value, and then be in a strong position to get stakeholders to contribute.

Mixed financing models may be considered around:

1. The core activity of the infrastructure, i.e., data sharing for general interest purposes

When citizens are direct users of the infrastructure, charging them would generally be counterproductive (e.g., *Mon espace santé*, Digital Housing Space). The infrastructure is linked to a public service that should not have an entry cost (e.g., increasing health prevention or quality of care, helping renovate housing).

When professional users belong to:

- **The public sector (e.g., healthcare professionals):** since the infrastructure saves time and improves work quality for professionals, access could be charged similarly to other digital services. However, this could create an entry barrier and would ultimately amount to using public funds. This option is therefore not recommended at this stage.
- **The external sector (e.g., farmers, companies listed in the *Produits Réels* database, researchers):** the less the stakeholders are involved in activities of direct public interest and the more financially robust they are, the more they could be involved using traditional licensing models or freemium models. The relevance of charging these stakeholders can therefore be assessed according to the type of stakeholder (e.g., do not charge farmers; charge agri-food industries and distributors). It can also be evaluated based on the type of use case: the service could be charged when the use case diverges from basic data use for general interest, for example, for research purposes (e.g., *Mon espace santé*) or to enable companies to refine their analysis beyond strict regulations (e.g., *Produits Réels* database).

2. Activities other than data sharing for general interest purposes:

- **By monetizing data sharing features for private use cases via a subscription system.** These use cases may include data sharing between ecosystem stakeholders for industrial or commercial purposes (e.g., Agdatahub, EONA-X?). It may also correspond to the creation of an "external economic activity" (ANCT designation) based on the data sharing infrastructure. For instance, apps in the *Mon espace santé* catalog that develop innovative services from *Mon espace santé* data—to which they would not otherwise have access—could be charged if they earn money from the shared data. In the physical world, an equivalent would be taxing the added value gained by owners of buildings near a new metro line.
- **By diversifying the services offered by the infrastructure.** These services may, for example, include consulting services dedicated to data and use cases for infrastructure users (Agdatahub).

The economic models developed must then comply with data intermediary regulations.

11. SHOULD THIS INFRASTRUCTURE BE CENTRALIZED OR DECENTRALIZED?

HEALTHCARE INFRASTRUCTURE

Mon espace santé has taken over the centralized DMP infrastructure—which is itself centralized—modernized it, and adapted it, to be able to store healthcare data (weight, height, pulse, etc.) in addition to text documents.

Each healthcare professional or institution sends a copy of the health data they produce to *Mon espace santé*, in the same way they would have recorded important data in a patient's paper healthcare record.

eHealth apps listed in the catalog can also be synchronized with *Mon espace santé* by the patient so that certain data from *Mon espace santé*.

As radiology images are particularly large files, they will not be copied to the infrastructure. *Mon espace santé* will access them from PACS servers that exist at the regional level, which will be subject to performance criteria, particularly in terms of flow rate and latency.

(see diagram)

AGRICULTURE INFRASTRUCTURE

Farms operate in rural areas (with internet access issues) and lack IT expertise. Due to agricultural production within rural areas and existing support structures, farm data (typically around 30 sources per farm) is decentralized, stored by long-standing partners of support networks and/or economic stakeholders who collect agricultural production data.

Exchanges are carried out on the sharing infrastructure—which is characterized by data offerings listed in a centralized catalog (by file or API)—made available via temporary storage space or via the cloud spaces of partners, and by prior registration via a digital identity of the partners associated with the farmers' consents/permissions.

Interoperability at the European level is ensured by the federation of infrastructure catalogs and the federation of digital identities through the implementation of Gaia-X de facto standards.

(see diagram)

HEALTHCARE INFRASTRUCTURE

The national scope—the need for rapid deployment within a few weeks—and the absence of a possible federated model (no stakeholders to carry it out, data aggregation required for indicators, complexity of validating too many private keys for generating Covid certificates, etc.) led to the creation of a centralized infrastructure.

This centralized infrastructure makes updates faster when the scope is not yet mature—which was the case with SI-DEP—which evolved significantly (integration of antigenic tests, COVID-19 variants, etc.).

It is worth noting that some intermediary platforms (e.g., Biocovid) have been used to simplify connections to multiple IT instances.

(see diagram)

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

A centralized infrastructure is essential for easy access to data for all and ensuring consistent review of its accuracy. However, the database could be fed in a largely decentralized manner, with a large number of contributors, including scoring experts, technical BASE institutes, manufacturers, brands, etc.

***PRODUITS RÉELS* DATABASE:**

The database will be completely decentralized: each brand will be responsible for sharing data about its products. The operational management of the database, on the other hand, may be centralized to facilitate access to and sharing of the data collected.

(see diagram)

EDUCATION INFRASTRUCTURE

The education infrastructure follows the regional organization and distribution of responsibilities: centralized for common data (i.e., “cold” or “lukewarm” data) and decentralized for “hot” data.

She has extensive knowledge of the tools and data available to structure exchanges between stakeholders.

Each educational software provider of educational digital resources provides a copy of the educational data they produce, which is intended to support the work of teachers, parents, students, and local authorities

(see diagram)

MOBILITY INFRASTRUCTURE

EONA-X has chosen a decentralized and federated architecture. Data remains in source systems and is accessed/consumed in the source system to avoid creating and managing data lakes. The data owner retains control over access to their information and is responsible for providing quality data (e.g., real-time updated schedules).

moB has a more centralized, pragmatic approach for short-term interoperability (from a technological standpoint). Local multi-instance deployments are envisaged, as well as connectors to decentralized identity systems, such as those eventually implemented in a data space like EONA-X. moB could then serve as an open-source gateway for stakeholders who are not yet familiar with decentralized identity federations.

(see diagram)

HOUSING INFRASTRUCTURE

The digital space for housing must be part of the centralized logic of certain databases that will feed into it: the energy performance database and audits, whose data is centralized thanks to feedback from diagnostic software; a database of advice provided using a government tool and connections planned for other software used locally, etc.

Data that is currently produced locally but not retrieved (e.g., visits to homes as part of renovation support) must be identified and retrieved by flow, copied, or read on the original servers depending on the volume. Professionals copy or enter data when it cannot be sent automatically (e.g., quotes, with the aim of harmonizing and digitizing quotes).

(see diagram)

DOCTRINE

This question is often by far one of the most debated, even though other issues are at least as important.

The concepts of "centralized," "decentralized," "federated," and sometimes "distributed" often encompass multiple realities. It is necessary to examine each specific case in detail to understand exactly what is being referred to: which technical function is centralized, decentralized, federated, or shared? What is the technical reality behind a superficial description such as “distributed”? etc. **In most cases, infrastructures are in fact hybrid.**

It is difficult to conceptually compare these different options in terms of technical performance, environmental and financial costs, security, resilience, or data freshness without examining the specific technical architecture in question.

Decisions must be scalable as stakeholders and technologies mature.

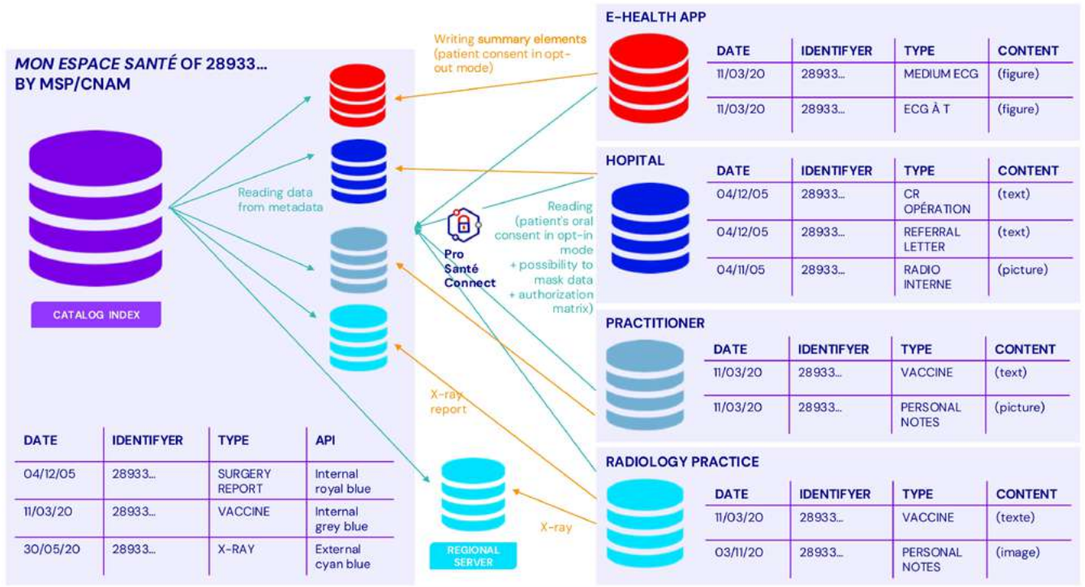
Case-by-case analysis must be carried out taking. into account two main criteria: technical feasibility and acceptability by stakeholders. The first criterion is particularly important given the inherent complexity of data-sharing infrastructures. This is especially true as the argument "it will never work" is, quite rightly, their main enemy. The second criterion is also important, as it can significantly hinder the progress of a project (e.g., Health Data Hub).

- **Most of the time, identification and indexing/ catalog components are centralized and federated,** as this usually allows for better performance, decentralized indexing/catalog technologies have not always been satisfactory, and most stakeholders agree to pool these components when managed by public authorities (e.g., *France Connect*, *Pro Santé Connect*) rather than GAFAM.

Data can be centralized (i.e., copied) or decentralized/distributed (i.e., remaining hosted with their provider). Decentralized/distributed solutions are often more readily accepted by stakeholders as they allow "exchange without exchanging" data. They are also sometimes the only option when non-homogeneous regulations prevent data transfer, at the European or international level, for example. Elegant as they may be, they can nevertheless raise performance issues (uptime, latency, throughput) and be more complex to implement, as they significantly increase the technical challenges of standardizing, aggregating, processing, and analyzing large volumes of data. SI-DEP and the Covid certificate, *Mon espace santé*, and the *Empreinte* database are relatively centralized infrastructures. Conversely, EF3.0, the European equivalent of the *Empreinte* database, which is more decentralized, has not proven its efficacy.

- **Conditional arbitrations can be put in place:** data remains with its provider in a decentralized mode as long as the provider can ensure the performance level required by the infrastructure; otherwise, it is copied in a centralized mode. Agdatahub manages a centralized catalog of data offers, exposed by file or API, with data available via a temporary data storage space for organizations that cannot ensure this performance or via a direct connection to partners' clouds. EONA-X federates a large ecosystem of relatively mature stakeholders on digital issues and is based on a completely decentralized architecture.

MON ESPACE SANTÉ



DATE	IDENTIFYER	TYPE	API
04/12/05	28933...	SURGERY REPORT	Internal royal blue
11/03/20	28933...	VACCINE	Internal grey blue
30/05/20	28933...	X-RAY	External cyan blue

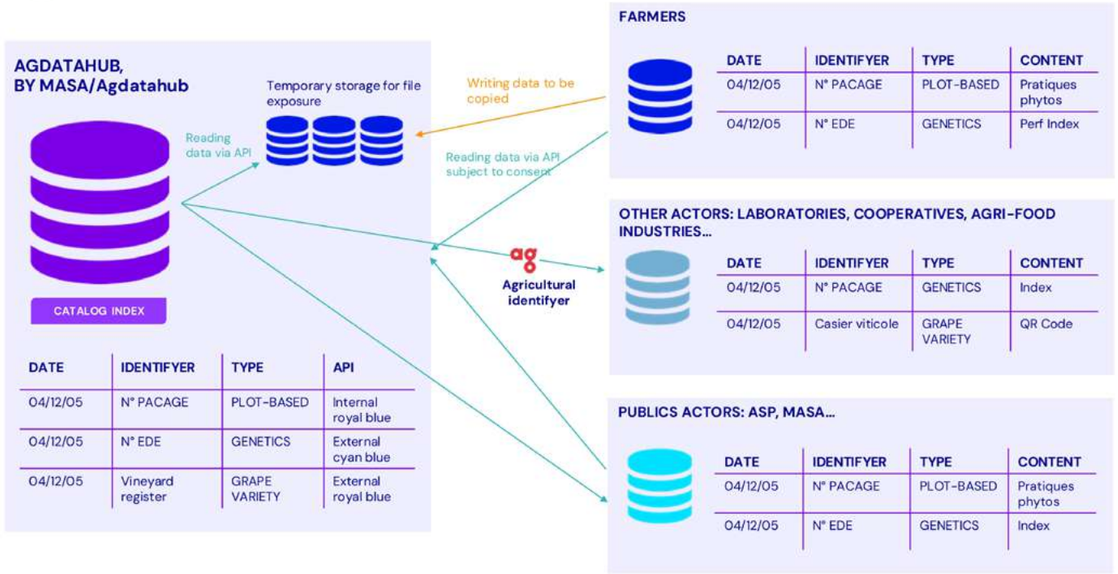
E-HEALTH APP	DATE	IDENTIFYER	TYPE	CONTENT
	11/03/20	28933...	MEDIUM ECG	(figure)
	11/03/20	28933...	ECG À T	(figure)

HOPITAL	DATE	IDENTIFYER	TYPE	CONTENT
	04/12/05	28933...	CR OPÉRATION	(text)
	04/12/05	28933...	REFERRAL LETTER	(text)
	04/11/05	28933...	RADIO INTERNE	(picture)

PRACTITIONER	DATE	IDENTIFYER	TYPE	CONTENT
	11/03/20	28933...	VACCINE	(text)
	11/03/20	28933...	PERSONAL NOTES	(picture)

RADIOLOGY PRACTICE	DATE	IDENTIFYER	TYPE	CONTENT
	11/03/20	28933...	VACCINE	(texte)
	03/11/20	28933...	PERSONAL NOTES	(image)

AGDATAHUB



DATE	IDENTIFYER	TYPE	API
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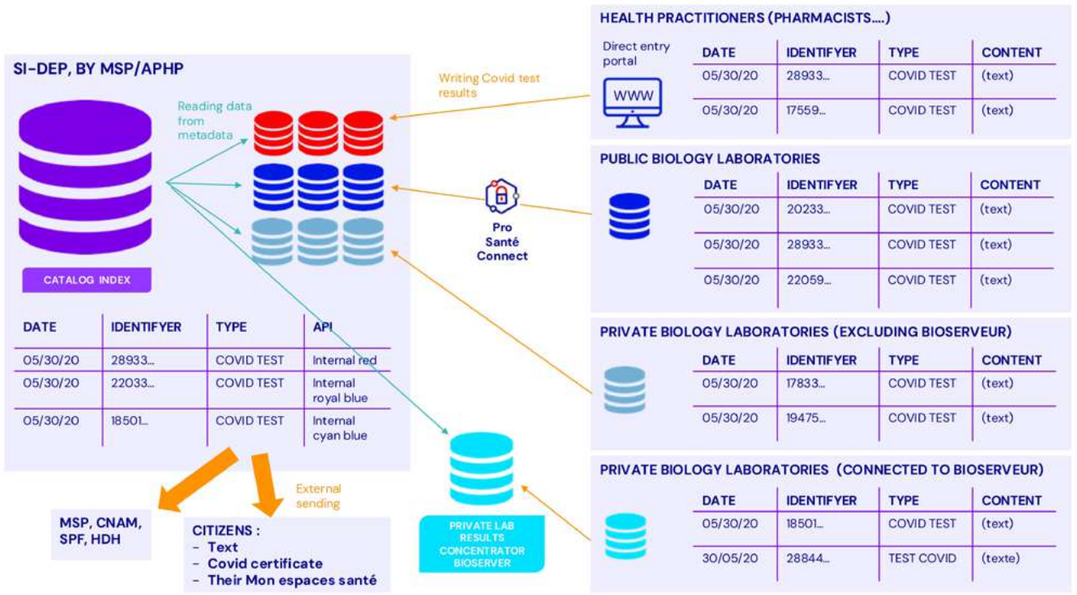
04/12/05	N° EDE	GENETICS	External cyan blue
04/12/05	Vineyard register	GRAPE VARIETY	External royal blue

FARMERS	DATE	IDENTIFYER	TYPE	CONTENT
	04/12/05	N° PACAGE	PLOT-BASED	Pratiques phytos
	04/12/05	N° EDE	GENETICS	Perf Index

OTHER ACTORS: LABORATORIES, COOPERATIVES, AGRI-FOOD INDUSTRIES...	DATE	IDENTIFYER	TYPE	CONTENT
	04/12/05	N° PACAGE	GENETICS	Index
	04/12/05	Casier viticole	GRAPE VARIETY	QR Code

PUBLICS ACTORS: ASP, MASA...	DATE	IDENTIFYER	TYPE	CONTENT
	04/12/05	N° PACAGE	PLOT-BASED	Pratiques phytos
	04/12/05	N° EDE	GENETICS	Index

SI-DEP



DATE	IDENTIFYER	TYPE	API
05/30/20	28933...	COVID TEST	Internal red
05/30/20	22033...	COVID TEST	Internal royal blue
05/30/20	18501...	COVID TEST	Internal cyan blue

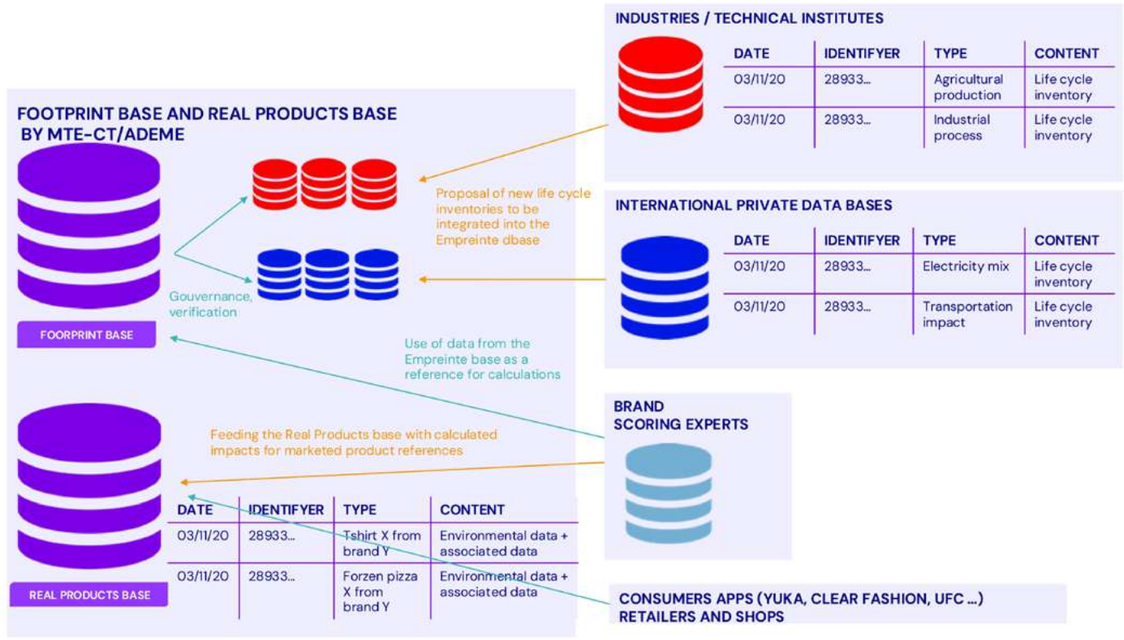
HEALTH PRACTITIONERS (PHARMACISTS....)	DATE	IDENTIFYER	TYPE	CONTENT
	05/30/20	28933...	COVID TEST	(text)
	05/30/20	17559...	COVID TEST	(text)

PUBLIC BIOLOGY LABORATORIES	DATE	IDENTIFYER	TYPE	CONTENT
	05/30/20	20233...	COVID TEST	(text)
	05/30/20	28933...	COVID TEST	(text)
	05/30/20	22059...	COVID TEST	(text)

PRIVATE BIOLOGY LABORATORIES (EXCLUDING BIOSERVEUR)	DATE	IDENTIFYER	TYPE	CONTENT
	05/30/20	17833...	COVID TEST	(text)
	05/30/20	19475...	COVID TEST	(text)

PRIVATE BIOLOGY LABORATORIES (CONNECTED TO BIOSERVEUR)	DATE	IDENTIFYER	TYPE	CONTENT
	05/30/20	18501...	COVID TEST	(text)
	30/05/20	28844...	TEST COVID	(texte)

EMPREINTE DATABASE AND PRODUITS REELS DATABASE

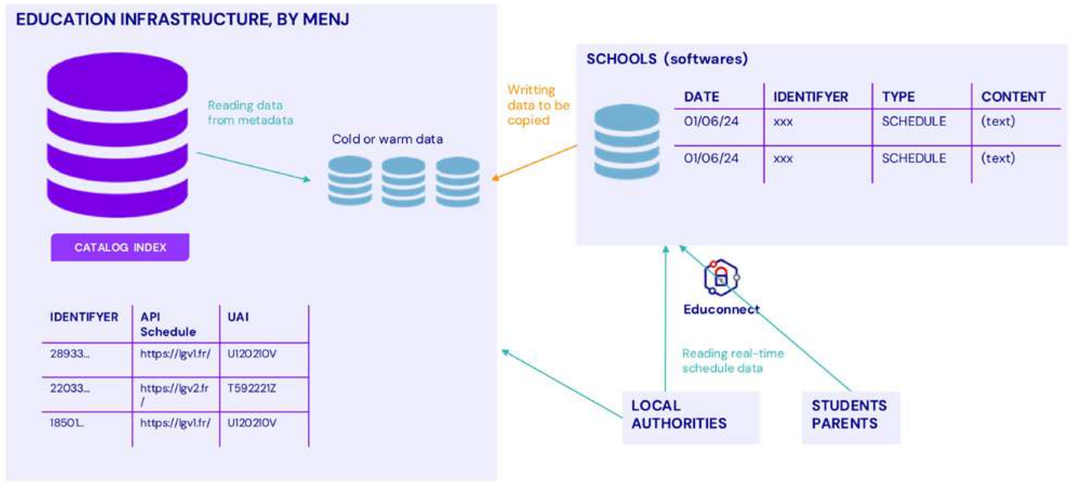


DATE	IDENTIFYER	TYPE	CONTENT
03/11/20	28933...	Tshirt X from brand Y	Environmental data + associated data
03/11/20	28933...	Forzen pizza X from brand Y	Environmental data + associated data

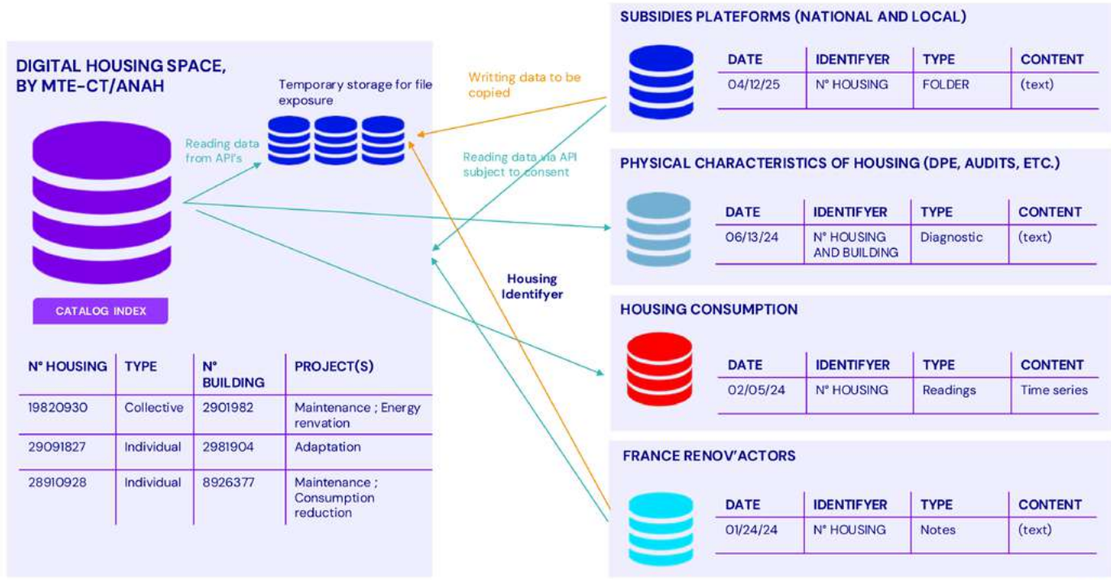
INDUSTRIES / TECHNICAL INSTITUTES	DATE	IDENTIFYER	TYPE	CONTENT
	03/11/20	28933...	Agricultural production	Life cycle inventory
	03/11/20	28933...	Industrial process	Life cycle inventory

INTERNATIONAL PRIVATE DATA BASES	DATE	IDENTIFYER	TYPE	CONTENT
	03/11/20	28933...	Electricity mix	Life cycle inventory
	03/11/20	28933...	Transportation impact	Life cycle inventory

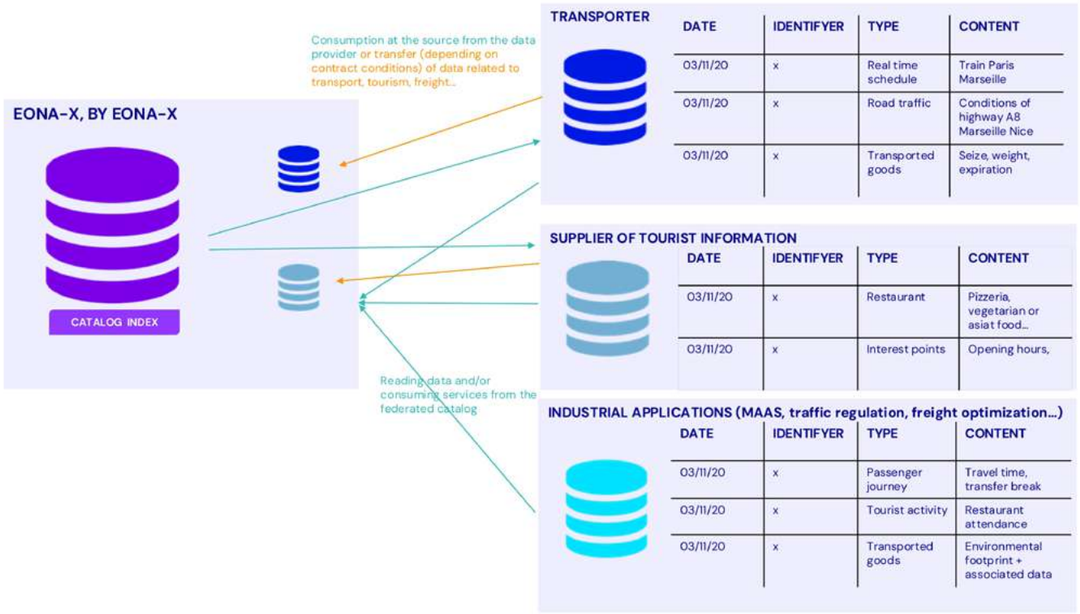
EDUCATION INFRASTRUCTURE



DIGITAL HOUSING SPACE



EONA-X



12. WHAT ORGANIZATION AND WHAT TYPE OF SUPPORT?

HEALTHCARE INFRASTRUCTURE

In 2019, the Ministerial Delegation for Digital Health (DNS) replaced the DSSIS, a team attached to the General Secretariat of the Social Ministries which was unable to effectively coordinate the various stakeholders. The DNS is responsible for the entire e-health roadmap, of which *Mon espace santé* is one of 30 initiatives, and for the rollout of the huge associated Ségur program (€2 billion). The DNS has been placed under the authority of the Minister, has renewed 80% of its team, taken direct control and transformed the Digital Health Agency (ANS) (notably through a majority vote at the AGM, a change in the management team and a massive increase in its resources) and re-established strong links with the various operators (CNAM, CNSA, GIE SV, HAS, ANAH, ATIH, etc.). It has grown from about 10 to 40 people in 3 years from a minimal operating budget to managing a budget of nearly €3 billion for digital health. In 2024, after proving its worth following an IGAS report and the support of the relevant DACs (DGOS, DGS), the DNS integrated the "IT" teams from these directorates, growing to 70 people. It became a Central Administration Directorate and formally took over most of the digital operators. The link to the Minister was essential in order to have weight against other stakeholders and ensuring the necessary cross-functionality, as Mon espace santé serves hospitals (DGOS), private practitioners (CNAM), epidemics and prevention (DGS), and medico-social sectors (DGCS). Unfortunately, the Covid crisis occurred during the call for tenders for *Mon espace santé*, which was too early to accelerate its development. Nevertheless, the inclusion of Covid certificates in *Mon espace santé* demonstrated from the beginning that it was not an empty shell, unlike the DMP.

Due to the CNAM's political weight, its management of the DMP and the INS remote service, and its extensive network supporting private practitioners through CPAM, it was chosen as the primary operator, with significant contributions from ANS and GIE SV (on standards, identification of professionals and patients, Ségur certification of software compatible with *Mon espace santé*), HAS (for professional criteria), ASP (for software vendors' payments), and to a lesser extent, ANAH and ATIH. Clarifying the roles of each of these stakeholders in the deployment of Mon espace santé was necessary, particularly regarding interoperability, where the ANS was officially responsible, but the CNAM often imposed its (different) standards in practice. Under the impetus of the DNS and their DGs, these operators initiated massive internal transformations to successfully manage the infrastructure and its underlying components, notably the ANS (50% of staff replaced, increase from 150 to 250 employees, relocation, cultural change, etc.) and the CNAM (more integrated links between the teams in charge of “project management” and “project implementation,” strong support from the CEO, etc.).These transformations, which are as essential as they are difficult, have caused tensions between stakeholders (friction is inevitable when change is afoot!) and are still ongoing. However, thanks to a colossal collective effort and everyone’s shared pride, Mon espace santé was successfully launched in early 2022, within the tight schedule announced in 2019.

At the request of the DNS and the CNAM and under Article 3, the Interministerial Directorate for Digital Affairs was involved from the beginning of the project to ensure that the teams worked in “product mode” and to contribute to the public procurement process. The Interministerial Directorate for Digital Affairs also produced an Article 4 report. The Ministry of Economy was involved at the start of the project only, to align itself with the distribution of public/private roles (notably Doctolib).

The HAS contributed to the sectoral standards that must be met in order for an app to be listed in the *Mon espace santé* catalog (reliability of medical information, etc.). It would certainly be necessary for HAS to also become the organization responsible for approving the "authorization matrix," which defines which professionals are authorized to access which data, instead of the DNS, which has no professional legitimacy. The Data Protection Agency and the ANSSI have been involved since the early stages of the project. Discussions with these bodies have been very constructive, but their processing times often interfere with the schedule and operational requirements.

Mon espace santé was supported by the Ministers of Health and the Secretary of State for Digital Affairs at key moments (project announcement, defense before the chambers, launch, 2-year review). No direct support came from the Prime Ministers or Presidents themselves. The Secretary of State for Digital Affairs, health and digital advisors from the PM/PR offices, and some parliamentarians played a key role in overcoming obstacles faced by healthcare stakeholders (opt-out, Ségur funding, governance, etc.). DGConnect and the DGSanté of the Commission were also valuable supporters. External stakeholders, including patient associations, some professional unions (biologists, pharmacists, FHP, FEHAP, FHF, etc.), or digital (Numeum, FEIMA, etc.), played a crucial role over time. All the arguments in favor of the doctrine were used.

AGRICULTURAL INFRASTRUCTURE

The organization of the infrastructure managed by Agdatahub and its implementation followed several stages:

Stage 1 (2014 / 2017): incubation by agricultural R&D with the applied research fund (CASDAR), financed by a tax on the turnover of farms.

- Filing and financing of 2 research projects (API-AGRO for the exposure of open data from agricultural R&D and MULTIPASS for consent management) coordinated by technical institutes.
- Commission by Minister of Agriculture Stéphane LE FOLL for 2 reports (AgGate then Innovation 2025) to Jean-Marc Bournigal, President of IRSTEA, to highlight data and usage issues for the next 10 years.

Stage 2 (2017 / 2023): transfer from R&D to a company with industrialization co-financed by the agricultural sector (equity) and public authorities (SGPI, CDC).

- Transfer of R&D projects to API-AGRO then Agdatahub, which formalized private governance by agricultural stakeholders.
- Decision to use European (Digital Europe Program) and French (DGE, SGPI) funding, prioritizing technological infrastructures over agriculture. Significant support from the Secretary of State for Digital Affairs and DGE during the COVID period.
- 2018-2022: no data/digital pilot from MASA. 2023: Creation of a high-ranking digital official position but without ETP resources and little political support. 2024: ongoing changes thanks to ministerial support. A transversal issue to DGAL / DGPE / DGER to coordinate administration, sectors, and stakeholders, and prioritize use cases with associated resources (HR and budget) based on true priorities for farmers.
- Difficulties in ensuring interministerial coordination on agricultural digital issues: the Interministerial Directorate for Digital Affairs on digital identity, DGE on Gaia-X / EDIC / data spaces, ASP on TELEPAC data, MASA, Matignon with SGPI / SGPE…
- Major shift due to long-term support from the SGPE, which helped secure human and financial resources for MASA and align Matignon, MASA, MTE-CT, SENUM with direct involvement from the delegated Minister linking innovation, digital, economic, and environmental performance, in the context of an agricultural crisis.
- The political "takeover" of the project has shaken up the principles of the DGE/SGPI, which favored the emergence of private companies in the competitive sector without taking into account the issues of sovereignty or the collective importance of these infrastructures.
- The Interministerial Directorate for Digital Affairs and DGE were more opposed to the project than supportive of it due to a lack of common interministerial political vision. No Interministerial Directorate for Digital Affairs assistance was provided for securing human and financial resources for the MASA project or for establishing high-level governance at MASA.
- A public sector project manager is required to coordinate the various stakeholders involved in the project (MASA, MTE, SGPE), including cross-functional departments (Interministerial Directorate for Digital Affairs, DGE), the CDC and regulatory authorities (CNIL/ARCEP). Recruitment is currently underway. Long-term support from the Minister is absolutely essential.
- Throughout this period of alignment between ministries and public operators in France, professional stakeholders have strategically implemented the project on the ground with Agdatahub, chambers of agriculture, agricultural unions, interprofessional organizations, and digital organizations (LFD), which are stepping up whenever necessary to remind everyone that data sharing is essential to overcoming the crisis.
- Negotiations and the publication of new European regulations (DGA, DA, IA Act…), the deployment of the Commission’s data strategy, and funds from the Digital Europe Program, combined with the dynamic supported by Gaia-X, have reinforced the legitimacy and innovative vision championed by Agdatahub, cited as an example in many European conferences.

Stage 3: National deployment with accelerated use cases supported by public authorities and interoperability with the European Agricultural Data Space.

- Continuing requests for European funding to ensure the deployment of the European Agricultural Data Space, in which Agdatahub could serve as the French infrastructure or even expand to other Member States that do not have infrastructure in place. The EDIC mechanism could contribute to this development.
- There is no need to negotiate with the private structure since it is pushing for this change itself. However, the adaptation of the structure and its ecosystem is based on the practice of “small and quick steps”. Public governance will proceed through the conversion of OCA France2030, with a major evolution expected at the beginning of 2025.

CONSUMPTION INFRASTRUCTURE

***EMPREINTE* DATABASE:**

The *Empreinte* database—as envisioned today—is an evolution of a series of technical tools developed by the "ecodesign" team at Ademe (impact base, carbon base) or the "agriculture" team (Agribalyse). These different tools are subject to different strategic choices made at the technical team level. The impact base was subject to licensing conditions, while Agribalyse has so far offered open, free and reusable data.

Environmental labeling methodologies—which rely on the *Empreinte* database to provide environmental scoring of products—have been under significant political attention since the enactment of the Climate and Resilience Law in 2021. This attention has led to the mobilization of substantial resources at the MTECT, notably through CGDD (SEVS) and the State startup Ecobalyse, with additional support from the Interministerial Directorate for Digital Affairs and FINDPE. At Ademe, the implementation of environmental labeling is being led by an independent unit, separate from the teams responsible for databases.

The strategic guidelines and resources that are currently being allocated to the *Empreinte* database are crucial. To play the central role expected—particularly in the generalization of environmental display— the *Empreinte* database will need to provide numerous, high-quality data with a high level of openness to facilitate the dissemination and reuse of data. Strategic dimensions (such a database is a matter of sovereignty) and economic dimensions (the form and effectiveness of the competitive landscape for scoring experts will largely depend on the data-sharing infrastructure that is put in place) need to be better integrated.

To enable the emergence of an effective data-sharing infrastructure, it is necessary to:

- [COHERENCE] Ensure consistency in the technical work currently being carried out by different teams at Ademe with a view to developing a comprehensive system for scoring the environmental impact of products. If necessary, the current organization could be reviewed.
- [DATA EXPERTISE] In addition to the technical expertise already available at Ademe, make better use of strong legal expertise on the sharing of data of public interest.
- [AMBITION] Recognize the strategic nature of negotiations with Ecoinvent, the failure of which would compromise the achievement of the political ambition (environmental labeling for all products sold in France). In the event of failure, an ambitious program will need to be quickly launched to mobilize another, more open database.
- [CONNECTION TO THE ECOSYSTEM] Maintain close ties with the ecosystem (experts, industries, brands, academics, etc.), through governance to be established or in a work program whose pace should be able to be separated from the political calendar, isolating questions that require political arbitration (e.g., should ecotoxicity be given more weight compared to climate?).

***PRODUITS RÉELS* DATABASE:**

The *Produits Réels* database must undergo an investigation phase in the summer. An EIG has been mobilized by the Interministerial Directorate for Digital Affairs to bring this new project within an expanded Ecobalyse team (CGDD, Ademe).

The boundary between the topics covered by Ademe and the Ministry would benefit from being formalized. It is important to maintain close links with politicians on sensitive issues (fast fashion, signals sent to organic farming, etc.) and to ensure the robustness and sustainability of a technical team that will need to accelerate the production of data and robust methodological guidelines so that environmental labeling can cover most

HEALTHCARE INFRASTRUCTURE

SI-DEP was initiated from a need that ultimately became secondary: to manage the IT systems for the testing facilities set up by university hospitals that had acquired exceptional sequencers (MGI Tech).

The Ministry, particularly through the DGOS and DNS, quickly realized the importance of building a common infrastructure for this purpose, but also for all other biology laboratories, in order to obtain reliable figures.

Given the time constraints, it was decided to use an existing infrastructure, repurposed from its original use, with a results server set up by AP-HP, which enjoys a certain level of trust and experience —other operators being more cautious or already busy with other IT projects (e.g., the CNAM with *Contact Covid* to list the contacts of positive cases). The DGS, which is leading the response to the health crisis, quickly became involved in the project and was one of the first users in its daily communications. In practice, the DNS remained the strategic IT system leader with the AP-HP responsible for operations and integration.

As the first lockdown lift approached, it quickly became clear that it was essential to trace positive cases, which was only possible with SI-DEP, making it even more strategic within the interministerial crisis management system. Minister Olivier Véran vigorously defended the law in Parliament, though it was not taken up at higher levels, as the focus was on the StopCovid application (now *TousAntiCovid*) sponsored by SeNum. The laws were eventually passed with significant safeguards, notably the 3-month retention period that caused issues (loss of data for research, inability to regenerate an old pass, etc.).

Biologists and patients strongly supported the initiative. Providers were getting involved, given the urgency of the situation and the funding required.

Overall, the DNS led the initiative, with a highly involved operator (AP-HP). The DGS was the main user and data controller. It also took over strategic leadership after one year.

In terms of organization, a daily then weekly steering committee kept everyone on track.

EDUCATION INFRASTRUCTURE

Announced by the Minister during the General States of Digital for Education in November 2020, the Education Data Hub project referred to the organization of technological tools and the ecosystem of public and private partners aimed at cataloging and sharing, via a secure single-window, education datasets and organizing their use.

This platform aimed at improving existing services and developing innovative services for students, teachers, researchers, economic operators, and education stakeholders, within the Ministry's trust framework, ensuring transparency, ethics, and personal data protection.

A preliminary phase involving stakeholders was designed to define the service offering. The Ministry has partnered with Inria to consult stakeholders between November 2022 and May 2023. During these discussions, an idealistic, even naive vision of a data platform emerged, which would enable the development of any innovative service beyond the constraints of data warehouse management, security requirements, and governance.

The experience gained in the field of data exchange by both parties is genuine and does not pose any technological challenges. However, implementing such a project requires a significant financial investment estimated at €5 million to ensure its design, implementation, and initial deployment. Longevity will be ensured by internal Ministry funding.

This use-case approach aligns with the Interministerial Directorate for Digital Affairs' recommendations: develop less complex products with rapid impact.

MOBILITY INFRASTRUCTURE

Currently, EONA-X and moB are not directly managed or financed by DGITM/Min. Transport but are only monitored. EONA-X receives financial support from DGE, while moB receives financial support from Ademe.

It is necessary to ensure the transferability of the responsibility from an innovation/exploration phase to a generalization phase under DGITM management. This requires devising a process for the emergence and management of multi-actor public infrastructures and their funding. Alignment of strategies between Ministries is desirable so that initiatives funded by DGE can be tested and, if possible, adopted by other Ministries.

The Single Title will create an infrastructure between regions/AOM, the State, and operators, along with associated governance/management, beyond the experimentation phase. This approach could inspire other projects or lead to resource/structure pooling. A "neutral" structure (such as an association or equivalent) is necessary to build trust and manage digital and ontological commons, while allowing contributions from the private sector on data sharing, resources, agile methods, etc.

HOUSING INFRASTRUCTURE

To date, there is no clearly identified DGALN pilot with the necessary skills and expertise in the field—particularly in digital technology—to take on this issue.

It will be essential for the digital housing space leader to have sufficient weight with DGFIP, which has a key role (dissemination of the unique housing identifier), and the DGEC. It is particularly important that there be support from above Matignon/SGPE, as the DGALN does not have oversight of the DGFIP/DGEC. Currently, information is not circulating, and the building blocks underlying the digital housing space (such as unique identifiers) are not progressing quickly enough.

The question of who should lead is still pending: should there be a request for significant changes from ANAH and contributions from CSTB, ADEME, and IGN? Currently, stakeholders are working independently, with some data not being shared (CSTB building data with a paid model).

The Interministerial Directorate for Digital Affairs support also needs to be clarified. It is also essential to align the DGE with the vision so that it does not finance competing private initiatives, as was almost the case with France 2030.

The question of the need for a professional "referee" is still open. Could the DGALN play this role?

CDC assistance with financing would be necessary if the state budget does not allow for the financing of the digital space in housing, but care would then need to be taken to avoid a mixing of roles.

There is currently no political support. The case for the need for this space needs to be strengthened in order to seek political support, which is currently lacking, even though a previous housing cabinet seemed rather favorable to the project.

DOCTRINE

The various roles are deliberately presented in the following order. **The most critical stakeholders are those who actively lead and those who execute.** Political sponsorship is, of course, a necessary catalyst, but it is unfortunately rarely present at the beginning, when progress must be made regardless. It will achieve nothing without an organization and individuals who excel both in ability and mindset. This is a point that is all too often overlooked in the civil service.

Who Leads and Coordinates?

- **Although this role is an extremely important prerequisite, it is often overlooked or unclear at the national level.** At best, there is a coordinator within the Administration with little influence and/or resources (with only vague functional connections), who is not referred to as a "leader" for fear of upsetting other teams (e.g., previously the DSSIS on the health side, vague organization on the mobility side, etc.). At worst, there is no such role (e.g., no point of contact for digital technology in agriculture before the appointment of the senior public official for digital technology).
- This modesty and these gray areas are the best way to fail. **It is in this sense that the European Commission has called for the establishment of single "national contact points,"** for example for the European Health Data Space.
- **This leader must be explicit and responsible for implementing ethical digital practices in line with their public policy,** particularly by building the necessary data-sharing infrastructure. They are responsible for ensuring that everything runs smoothly from start to finish and they must fight against the risks of uberization at all costs. To achieve this, they must act as a conductor, coordinating the many stakeholders who each have a part to play in harmony to ensure that the infrastructure operates effectively.
- **They may intelligently take advantage of crises to put all contributors into "command mode" around the infrastructure,** in order to simplify a frequently nightmarish Gantt chart and take the project to the next level (e.g., the Covid crisis made it possible to get the 3Iabos IS off the ground).

This team must absolutely 1/ gather all the Administration people responsible for managing a digital product necessary for the infrastructure and 2/ be attached to the highest sectoral level (the Minister, or in rare cases, the Director) because:

- **The leader must have significant internal influence** to align departments and operators that are often much stronger politically. They must be able to speak directly with the Directors of Administration or operators and be the decision-maker on the budgets allocated to digital issues (question 13).
- **The pilot must be able to publicly promote the digital strategy** in order to effectively consult and engage stakeholders in what is necessarily a collective endeavor. This leadership cannot be solely performed by sectoral stakeholders, who do not have sufficient digital expertise.
- **The leader must be highly attractive to skilled individuals.** These very complex projects require top-level project managers—some of whom previously held senior managerial roles. They are often willing to forgo having anyone "below" them if, and only if, they have nearly no one "above" them and are guaranteed to join a robust and skilled digital team.
- **The pilot must be large enough to bring together the wide range of expertise needed to make such a project a success.** Experts must be able to work together fluidly, without being fragmented among different departments or sub-departments. They report to the digital pilot in terms of hierarchy and to the business lines in terms of function. Digital and business stakeholders then work together in an integrated, product-based manner.
- **The leader cannot be part of a specific domain team because infrastructure is, by nature, transversal.** We would not ask the Ministry of Education to build roads connecting schools to homes, hospitals, etc. Even if the Ministry needs them, they are not the only ones and they do not have the expertise: they will always prioritize the proper development of schools over roads as this is what it is directly judged on.
- **However, infrastructure has a very strong sectoral component,** so there cannot be a single team responsible for developing digital infrastructures needed for all public policies (e.g., the Interministerial Directorate for Digital Affairs, whose role is different—see following slides). Just as it is not the same team that builds roads, electricity networks, and water networks.

The leader must take on both the role of "bad cop" and "good cop", for the benefit of all. Just as playing a handball game without a referee is unpleasant for both teams, a project without a leader creates entropy that discourages those involved. It is essential to avoid the overly complex governance structures often implemented in the Administration to avoid offending anyone. The leader takes responsibility for consulting stakeholders and then deciding or referring a decision to political arbitration if it is a major one.

Which stakeholders operate?

This role is obviously fundamental and, as strange as it may seem, it is often vague or ambiguous for a significant period of time. This is mainly due to the fact that a data-sharing infrastructure must bring together several missing or existing technological building blocks that are provided by different stakeholders (databases, electronic identification tools, etc.).

It is often necessary to:

- **Identify a primary leader** responsible for the bulk of the work, **and secondary contributors** who contribute to the project in particular by building all the underlying building blocks, and **clearly explain the division of roles.**
- **Prioritize the transformation of existing stakeholders—even drastically—rather than creating new stakeholders** (via a new GIP, GIS, GIE, etc.), which would contribute to the entropy everyone complains about.
- **Find the right level of cooperation among stakeholders** responsible for managing different sectoral infrastructures: while it would not make sense to entrust both *Mon espace santé* and the *Produits Réels* database to the same stakeholder—given how different the sectors are—there are certainly synergies to be found between more closely related sectors that share common aspects, for example, those using geolocated or spatial data.

These organizations can be the Administration and/or operators (at national, regional, or international levels depending on the infrastructure):

- **The administration is often overlooked for the wrong reasons:** the folly of political decisions made overnight, a lack of continuity, very limited human and financial resources, highly controlled communication, little appetite for digital technology, etc. The project is then entrusted to multiple operators who are further removed from politics and often have more room for maneuver, which can complicate governance and put the project at risk, instead of tackling administrative reform and giving it a chance to work properly. When the project is nonetheless entrusted to the Administration, the teams responsible for implementation are often the DNUM (Note: in its current state, the DNUM is often not the ideal leader as it does not meet all the criteria mentioned above).
- **Most operators also require a significant internal transformation to effectively support these infrastructures.** These transformations are underway among some stakeholders and have not yet been implemented or even identified among others. Transformation varies depending on the historical purpose of the operators: those responsible for distributing or collecting funds (e.g., the CNAM for doctors, the ASP for farmers, the DGFIP for individuals and businesses) must reduce their technical debt, adopt API standards, and make their massive legacy IT systems more agile without disrupting them; operators distributing smaller-scale aid aid or operators in fields that are not very digital must structure themselves, strengthen their capabilities, and become more professional (ADEME, ANAH, Cerema, Canopée). Operators with fairly specific technical expertise need to diversify their know-how and develop their economic model (IGN, Météo France); general technical operators must become more closely involved in the profession (INRIA), etc.

These stakeholders must be clearly identified as soon as possible, their roles explained, and their HR and organizational transformation made an absolute priority. It can be done! Most of the time, we have not really tried, or have not tried hard enough, or have not tried together.

Which stakeholders are responsible for providing support and oversight across ministries?

At the interministerial level, the issue straddles topics related to "internal" digital matters (related to public transformation), coordinated by the Interministerial Directorate for Digital Affairs, and more "external" digital topics (related to the economy), part of the "carrot" (FrenchTech, France 2030...) and part of the "stick" (digital regulation), managed by DGE (see diagram). **The lack of a common vision between "domain" digital, "internal," and "external" digital sometimes leads to dissonant voices that hinder project progress and discredit us.**

It is essential that sectoral infrastructure providers receive interministerial support and that compliance with common doctrine is ensured. Therefore, it is necessary that the Interministerial Directorate for Digital Affairs/DGE duo, i.e., MTFP/MNUM, coordinated by advisors associated with the PR/PM cabinets, can:

- **On the "good cop" side**, this aspect is often underdeveloped, even though it is at least as important as the bad cop side:

  › DGE and the Interministerial Directorate for Digital Affairs: facilitate interministerial sharing and coordinate the network of infrastructure providers (as a subnet of the State's digital agents network being established); ensure balance between different types of funded digital projects (e.g., AI vs. infrastructure).

  › Interministerial Directorate for Digital Affairs: help negotiate the State's human and financial resources, in particular to ensure the ratio of outsourcing and the balance between domain/digital funding and between Ministries are respected; assist in negotiating proper organization and political support; ensure that the remuneration scale is effectively respected; define an overall urbanization doctrine and assist businesses in implementing it; provide and adapt interministerial components to sector-specific needs through appropriate governance; offer expertise on how to handle public procurement if necessary, including if it is not managed by the Administration but by an operator.

  › DGE: encourage manufacturers to create innovative digital services that are necessarily connected to infrastructure; contribute to the emergence of an efficient and sovereign digital sector capable of responding to public infrastructure contracts; provide expertise in digital regulation, particularly in conjunction with the DGA and DA; ensure the right balance between public/private funding; where appropriate, help digital industry stakeholders to negotiate national funding from France 2030 and European funding, particularly for setting up and monitoring calls for proposals.
- **On the "bad cop" side:**

  › DGE and Interministerial Directorate for Digital Affairs: ensure compliance with the doctrine on the division of roles between the public and private sectors (e.g., not funding private stakeholders to build infrastructure whose governance is not appropriate; make the distribution of funds conditional on connection to the infrastructure; conversely, do not launch public projects that are in the competitive domain, except in exceptional cases).

  › Interministerial Directorate for Digital Affairs: ensure that sectoral infrastructure complies with the overall urbanization doctrine and uses interministerial technical building blocks where they exist; enforce Articles 3 and 4 of Decree No. 2019-1088 where necessary.

To fulfill these missions, it is necessary to create a dedicated team for data-sharing infrastructures at the Interministerial Directorate for Digital Affairs and to strengthen governance between the DGE team responsible for data spaces, those in charge of industrial sectors, and the relevant ministries

At the European level, responsibility for data spaces is shared between DG Connect and the policy departments (DG ENVI, MOOVE, ENER, etc.). **It is not easy to navigate between the various stakeholders and the different European texts related to the subject** (see diagram). The Commission should be encouraged to clarify its governance by adapting the national model described above at European level.

<u>What other stakeholder(s) can provide the specific expertise needed?</u>

- **On the sectoral side:** since these infrastructures are closely tied to specific sectors, several decisions need to be made by a lead organization that consults with stakeholders and quickly decides on rules for data access, methodology, standards, etc. Often, this organization is not the one responsible for the infrastructure (e.g., the HAS in healthcare).
- **On the security side:** given that data is almost always sensitive, it is essential to work from the outset with the Data Protection Agency and/or the ANSSI, explaining the sectoral stakes in an educational manner to resolve frequent paradoxical demands between "usage" and "security."
- **On the budget side:** since data-sharing infrastructure is crucial for public efficiency, **the Budget Directorate (DB) must perform a control function verifying that all requests for funding for a public policy measure are accompanied by a digital and data strategy,** ruling in particular on the need for data-sharing infrastructure and, where applicable, requesting the associated appropriations. This institutional vigilance provides a safety net in addition to the capacity to persuade with the arguments below.
- **On the governance of the infrastructure:** if mixed arrangements are necessary (not recommended, see question 13), the SGPI, CDC, and BPI should provide their expertise. If a change in governance of the currently managing private stakeholder is needed (see question 9), the SISSE of the DGE should offer its expertise and mobilize other relevant public stakeholders if necessary (APE, BPI, CDC, etc.).

Which stakeholders provide political support?

- **Since the topic is highly sectoral, initial political support must come from the relevant minister. However, given the stakes involved, the Prime Minister and President of the Republic could also legitimately become involved on an ad hoc basis.**
- With few exceptions, **political support is often too weak**, which hampers obtaining resources and internal coordination and complicates mobilizing the ecosystem.

- **It is crucial to address this as political support is often necessary for success: establish a pilot and coordination team** that consolidates the organization's FTEs and is attached to the highest level of the business.
- Often, few stakeholders are fiercely opposed to the project. Everyone frequently says, "*digital technology is important*," without it being followed by concrete actions. **Support is weak because issues are poorly explained/understood, external stakeholders are rarely vocal on the subject, there are concerns about data sensitivity controversies, doubts about our ability to deliver or do it well (fear of creating "empty shells"), the topic is not deemed attractive, and/or because the political fallout, particularly in the short term, is underestimated.**
- **To address this, several arguments are useful for both policymakers and sectoral stakeholders:**

  > Be very convincing about sectoral needs, by both explaining the systemic logic of public platforms and underlying infrastructures, which are essential for building an urbanized city rather than a slum ("macro aspect," question 1), and by discussing concrete, current sectoral use cases that illustrate why the public policy will not be implemented correctly without this infrastructure ("micro aspect," question 2).

Challenge the *status quo* : clarify the advantages and disadvantages of different scenarios, including that of not building the infrastructure, which often involves more risk than building it (see question 7). Do not leave the decision to not build the infrastructure ambiguous. Ensure that a clear and formal decision is made, so that everyone is accountable.

Explain in detail and with conviction the threat of uberization, giving examples to show that it is not a fantasy and that there is a pressing deadline: this is a matter of national sovereignty, and if we don't get started right away, we will be left with nothing but tears, as is so often the case.

Reassure stakeholders about the ethical framework that will proactively manage data risks: work hand in hand from the outset with official or activist organizations responsible for protecting this data (see question 6), and publicly demonstrate that we are working in a spirit of trust to reassure the ecosystem and policymakers (e.g., see quotes from the Data Protection Agency in *France Nation Verte*'s "Digital and Data" roadmap).

Reassure them of our ability to deliver: when we fail, it is because we have set ourselves up for failure by doing the opposite of what is recommended in this doctrine. Sometimes, we have not really tried. Let's be optimistic, we have everything we need to succeed, and many projects are already a success or on their way to being one (e.g., SI-DEP, *Mon espace santé*, the education infrastructure v0, but also in the interior, defense, the nominative social declaration for companies, etc.)!

Highlight environmental, budgetary (e.g., *Mon espace santé* allows for more effective personalized prevention, leading to less need for care and thus consuming fewer physical and budgetary resources), and **economic** benefits (in terms of simplification for businesses, reindustrialization, job creation, digital sovereignty, innovation, etc.).

Note: **it is often important to present the budgetary aspect as a positive externality of the infrastructure rather than its r*aison d'être***, to avoid confusing objective with means. For example, *Mon espace santé* primarily enables people to receive better care; it also happens to be a source of substantial savings.

Reassure about political fallout, including short/medium-term: granted it is harder to open a sewer system than a building, but citizens and professionals are not dumb! If you explain the benefits of infrastructure to the professional ecosystem in an educational way and show progress in a "small and quick steps" approach, the ecosystem is often grateful that politicians are pursuing a long-term strategy rather than short-term tactics, and will be keen to highlight this in the specialist press, which is often picked up by the mainstream media.

Find allies/sponsors and ensure they widely and publicly support the project:

- **In the public sphere:** politicians, brave advisors in sectoral ministerial offices, SENUM, MTFP, PM and PR, particularly sensitive DACs. Some parliamentarians and leaders of national agencies or independent authorities, as well as European Commission officials, are less influenced by short-term whims and often serve as valuable, more expert, and more enduring allies.
- **Externally:** citizens, professionals, businesses—particularly through their associations, unions, federations, NGOs, and "VIPs" in the sector—**are the most important allies**, as they are persistent, help convince internally, and ultimately, are the ones we are all working for collectively (see question 15).

13. WHAT HUMAN AND FINANCIAL RESOURCES?

HEALTHCARE INFRASTRUCTURE

Mon espace santé was announced in April 2019 by the Minister at the initiative of the DNS, despite no additional human or financial resources being allocated.

Then the "Couet method" ("fake it until you make it"), the approach of small but quick steps, and the health crisis improved the situation. By summer 2020, the Ségur reform allowed for an increase in human resources at the DNS (+19 FTEs, initially non-renewable fixed-term contracts due to lack of alternatives, later made permanent), at ANS, and at CNAM, as well as their financial resources from European funds, which complicated reporting but enabled the release of significant funds (+ €2 billion, including €105 million for *Mon espace santé*).

In the early years, many consultants were brought in due to a lack of internal resources, the ratios later stabilized. The DNS recruited a wide range of profiles recognized in the ecosystem for their digital expertise.

A key point is that the Ségur fund is multi-year and has been entrusted to the DNS, which has been able to allocate funds to operators according to needs and coordinate effectively.

AGRICULTURE INFRASTRUCTURE

Agdatahub consists of a team of 10 multidisciplinary employees representing a total annual payroll of €1.3 million, handling commercial, functional, level 1 support, consulting, and financial functions. R&D, software development, and technical support functions are outsourced to technology vendors, involving nearly 25 external people. Future recruitments will focus on profiles needed to support the framing of use cases and the scaling of the infrastructure, particularly in support. The technical team will need to be strengthened with experienced profiles to contribute to data and interoperability protocol standardization, as well as to interconnect with other European infrastructures.

Before 2023, the Ministry of Agriculture had no public agents dedicated to defining a coherent and ambitious vision for digital matters, which was a real problem. In 2023, a high-level digital official reporting to the Minister was created under the impulse of SGPE. In 2024, to implement the France Nation Verte roadmap and particularly manage Agdatahub, an additional 10 FTEs will be added. More than €1 million will also be allocated to the infrastructure (FINDPE + CDC budget). Budgets for the following years are currently being negotiated, and the lack of multiannual visibility is problematic.

HEALTHCARE INFRASTRUCTURE

Over more than 4 years of construction and operation, the total cost is around €100 million, or about €0.25 per collected test (a PCR test costs around €50).

At the beginning, without this "whatever it takes" state of mind, the infrastructure would never have seen the light of day. The project team was able to begin thanks to IT and project professionals from AP-HP who were mobilized (about 20 people at most), along with dozens of recruited consultants and a company for national IT support.

In total, several hundred people were mobilized for the construction, including various entities (Ministry, AP-HP, vendors, SPF, etc.).

CONSUMPTION INFRASTRUCTURE

The implementation of a comprehensive environmental labeling system, which requires the use of two *Empreinte* databases, requires:

- An expanded team around about twenty people (Ademe agents, CGDD, beta.gouv providers, Interministerial Directorate for Digital Affairs support, etc.) with a total estimated budget of around €3 million for the next 2 years, including €1.2 million to be mobilized for the state startup Ecobalyse. At this stage, FINDPE has granted support of €675,000, which will fund activities in 2024. Funding for 2025 remains to be determined.
- A massive data availability strategy.
  > If this data can be shared by a partner (e.g., Ecoinvent), a budget of around €2 million per year seems necessary.
  > If an open alternative must be considered, it remains to be defined, but a significant human and financial effort may be needed over the next 3 years.

EDUCATION INFRASTRUCTURE

The education infrastructure does not have any additional human or financial resources allocated. However, a quick but small steps approach allows for initial progress, such as calculating short-term substitution indicators since the start of the 2023 school year.

Moreover, aware of data issues, DNE has set up an incubator to explore some technical avenues and demonstrate the concrete reality of data use. Prototypes will be developed with recently recruited internal resources.

MOBILITY INFRASTRUCTURE

The necessary human and financial resources are under review.

The current resources of the DGITM—which is supposed to play the leading role—are currently too limited to cover the subject (involvement in standardization efforts with the sector, governance, use case development, creation and operation of a sharing infrastructure, etc.).

EONA-X has a budget of €20 million over 5 years, funded 50%-50% between France 2030 and sectoral stakeholders (transport operators, urban mobility, transport infrastructure managers, automobile manufacturers, tourism stakeholders, etc.). This is likely a first step. High-level profiles with experience in both large enterprises and startups are essential to create the necessary momentum and dynamism while adhering to large group rules. Experts familiar with the latest global technologies and operating international systems competitively and professionally are also an asset in maximizing the chances of success.

HOUSING INFRASTRUCTURE

Accurate estimates of the human and financial resources required are currently being made.

If implementation is carried out by an operator such as Anah, the currently insufficient internal vs. external ratio for functions that should be predominantly internalized to ensure control of the IT system must be reversed.

Anah must also reinvent its IT system to move away from a "silos" approach to aid distribution and place the user at the center of the IT system. This requires a significant investment in both human and technical resources.

DOCTRINE

Human resources are deliberately presented before financial resources. Just like political support, financial resources (question 12) are necessary. However, if a high-caliber team can initiate a project with limited means, money without a robust project team will inevitably end up being wasted. **Just as investors first examine the composition of the team before investing in a new startup, human factors should be the priority for any decision-maker.**

Political support is rarely present at the beginning (see question 12), and neither are the resources. It is often necessary to start working in a very basic way, to structure the idea or even create a prototype and get external stakeholders on board, who will then help to obtain support and resources (as with the e-health roadmap).

It is also necessary to get budgetary decision-makers on board from the outset and turn them into allies, explaining clearly and convincingly that infrastructure will enable public policies to be implemented efficiently and savings to be made: the best defense is a good offense!

As with the economic model (question 10), **human and financial resources must align with the previously established governance and support the right stakeholders.**

Human Resources:

1. Number: by a circular issued by the Prime Minister, the State has deemed that **projects that outsource more than 60% of their work are at risk**. It is therefore necessary to stay well below this ratio. Beyond the organizations that develop the infrastructure, the organization that leads it must also be sufficiently well staffed: far from merely performing occasional supervision tasks, it should continuously co-develop the infrastructure and delve deeply into the subjects to effectively manage, coordinate, and engage the many stakeholders involved. Delegating this task to a service provider is a recurrent cause of project failure.

2. Profiles: the challenge is to **find the right balance between integrating high-level profiles capable of managing very complex projects, ensuring that they fit in with team values** (question 14), **and ensuring profile diversity** (gender, age, education, background, civil servant/contractual, experience in public service, nationality, etc.). Diversity is essential for efficiency and ethics, but it is also a democratic issue: representing everyone's interests is much harder when the team is only made up of people with similar profiles. The ideal is to find profiles mixing both digital and sector skills. Since such profiles are very rare, if a choice must be made, it is highly recommended to prioritize digital expertise over sector expertise, as the latter is more readily available within the Administration, whereas digital expertise is scarce.

Financial Resources:

1. Volume and Source:

- The cost of digital infrastructures is indeed much lower than that of physical infrastructures, but it often still amounts to tens or even hundreds of millions of euros, not including potential ecosystem connection costs (see question 17). Therefore, it **is more expensive than a typical digital product by about an order of magnitude,** just as a sewer network is much more expensive than an individual building.
- **Despite the enormous challenges involved and the significant savings that these infrastructures enable, they are very often underfunded because there is little support** (see question 12), it is difficult to estimate the savings accurately (see question 7) and/or their cost is compared to that of a traditional digital product.
- **This underfunding is inconsistent both with the resources provided by the European Commission and some of our counterparts such as Germany, and with UN recommendations.** The Commission has already engaged or planned funding exceeding €3 billion for European data-sharing infrastructures. Catena-X, Germany's national data-sharing infrastructure for the automotive industry, has a total budget of around 220 million euros over 4 years. The UN Environment Programme's (UNEP) report on "Digital Public Infrastructures" for ecological transition advocates for massive support for these infrastructures.
- **Major inconsistencies exist between**
  - Funding for **sectoral projects** (e.g., building renovations) and digital projects (e.g., developing a digital housing space), even though the latter are essential to the former.
  - Funding for digital initiatives across different **sectors**: approximately €7 billion for interior, €3 billion for healthcare, and €20 million for ecology for a scope 8 times larger overall **(and currently €0 million planned for 2025!)**; see also the budgets for each infrastructure presented.
  - **The types of digital projects** f-funded: AI attracts far more capital than data-sharing infrastructure, even though the latter resolves many more issues and is a prerequisite.
  - Public vs. **private funding**: funding for digital and environmental initiatives in France 2030 exceeds the €20 million allocated to the *France Nation Verte* roadmap in the state budget by one or two orders of magnitude; the CDC has announced €100 billion for the environment, while BPIFRANCE has pledged €25 billion.

Beyond the additional funding to be found, it is therefore essential for the DB to make adjustments, particularly between public and private sectors, with the help of DGE and Interministerial Directorate for Digital Affairs and in connection with each ministry.

It is strongly recommended that the state budget be used, in conjunction with innovative financing options currently being considered by the state in general to address the unfavorable economic climate.

In the event of a major deadlock, the following options could be considered:

- **Seeking funding from European funds,** as was done with the Ségur health reform. Funds from the Digital Europe Program could be mobilized in certain cases.
- **Establishing partnerships with entities that distribute France 2030 loans** (CDC, BPIFRANCE, etc.), in the same way that a European EDIC is itself eligible for European funds (see here)

These options involve significant risks:

- **In terms of dispersion,** these funds often come in the form of project calls, whose formation and monitoring can be exhausting for stakeholders. If these options are pursued, **it is crucial for SGPI and/or DGE to provide transversal support in this regard.**
- In terms of governance, as they often lead to a reversal of roles between project leader and founder (e.g., Agdatahub, education). **If pursued, it is essential that the partnership agreement explicitly states that the project leader remains the Ministry and that the funder's role (BPIFRANCE, CDC, etc.) is limited to providing internal and/or external funding.**

2. Governance and durability:

- **Budgets should be allocated by product rather than by stakeholders,** otherwise stakeholders become siloed and so are the digital tools they produce and the data generated.
- **The infrastructure budget must be managed by the lead entity,** who then allocates resources among the many stakeholders involved—provided they adhere to the collectively defined urbanization doctrine (e.g., Ségur de la santé, FINDPE in ecology). **The Interministerial Directorate for Digital Affairs includes in this doctrine the rules to be followed and the building blocks** to be used across all sectors in order to promote interoperability between sectoral infrastructures and pool costs.
- Like any infrastructure, **digital infrastructure is a structural project rather than cyclical one; it cannot be properly managed without medium/long-term visibility.** Funding through calls for projects, due to a lack of funds in long-term budgets, and working in "project mode"—which can be beneficial in other respects—very often undermine continuity. **The DB therefore must ensure that the peak investment of these projects is financed in a multiannual manner, and then that ongoing development costs are included in the budgets.** This does not preclude ongoing evaluation, which may lead to the project being halted if it does not deliver the expected results. The multiannual nature has already been established for the *France Nation Verte* plan as a whole; digital must be integrated accordingly.

14. WHAT WORK CULTURE AND HR ATTRACTIVENESS FACTORS?

HEALTHCARE INFRASTRUCTURE

The mindset of the first recruits to the DNS was crucial. They were dubbed "the #determined team" by external stakeholders following the 2019 regional tour, where each conference ended with "*We're going to do it, alright*". As the team grew beyond a dozen people, the culture was naturally articulated to ensure it did not dilute with the increase in numbers and to make it a factor in attracting new recruits. It could not be extended to operators.

Being directly attached to the Minister and the Interministerial Directorate for Digital Affairs v1 framework were essential for recruiting individuals of a high standard. Support from the cabinets was necessary for its actual implementation by HR and CBCM. The managers dedicated a lot of time to "headhunting," both directly and through a recruitment firm.

Mon espace santé is developed in a "product" mode (released every month and a half, etc.), but it was not launched through a dedicated State startup to maximize its chances of reaching the entire country in a short time.

Mon espace santé has often been used as an example to explain the importance of the infrastructures outlined in the *France Nation Verte* roadmap and to help frame them by adapting its model to each sectoral reality. Experience sharing deserves to be explored further in both directions.

HEALTHCARE INFRASTRUCTURE

The people recruited were highly motivated by the projects' scope and all showed significant commitment to the project, despite the sometimes demanding pace. The appeal of the project attracted good candidates, despite its short-term nature.

The project being "public," "well-known" and "great national cause" was decisive.

Moreover, transparency—with a very broad steering committee involving all parties and dynamic management—was one of the factors of interest.

Recruitment was largely done through word of mouth via the AP-HP teams mobilized on the project.

AGRICULTURE INFRASTRUCTURE

The team within the Ministry of Agriculture is currently being formed. It will be part of the broader team of public agents implementing the Digital and Data roadmap of *France Nation Verte*, driven by the culture described below.

At Agdatahub, the team has been gradually formed based on defined job descriptions and recruitment based on networks and the convergence of human values essential for project success. In-depth knowledge of the agricultural sector and its workings has proven indispensable for understanding project issues and supporting stakeholders (who are mostly without data managers in their organizations). The project's political support from the President of the Agricultural Chambers has established the project's legitimacy with agricultural organizations. The team's motivation is ensured by implementing an annual objectives plan linked to a variable remuneration bonus.

CONSUMPTION INFRASTRUCTURE

The subject is currently being shared among several teams in different departments of Ademe, at CGDD, and the Digital Factory of MTECT. The way the state-owned start-up Ecobalyse operates is very attractive. 42 applications were received in 2 days for a Technical PO position posted in June 2024. The shared vision of the teams at Ademe, CGDD, and beta.gouv contributes to this attractiveness.

However, the current setup is fragile, relying notably on "off-chart" agents at Ademe (environmental labeling coordinator) and CGDD (mission officer "labeling" and their deputy attached to the SEVS service head). In contrast, other experts working on these issues have only limited interaction with the Ademe-CGDD-beta.gouv "environmental labeling" team. The work culture described in *France Nation Verte*'s digital & data roadmap could—in the future—be applied to a compact, coherent, and cross-functional team. A technical positioning, naturally embodied by Ademe, would enhance HR attractiveness for the technical resources that need to be sustained or mobilized.

EDUCATION INFRASTRUCTURE

The mindset of the first recruits to the DNE will undoubtedly be decisive. The goal is not to theorize the infrastructure but to trigger a reflex of "let's do it."

Recent recruitments have identified individuals with an entrepreneurial spirit. The Interministerial Directorate for Digital Affairs framework was essential for enabling these recruitments. Support from the cabinet was also necessary.

The education infrastructure will be developed in a "product" mode (releases every month and a half, etc.), but was not launched via a dedicated State startup to maximize its chances of reaching the entire country in a short time.

MOBILITY INFRASTRUCTURE

On the DGITM side, moB or EONA-X present new challenges in organization and internal resources. The structure is currently mainly organized to manage standards, studies, and projects. However, in recent years, these have become increasingly complex, long-term, multi-stakeholder projects, operating in a state startup mode. We now need to take this approach to its logical conclusion.

EONA-X members are often members of the executive committees of international companies and frequently serve as information systems directors. One-third are large public enterprises (state shareholders) or public organizations, another third are international private sector stakeholders, and the final third consists of highly agile and dynamic SMEs. To ensure trust, an organization representing the different sectors and types of members is necessary. Mutual aid, the motivational factor among members, and project culture are very important.

HOUSING INFRASTRUCTURE

A common work culture for all entities contributing to *France Nation Verte* has been developed and now needs to be sufficiently disseminated within these entities.

The initial recruitments for the digital housing space should exemplify this work culture. The agents will develop the infrastructure in product mode, closely tied to the field, and ensure collective mobilization.

DOCTRINE

This issue is one of the two most important parts of the guidelines, along with question 15. Ultimately, it is all about people. This is the issue that deserves the most time and commitment.

On an individual level:

- **The agents—more or less public—who support the presented are perfect examples of brilliant, committed individuals who are dedicated to the common good and extremely determined. They should be encouraged, congratulated, and thanked for their work on behalf of France!** Peter Koening said of digital commons: "*I want to emphasize the impact of having someone who cares about the issue and has the technical ability to do something about it. I do it because it's important to me. It's my baby.*"
- **The ability to persevere despite fear and difficulties is particularly important. It's crucial that the desire to do well outweighs the fear of failing.** The question is not so much "*Is it possible to achieve this?*" as "Is it ethical not to try?" It is necessary to be courageous in the sense described in the book *Oser le courage* [Dare to be Brave] by Violette Bouveret and Jérémy Lamri: "*The courageous challenge the status quo without being certain of what to do. They have an inner strength that drives them to face challenges, uncertainty, fears, and difficulties with determination and resilience, in the hope of a better world. They defend what they believe in, even if it goes against the general opinion. They refuse to submit to conformity and the easy way out, and choose to fight for their convictions, even if it requires sacrifice. They show empathy, solidarity, and compassion towards those who suffer and need our help.*"
- **All levers are now available to attract talent.** Contract workers in the digital sector now benefit from a very attractive remuneration benchmark, which does not require approval by a budget controller—a process that can increase recruitment times and encourages the use of permanent contracts. There are headhunting markets. It is up to us to know how to use these levers—and often even more powerful ones—such as the immense meaning of the projects undertaken, the organization and attachment of the structure at the highest level, the rigorous interview process (still too rare in the public sector), and an effective and joyful team culture.

On a collective level:

- **Like a sports team, attracting good stakeholders is not enough.** It is about creating a real collective adventure driven by shared values and a team culture. The values and culture of the Ministerial Delegation for Digital Health and the officials responsible for the *France Nation Verte* roadmap are set out below.
- Beyond the team that leads the infrastructure, it is particularly important that the various teams from the often numerous organizations involved work together in product mode. **The idea is to find a hybrid model between the historic State startup model**, allowing for agility but often encountering difficulties in scaling up and not being suited to the systemic logic of infrastructure, **and the model of more traditional large scale IT projects,** which are often not fast or close enough to the field but are generally massive and resilient (as was done with *Mon espace santé* or SI-DEP, for example).
- In particular, if the pace of an infrastructure is not that of state startups and nothing can be demonstrated in 6 months, **it is still essential that the first building blocks are completed within about 2 years** to de-risk the project and allow for support from external stakeholders and political figures.
- Beyond the extended team of a given infrastructure, **it is essential to network the various infrastructure providers to share tips and, quite simply, to stick together.** The difficulties encountered are often very similar from one project to another, and these exchange a huge amount of time and energy. They also attract human resources and break down barriers between sectors. They could be organized by the Interministerial Directorate for Digital Affairs/DGE as part of the community currently being set up, which will be extended to operators.
- **It would also be a good idea to offer each infrastructure leader one or more mentors:** start-ups get lots of help from a board of directors with top experts giving them advice and support, so why not show some solidarity for projects that benefit everyone? To keep going, infrastructure providers need people to cheer them on.

EXAMPLES OF THE TEAM CULTURE OF DIGITAL AND DATA INTRAPRENEURS FOR ECOLOGY

The ecological transition is a complex issue that will necessarily require a collective cultural shift, particularly within the government and its operators.
The culture described below outlines the approach that public officials involved in the initiative believe is most effective in fulfilling their mission. It also explains the values they consider important, beyond their professional effectiveness. It represents what they want to embody collectively. Each of them has their own way of promoting these values and inventing new ones!

1. Have a positive and open attitude

- See the glass as half full, show enthusiasm
- Praise, encourage, and thank those you work with both internally and externally
- Work towards collective successes rather than engaging in turf wars
- Value all successes, both your own and others'
- Avoid mockery or cynicism, traits of those who have given up
- Speak and listen to everyone freely rather than adhering strictly to hierarchical protocols
- Be willing to evolve your missions with the context: no one owns a project led by public authorities
- Act proactively to surround yourself with diverse profiles rather than cultivating a comfortable inner circle
- Work together to ensure non-discrimination

2. Act with courage, discipline, and compassion

- Act as a committed citizen rather than as a manager
- Prioritize citizens' interests over those of institutional representatives: just because a decision is agreed upon by deciders does not mean it is the right one.
- Base decisions on common sense, stepping back from the legal and administrative constraints we often impose on ourselves
- Take risks, even if it is frightening
- Inform about decision-making with precise, quantified, and coordinated arguments, including to those who cannot make their voices heard or access decision-makers
- Remove ambiguity: always seek to explain and clarify "who does what and when"
- LSpeak from the heart! Present topics with conviction

3. Act with determination and pragmatism

- Lead projects with determination, never giving up (or almost never)
- Be obsessed with the real impact of our actions in the field
- Seek to quickly implement a concrete achievement—even if modest— rather than framing the ideal. Adopt the "small but quick steps" approach. Manage by deadlines ("done is better than perfect")
- Share difficulties with the team: if the team does not have a solution, they will at least be a source of comfort
- Communicate regularly and extensively about projects' successes (public and/or professional communication, social media, etc.)
- Multiply communication by leveraging our internal and external partners

4. Be close to the field and to the decision-makers

- Proactively engage with stakeholders in the field (sector professionals, digital companies, researchers, NGOs, and think tanks) through field visits, conferences, and bilateral meetings. Make yourself available, even if it means sacrificing internal committee meetings.
- Participate in the "Digital and Data" Council for Ecology, stakeholder committees, and Tours de France
- Co-develop digital projects with stakeholders from that ecosystem, in particular by involving them in project governance in real time and through representative organizations
- Implement a feedback channel for users on all projects (surveys, questionnaires, etc.)
- Cultivate a direct connection with the field by providing customer service a few times a year and by participating in citizen committees

5. Share information widely and show solidarity

- Use the collaborative tools selected for the project (currently: Tchap, Osmose), be responsive
- Share ongoing work, successes, and difficulties by providing accessible summaries to the whole team at regular intervals
- Share information widely and faithfully with all public bodies and external parties: in reality, very few topics are confidential
- Systematically favor open data and open source
- Do not hesitate to ask for help, explanations, training, or advice
- Help colleagues solve their problems and develop their skills and show solidarity

This culture must not remain a mere declaration of intent. To ensure that it truly fosters an efficient and pleasant working environment and acts as a real HR attraction factor, it must be respected, developed as necessary, and widely disseminated.

15. WHAT ARE THE LEVERS FOR STAKEHOLDER ENGAGEMENT?

HEALTHCARE INFRASTRUCTURE

Patient associations—historically in favor of online healthcare records but discouraged by the setbacks of the *Dossier Médical Partagé* (DMP)—were key stakeholders in reviving the project. Professional unions, sometimes reluctant for fear of increasing the risks associated with their medical responsibility, patient mobility, and the potential loss of time or money resulting from data sharing, gradually gave their support. Software developers—keen to move beyond the prevailing chaos despite the workload—were essential allies and experts. All these parties provided crucial support to ensure that *Mon espace santé* could be sustained despite changes in administrations and ministers.

Mon espace santé was built upon the DMP, even though it may have been more complicated to modernize it than to start from scratch—particularly in order to avoid demotivating the patient associations that had supported it and the pioneering professionals who were already involved.

Each stakeholder was consulted both via trade unions in regular committees and directly. A citizens' committee—consisting of 30 randomly selected citizens mixed with patient associations—provided decisive opinions on the functioning of *Mon espace santé*. Once the consultations and decisions were made, the implementation was very proactive. Every 6 months, the Health Digital Council, open to all, meets to report publicly and collectively.

Consultations around the roadmap or a specific project were conducted based on a preliminary version proposed by the public authorities following a listening phase.

HEALTHCARE INFRASTRUCTURE

Providers were interested in the "national cause" aspect and the significant funding allocated.

Laboratories saw an opportunity to enhance their commitment to screening policies, and to ensure that their work was useful (e.g., contact tracing).

Citizens and parliamentarians saw the value of better controlling the epidemic crisis.

All stakeholders were all the more supportive because they were involved from the very beginning, even before the project was officially launched.

AGRICULTURE INFRASTRUCTURE

It would have been very complicated to recreate an infrastructure from scratch via a State startup (Interministerial Directorate for Digital Affairs recommendation) or a new public market (DGE recommendation) given the past involvement of the profession, agricultural chambers, and public funding in Agdatahub.

As part of the *France Nation Verte* roadmap, a collective exchange event open to all will be organized every 6 months for contributors to review past actions and plan for the upcoming semester. Additionally, regular exchanges will be organized by stakeholder. The agricultural profession also includes many consultative bodies among agricultural organizations, inter-professions, and the Ministry of Agriculture (e.g., the Superior Council for Agriculture - CSO).

Given its history, Agdatahub also has 3 levels of stakeholder consultation, which will need to be adapted as the structure's governance evolves:

- The 30 historical shareholders of the APi-AGRO holding company
- The Company's Board of Directors
- The Steering Committee responsible for gathering customer requirements in order to interact with the roadmaps of publishers and the infrastructures of other Member States (EDIC, etc.)

CONSUMPTION INFRASTRUCTURE

To engage stakeholders, various communication methods should be maintained and strengthened:

- Regular updates on social media
- Activity on exchange forums
- Implementation of shared governance for the *Empreinte* database (e.g., GIS Agribalyse)

As part of the *France Nation Verte* roadmap, a collective discussion open to all will be organized every 6 months for contributors to review past actions and plan for the upcoming semester. Additionally, regular exchanges will be organized by stakeholders.

EDUCATION INFRASTRUCTURE

The education infrastructure should involve several levels of stakeholders:

- Political: Ministers, cabinets, high representatives of local authorities, particularly regions and departments → a dialogue committee was established in 2022 to address digital strategy issues.
- Tactical: regional stakeholders, particularly representatives of the ministry and local authorities
- Field: management staff, inspectors, teachers, parents, etc.

MOBILITY INFRASTRUCTURE

As part of the *France Nation Verte* roadmap, a collective discussion open to all will be organized every 6 months for contributors to review past actions and plan for the upcoming semester. Additionally, regular exchanges will be organized by stakeholders.

At the private sector level, the data sharing infrastructure strategy should receive explicit and regular support from the president of each entity. Official sponsorship and effective involvement of a member of the executive committee of each member would ensure that actions are monitored in the field.

It is also important to involve federations representing different modes of transport in consultation and decision-making processes.

HOUSING INFRASTRUCTURE

France Rénov' professionals, advisors, and support staff can assist with the project, as they would benefit from a clear tool for collecting and exchanging data on households.

Owners' and tenants' associations could support the simplification of retrieving essential housing data and sharing best practices.

Construction professionals and tradespeople may see a housing and renovation-focused tool as a spotlight on their activities and thus, a source of growth.

As part of the *France Nation Verte* roadmap, a collective discussion open to all will be organized every 6 months for contributors to review past actions and plan for the upcoming semester. Additionally, regular exchanges will be organized by stakeholders.

— DOCTRINE —

This question is one of the two most important aspects of the guidelines, along with question 14. In the same way, at the end of the day, it is all about people, and not just internally. This is a topic that should be prioritized above others.

Current situation

- **For the same reasons explaining the low political support, external stakeholders are rarely vocal about data-sharing infrastructure** unless they have significant maturity on digital topics (e.g., in agriculture). Similarly, city residents complaining about diseases would likely request the construction of hospitals rather than sewer systems.
- **It is essential to educate and convince the beneficiaries of these infrastructures so that they no longer ignore each other,** using the arguments set out in question 12**. These infrastructures can then become the "bridgeheads" representing the public platform and drive the deployment of all the underlying layers** needed for their operation, as well as those necessary in themselves (e.g., ethical rules, interoperability standards, security measures, electronic identification tools, etc.).

Why?

For reasons of efficiency and ethics, sincere, demanding, continuous, and effective co-construction is absolutely essential. The State must be reintegrated into the community, rather than merely observing from a distance, even though most public stakeholders would prefer it otherwise. This is also the choice made by the European Union which requires, for example, that the European health data space be co-constructed with a stakeholder forum including professionals, patients, industry stakeholders, and researchers.

It is necessary:

- **For the relevance of the decisions made:** it is essential to gather opinions from both experts and non-experts and to be closely connected to the field to detect weak signals.
- **For the acceptability of these decisions:** nobody likes to have something imposed on them, especially when the solution is necessarily imperfect due to paradoxical demands. Without co-construction, stakeholders' energy will be spent explaining why the chosen decision is problematic rather than working on the least worst solution.
- **For the continuity of public action:** while elected officials often change far too frequently compared to the time needed to roll out these infrastructures, stakeholders remain in place and are often the guarantors of the project's continuity and its ethical framework.
- **More broadly, to create an ecosystem:** the 21st century transformations—both digital and ecological—are profoundly systemic. No single stakeholder holds the key; we must move "from ego to eco" and work hand-in-hand to address these challenges. The State must initiate, lead, and catalyze the creation of these ecosystems.

Who, What?

It is necessary to consult both representative stakeholders (unions, federations, associations) and individuals directly (patients, teachers, farmers, businesses, etc.). These two modes of consultation are complementary: direct individuals provide fresh, unfiltered feedback without political agenda or electoral interest; the opinions of representative stakeholders are expert opinions, based on consensus among members and, as such, have a different kind of legitimacy (see the "citizen committees" on digital health and Action 1 of the cross-cutting theme of the roadmap "Digital and Data for Ecological Planning").

To successfully engage stakeholders, it is essential to consider their past investment in terms of time, money, and communication: even if, from a purely technical perspective, it would be more rational to start from scratch, it is often symbolically detrimental and poses a significant risk (e.g., *Mon espace santé* was built upon the DMP; the agricultural infrastructure was based on Agdatahub). **The most valuable asset of the project is indeed the community it has managed to involve, ahead of the technical infrastructure itself.**

Sectoral professionals—often organized into unions—usually have significant political influence, to the point where ministries are sometimes perceived as "clientelist," serving these professional bodies rather than the general interest. **A rebalancing is needed to build more collaboration with two key stakeholders in data-sharing infrastructure:**

- **Citizens themselves and their representatives, or more broadly those representing the living,** where they exist: they are often the primary beneficiaries of the infrastructure (e.g., *Mon espace santé,* SI-DEP, digital housing space). Beyond the mere ergonomics of tools, their input is crucial on all strategic and societal issues, especially when they involve conflicting general interests. The executive branch will then often be much less reluctant to give a favorable opinion to a potentially sensitive citizen, association, or parliamentary proposal than to adopt it directly.
- **Digital industry stakeholders,** as they often drive digital services for public policy on the ground. In addition to professionals, it is essential to engage them directly on technical and economic aspects for more collective efficiency.

How?

Often, decisions are made with insufficient consultation, leading to weak implementation. The opposite approach should be taken:

- **Rigorous participatory democracy,** for collective decision-making, even if it takes longer than an authoritative decision: consultation must be **ongoing** and not a one-time event. It should be **effective** through the public authorities proposing a v0 to be completed/modified following a phase of listening to stakeholders, rather than asking them to express their views from a blank slate, both online and on the ground, and allowing in-depth discussions on stakeholders' opinions to find third ways (e.g., using the "5 whys").
- This is especially true for digital infrastructure, as it must be built in an agile manner and the ecosystem may initially be reluctant due to a lack of understanding of the issues at stake. People need to know each other in order to work together constructively and professionally, even if they disagree. **This can be achieved by setting up regular committees for each type of stakeholder with strong involvement from representative bodies, ideally by adding a digital component to existing committees (e.g., CNTE, CSF, etc.) rather than creating specific digital bodies, supplemented by live consultations with professionals and citizens.**
- **Then, a "collaborative dictatorship" to effectively implement** what has been decided together: this point cannot happen without the previous one; otherwise we would simply be in a dictatorship. Conversely, once a collective choice has been made, it is essential to show strong will in implementation to avoid the prisoner's dilemma (where nobody acts if others do not for fear of being taken advantage of). **Public authorities must ensure that everyone does their part by regulating stakeholders.** As Bruno Latour suggests in "Where to Land?", it is time to shift from a vision by action (what we want to do collectively) to a vision by stakeholders (what is each stakeholder's role in achieving our common project?). Once each stakeholder's to-do list is defined, public authorities must ensure everyone has the means to act with available "carrots" (funding, support, etc.) and actually uses the available "sticks" (regulatory obligations, monitoring, sanctions, etc.)—see Questions 16 and 17.
- **Radical transparency as a guiding principle to build trust, enable natural coordination, and boost morale:** regular meetings involving all stakeholders must be organized to report on the progress of the infrastructure and all related projects. These meetings are essential for all involved stakeholders to have an overview of the project and synchronize. **It is also essential to celebrate every new milestone despite the challenges that remain to be overcome, because the "big day" will never come:** such a project is never truly over. Before reaching concrete uses, data infrastructures go through several stages ("valleys of death"): updating necessary software, then effective data collection and/or sharing, then use by one category of users, followed by another once network effects are achieved, then usage, and finally improvement of business indicators. **It is essential to explain these phases to everyone and to put in place interim indicators to show that we are on the right track and encourage people to persevere.** These milestones are the very first things to be organized.

16. WHAT COERCIVE LEVERS ("STICKS") ARE AVAILABLE?

HEALTHCARE INFRASTRUCTURE

It was first essential to break the vicious circle of data supply in order to escape the "empty shell" situation: professionals do not feed the system because very few accounts are opened, so patients have nothing to find there and do not open them. An amendment made it possible to switch to an opt-out system, where accounts are opened by default unless the patient objects, which is also important for reducing the digital divide (people with low levels of digital literacy who do not open accounts are at risk of receiving poorer care).

It was then essential to resolve the technical issue of feeding and reading data in *Mon espace santé* so that professionals could input data in one click, in the most user-friendly manner possible. Compliance with "the foundations of the house," particularly ergonomic connection to *Mon espace santé,* was mandated, all funding was contingent on it and non-compliance could lead to fines (Articles L. 1470-5 and L. 1470-6 of the Public Health Code). Providers were the first to support and even initiate these measures to prevent free riders.

As theoretical obligations rarely prove effective, a compliance verification mechanism was established via "Ségur labeling" of software. It was designed "in waves" to adopt a step-by-step approach and to give publishers a consolidated view of all necessary changes across the twenty or so relevant reference frameworks. This led to the creation of a true "labeling factory" at ANS. Since obtaining "Ségur" funding is a condition, industry stakeholders came forward to get their solutions labeled (see Question 17).

Professionals were already required to input data into the DMP (Article L.1111-15) but did not do so for the reasons mentioned below. Once these issues were addressed, the obligation was associated with indirect financial penalties and incorporated into existing certifications.

HEALTHCARE INFRASTRUCTURE

For laboratories, feeding data into SI-DEP became mandatory and was also tied to the reimbursement of the PCR test (€54). Additionally, a "bonus/penalty" system was created based on the turnaround times observed.

For publishers, there were no regulatory levers.

The transformation of the SI-DEP project into LABOé-SI in 2024 highlights how challenging it is to advance without such leverage.

AGRICULTURAL INFRASTRUCTURE

To address this, several levers are being considered:

For farms:

- Financial obligation: no low-carbon/quality premiums will be paid if agricultural data is not reported.
- Loss of business if farmers do not receive their certificates.

From their unions and chambers of agriculture: no state funding for infrastructure unless there is a commitment from professionals to use it.

For publishers: risk of losing customers if the solution does not comply with European regulations and is not interoperable with the infrastructure.

To date, there are significant challenges with engagement on use cases because there is no lever to force publishers (FMIS, startups) to deploy them as long as there is no demand from the publishers' customers and/or regulatory constraints in place.

CONSUMER INFRASTRUCTURE

The Climate Law makes environmental labeling mandatory. If momentum does not build quickly enough, particularly around the two data-sharing infrastructures (the *Empreinte* database and the *Produits Réels* database), the prospect of switching from voluntary to mandatory labeling will need to accelerate adoption. As a first step, and based on the Nutri-score model, innovative stakeholders (Yuka, Open Food Facts, etc.) could be allowed to use the data and model to roll out the system without waiting for each brand to take action.

For the establishment of the *Empreinte* database, negotiations with data providers (e.g., Ecoinvent) will continue to be crucial. In case of difficulties, the prospect of setting up a fully open reference base funded by public money should be a credible enough alternative to push currently major stakeholders to collaborate ambitiously.

EDUCATION INFRASTRUCTURE

In order to establish national monitoring of public policy on replacing absent teachers, the principle of reporting timetable data was presented to school administrators and management staff.

Additionally, a first version of the technical guidelines has been published to structure the exchange of education data. Part of these technical guidelines must be made enforceable in order to ensure that data sharing takes place under the right conditions.

Currently, the situation is paradoxical: there is support for use cases but great difficulty in obtaining data. This ambivalence was also detected during the preliminary phase of the Education Data Hub.

MOBILITY INFRASTRUCTURE

Each private and public stakeholder could aim to implement a specific number of concrete use cases per year, demonstrating the value of data sharing either through the volume of information exchanged or by improving a critical process. A second objective would be for each member to integrate five new members annually.

For cases of general interest, several options should be explored:

- Regulatory obligations (standards, interoperability, use of infrastructure) based on the model of open data publication on the PAN, which is already monitored by the ART.
- Obligation to share data subject to conditions on the infrastructure used. E.g., state funding for local authorities' carpooling policies conditional on the use of the PAN to publicize carpooling opportunities.

Note : the decree on carpooling bonuses did not ultimately make the use of moB mandatory after lobbying by some carpooling operators, but it was considered and would have been simpler. However, the use of the Carpooling Proof Register (RPC) was made mandatory.

HOUSING INFRASTRUCTURE

The digital housing space would be automatically created (opt-out model similar to *Mon espace santé*). Its mandatory nature needs to be analyzed, especially in light of the *Conseil d'Etat*'s judgment on its predecessor, the Housing Information Booklet. IAt the very least, it could be mandatory for some of its uses, such as making an appointment with a *France Renov'* professional or submitting an application for financial assistance.

The accreditation of advisors and co-funding of advisory spaces would be contingent on data reporting via the digital housing space (notably to monitor the dynamics of advice and support). Reporting this information should be as non-burdensome as possible (the "one-click" approach of *Mon espace santé*), thanks to significant partnership work with software providers.

DOCTRINE

Two actions are necessary for the infrastructure to fulfill its urbanization role:

- **The effective use of the infrastructure by data providers and users** (professionals, citizens), respectively to feed data into the infrastructure and trigger network effects, and to consult data for a given business use.
- **Compliance with all underlying technical components necessary for the proper functioning of the infrastructure by the relevant software** (standards of ethics, interoperability, security, identification tools, etc.). It should be noted that compliance with this technical doctrine has positive externalities that go far beyond mere connection to the infrastructure.

To trigger network effects and mitigate the risk of disruption, **it is absolutely essential to make these actions mandatory or adopt a "default" logic (opt-out) when an obligation is deemed unnecessary** (e.g., citizens' automatic opening of *Mon espace santé* accounts). When a business use of the infrastructure is itself a requirement, this obligation can specify that its implementation must go through this infrastructure.

In practice, these connections are often made by digital industry stakeholders who develop software for the relevant professionals. Therefore, **it is essential to apply these obligations and/or default logic to professionals, their digital service providers, public authorities, and citizens where applicable**

These obligations should be accompanied by clear role delineations between infrastructure managers, data providers, or users for the protection of sensitive data (such as personal data or business secrets).

In the case of obligations, **it is necessary to ensure that non-compliance has concrete implications for each of these stakeholders** (direct or indirect financial penalties such as the withholding of aid, lack of certification, reputational risks, etc.) to ensure effective compliance, as much of the law is not being applied.

To this end, an effective compliance control process for these software systems is often required. This process frequently involves creating real "labeling factories," whose organization and resources are often underestimated. It must also be designed in phases, meaning all obligations should be grouped within the same specification to be as clear as possible for external stakeholders. This approach also supports the "small but quick steps" method, gradually showing the level of requirement and reaching use cases as quickly as possible.

These measures are **beneficial** for all stakeholders because everyone is treated equally, which helps to overcome the prisoner's dilemma and/or the free rider problem, provides visibility, and deploys infrastructure that simplifies life for everyone. They are ethical as they are democratically constructed (see question 15) and have undergone necessary third-party checks to ensure they do not infringe on other freedoms (Data Protection Agency, European Commission, etc.). They are **essential** because private stakeholders seeking to build infrastructure instead of public authorities often use similar—and often much more aggressive—strategies. They are **efficient** in terms of public action because they are typically very effective and cost little or nothing; their absence, conversely, leads to often exorbitant communication and infrastructure deployment costs, with unsatisfactory results.

They align with the UN's recommendations in its Environmental Programme (UNEP) report on "Digital Public Infrastructures" serving ecological transition.

17. WHAT INCENTIVE LEVERS ("CARROTS")

HEALTHCARE INFRASTRUCTURE

A novel "Open and Non-Selective System" (SONS), inspired by SI-DEP and based on a European Court of Justice ruling, was created. This required a year of negotiations, involving the Legal Affairs Department of the Ministry of Economy, the Council of State, and two law firms. It is a purchasing mechanism that allows publishers to be paid once their software has been "Ségur-certified" and is actually installed in healthcare facilities (payment is made when data is received in *Mon espace santé*).

It required the creation of a true "payment factory" at ASP. This financial aid of €594 million was necessary to address significant compliance delays with software often installed locally within short timelines (18 months). It allows the government to pay directly at the right price rather than indirectly through professionals who do not always have the time or expertise to negotiate. This "Ségurization" led to consolidations in a highly fragmented market (around 250 initial publishers).

Healthcare professionals and institutions also received subsidies to receive support in using Ségur-approved software and, above all, to effectively send data to *Mon espace santé* by increasing existing funding mechanisms (e.g., negotiations for liberal professionals). They were assisted by CPAM and ARS.

A massive network of "*Mon Espace Santé* Ambassadors" was also deployed to support citizens.

HEALTHCARE INFRASTRUCTURE

For laboratories, not only did feeding data into SI-DEP become mandatory and condition the reimbursement of tests (see question 16), but it was also compensated (€5.4 per test out of €54, which has since been significantly reduced). In addition, a "bonus/penalty" system has been created for reported turnaround times.

Publishers received financial assistance (approximately €10 million in total for publishers in the sector).

In 2024, the transformation of the SI-DEP project into LABOé-SI illustrated how challenging it was to progress without these levers.

AGRICULTURAL INFRASTRUCTURE

Connection to the infrastructure must provide stakeholders with tangible savings:

For farms:

- Contribution to improving agricultural income (increased revenue and/or reduced operating costs)
- Administrative simplification

For industry stakeholders: contribution to enhancing the economic, environmental, and social performance of the company

For publishers: maintaining market position through the implementation of the latest interoperability standards

Stakeholders can also be encouraged financially to use the infrastructure through funding for their connection to the infrastructure and its actual use. This mechanism is provided for in the call for proposals for the deployment of the Agriculture Data Space, which is 50% funded by the EU and 50% by national co-financing through open calls.

CONSUMER INFRASTRUCTURE

A company that shares its data can benefit in terms of communication (environmental display) or financially (e.g., if bonuses/malus are tied to environmental costs, as proposed in the fast fashion bill adopted by the National Assembly in March 2024). This incentive applies to both bases. Additionally:

***EMPREINTE* DATABASE:** sharing a comprehensive life cycle inventory modeling the environmental impacts of an innovative or virtuous industrial (or agricultural) process. This sharing allows brands using this process to claim a lower environmental impact for their products.

***PRODUITS RÉELS* DATABASE:** brands that share the environmental impacts of their products see this data used by apps (Yuka, Claar fashion), distributors, consumer associations, etc.

These "natural" incentives seem to be enough.

EDUCATION INFRASTRUCTURE

A data transmission financing mechanism could enable private stakeholders to activate the transmission of data held in their tools.

However, this data might be considered as produced by public officials and thus minimally accessible by the Ministry, which could then share it with relevant stakeholders such as local authorities if the data falls within their responsibilities.

Furthermore, in a particularly tight budgetary context, it appears difficult to fund access to data produced by public agents and held by private stakeholders.

MOBILITY INFRASTRUCTURE

The most emblematic use cases could, for example, be awarded a prize and receive funding for a second use case.

HOUSING INFRASTRUCTURE

*France Rénov'*s and *France Service'*s advisors could act as ambassadors for the digital housing space, as they do for the *MaPrimeRenov* platform.

Advisors and support staff would receive training on the tool as part of the *France Rénov'* rollout, and specific funding for the use of the digital housing space could be provided for in regional agreements.

Software providers could be labeled "digital housing space" if they adhere to interoperability principles. These software solutions would be prioritized for use by advisors, support staff, and tradespeople.

Professional sectors may view the digital housing space as a growth vector for their activity: the more households are aware of renovation and maintenance, the more likely they are to take action.

DOCTRINE

Incentives ("carrots") can take the form of funding or non-financial support.

Like "sticks," **incentive levers must apply to all stakeholders involved**. Beyond professionals, support for digital industry stakeholders and citizens is often overlooked.

Their implementation often requires the deployment of real "factories to be financed" (e.g., with ASP) and/or "human Mexican armies to be supported" (e.g., with the local public authorities, France Services centers, etc.). It requires rigorous organization of operations and resources, which are often neglected, even though they are essential to the success of the project.

Several legal and contractual arrangements are possible for disbursing this funding to stakeholders:

- **Digital industry stakeholders:** use *ad hoc* mechanisms such as the Open and Non-Selective System established in digital health. This mechanism can be based on the framework of Services of General Economic Interest, Almunia or Minimis, for example.
- **Professionnals:** use existing mechanisms increased by the necessary amount (e.g., Ségur de la santé) or create ad hoc mechanisms (see above).
- **Citizens:** the need is often less financial than human, to support people—especially those furthest from digital technology, in using the infrastructure.

Funding is not always necessary. It becomes necessary when "sticks" are not effective enough because:

- **There are few or no "sticks":** the less public the stakeholders are, the fewer regulatory levers exist (e.g., it is easier to add a requirement to the regulatory framework that already applies to a school or hospital than to a private company). It is nevertheless possible and desirable to create such obligations, especially since private stakeholders are often better equipped financially than public stakeholders.
- **The cost of connecting to the infrastructure is significant** for stakeholders and poses a major risk to their financial stability if it is not accompanied by financial assistance. This may be particularly true when there is a need to **catch up** in order to connect to all the building blocks of the public platform (e.g., digital companies in the healthcare sector).
- **Some stakeholders are blocking the rollout of infrastructure** because they see no individual benefit beyond the general interest. Stakeholders often see a direct benefit in developing infrastructure that enables efficient payment or collection (e.g., nominative social declarations by companies, payment of healthcare professionals or farmers) or in electronic identification tools that save time or make software more attractive (e.g., Edu Connect, *France Connect*, etc.). However, they may block infrastructure deployment that allows the risky sharing of their own data. **Direct funding for these stakeholders can therefore be a very effective way of compensating for their perceived lack of individual interest and creating a contractual relationship with them, so that public authorities become customers with a say in technical specifications and deployment deadlines.** Note: another more comprehensive, engaging, and perhaps ethical way to create this contractual relationship is to modify the public/private and/or national/territorial boundaries of the public platform so that software is managed directly by the infrastructure operator (see reflections on education).

3

HOW?

Endorsing a common interministerial vision at national, European, and international levels and implementing it in a highly determined manner

All elements of the doctrine from the previous v0 guidelines correspond to recommendations. They could be summarized in the macro-actions indicated below, at the national level and at the European, and international levels.

RECOMMENDATIONS

All elements of the doctrine from the previous v0 guidelines correspond to recommendations. They could be summarized in the macro-actions indicated below, at the national level, as well as at the European, and international levels.

AT THE NATIONAL LEVEL

FOR EACH PUBLIC POLICY

WITHIN THE FRAMEWORK OF THE INTERMINISTERIAL DIGITAL COUNCIL (CIN) LED BY THE PRIME MINISTER, WITHIN 3 MONTHS::

➡ **Each "sectoral leader"—under the coordination of the PR/PM advisor duo and with the support of the Interministerial Directorate for Digital Affairs/DGE—must:**

- Identify data-sharing infrastructures for public interest and prioritize them.

For each infrastructure, assess compliance or non-compliance with each point indicated in the v0 guidelines.

In the event of a deviation, make proposals to supplement or amend the v0 guidelines in order to develop a v1, or propose actions to reduce the deviation if the v0 guidelines are deemed appropriate.

CROSS-SECTORALLY

TO CATALYZE AND POOL EFFORTS ON "HOW?" WITHIN 6 MONTHS:

➡ **Under the coordination of the "internal digital / external digital" advisor duo with the help of the Interministerial Directorate for Digital Affairs/DGE/DB:**

INTERNAL TRANSFORMATION:

What organization and support structure?
[question 12]

- Amend the decrees regarding the Ministers responsible for digital and public transformation, as well as and the missions of the associated administrations (Interministerial Directorate for Digital Affairs/DGE) as indicated in Question 12, specifically to: animate the community of data-sharing infrastructure developers; to help negotiate governance, human and financial resources, provide necessary expertise; to ensure adherence to technical doctrine by both public and private stakeholders, and to foster a robust and sovereign industrial sector. To fulfill these missions, it is necessary to create a dedicated data-sharing infrastructure team at the Interministerial Directorate for Digital Affairs and strengthen governance between DGE teams and sectoral roles.
- Organize regular follow-up meetings by the "internal digital / external digital" advisor duo to assist ministries and ensure sufficient political support from the Ministers, the Prime Minister, and the President.
- Establish a pilot team in all ministries that brings together all digital staff responsible for managing a digital product necessary for the infrastructure, reporting to the highest level of the sector (Minister for "small" ministries, DAC for "large" ministries).
- Define— through public policy and cross-sectorally—the ministries and/or operators responsible for the identified infrastructures and make their HR and organizational transformation a priority.
- Create and promote the “data sharing infrastructure” brand for public interest purposes, through the ad hoc bill and by ensuring that the term is used consistently by all stakeholders involved (ministries, operators, decentralized and devolved government, private sector, etc.).
- Add a mission to the DB to verify that all requests for funding for a public policy measure are accompanied by a digital and data strategy, ruling in particular on the need for a data-sharing infrastructure and, where applicable, requesting the associated appropriations.
- Add an expertise and support mission to the DGE's SISSE to assist ministries with changes in governance of private stakeholders managing data-sharing infrastructures for public interest

What human and financial resources are needed?:
[question 13]

- Ensure that digital FTEs in ministries are prioritized for data-sharing infrastructures and the underlying technical components needed for the public platform.
- Secure funding for data-sharing infrastructures from the state budget, including the interministerial fund "Digital and Data for Ecological Planning" (FINDPE) which is currently at risk. If necessary and with great caution, seek European or France 2030 credits (not recommended).
- Ensure that all distributed funding potentially including data-sharing infrastructure for public interest—such as the AAP "data space" managed by BPI France—exclusively funds projects that comply with these guidelines and does not fund private stakeholders to build infrastructure that should be public.
- Adapt or create funds allowing allocation by product rather than by stakeholders to break down project silos, provide multi-year visibility, and integrate into base budgets once the investment phase is over and the project's value has been confirmed.

What is the work culture and what makes the company attractive to HR?: [question 14]

- Ensure that HR attractiveness measures are suited to data-sharing infrastructures; if not, adapt them.
- nclude in the digital public official community a subgroup comprising data-sharing infrastructure developers to facilitate experience sharing and development of a pleasant and effective work culture; establish a mentoring system.

CO-CONSTRUCTION AND EXTERNAL REGULATION:

What levers can be used to engage stakeholders?
[question 15]

- Hold public consultations on the v1 guidelines developed by public officials within the framework of the CIN.
- S’assurer que tous les acteurs ont une voix dans la co-construction des infrastructures, notamment les citoyens et les industriels du numérique, et qu’ils sont concertés à la fois via les représentants et en direct.
- Ensure the establishment of permanent, grassroots, and deep-rooted "permanent participatory democracy" for decision-making, a "collaborative dictatorship" for effective and ethical implementation, and "radical transparency" as the guiding principle.

What are the coercive levers ("sticks") available?
[question 16]

- Ensure that connections to the platform are made mandatory and/or a "default" logic is applied for all relevant stakeholders by passing the necessary legislation.
- Ensure that a wave-based compliance control process is in place to guarantee adherence to these obligations by passing the necessary legislative measures.
- Ensure that direct or indirect sanctions are planned for those who fail to comply by passing the necessary legislation. Ensure that all public funding distributed is conditional on compliance with these obligations, including the “data space” public call for projects operated by BPI France.

What are the incentive levers ("carrots") available?
[question 17]

- Ensure that any necessary human and/or financial support mechanisms are in place for all stakeholders, particularly digital companies and citizens.

AT THE EUROPEAN AND INTERNATIONAL LEVEL

AT THE EUROPEAN LEVEL:

- Identify sectoral European data spaces (EDIC where applicable) where France should take a leading role (at minimum, healthcare and agriculture).
- Share its experience with counterparts: disseminate the guidelines; enhance them with their feedback.
- Encourage the European Commission to clarify its governance on the matter to facilitate support for Member States.
- Participate in public consultations on the subject.

AT THE INTERNATIONAL LEVEL:

- Promote the vision with international counterparts; enhance it with their feedback; support the deployment of similar strategies through bilateral and multilateral development aid.
- Share the vision with international organizations; identify key international data-sharing infrastructures where France and/or Europe should take a leading role.
- Participate in public consultations on the subject.

Digital New Deal

Digital New Deal supports private and public decision-makers in the creation of an Enlightened, European and Humanist Digital Age. Our conviction is that we can offer a third digital path by aiming for a dual objective: to defend our values by proposing a framework of trust through regulation (think-tank); and to defend our interests by creating ecosystems of trust through cooperation (do-tank).

Our publishing activity aims to shed as much light as possible on developments at work in the context of "digital sovereignty", in the broadest sense of the term, and to develop concrete courses of action for economic and political organizations.

Olivier Sichel (Founding Chairman) and Arno Pons (Managing Director) navigate the strategic direction of the think-tank under the regular supervision of the Board of Directors, which includes Sébastien Bazin, Nathalie Collin, Nicolas Dufourcq, Axelle Lemaire, Alain Minc, Denis Olivennes, Odile Gauthier, Judith Rochfeld, Bruno Sportisse and Robert Zarader.

Terra Nova

Founded in 2008, Terra Nova is an independent progressive think tank dedicated to developing and broadcasting innovative political solutions in France and in Europe. Terra Nova is a non-profit organization which promotes proposals in all areas of public policy through publications and events. Supported by a large group of volunteer experts from the academic world, senior civil service officials and civil society, Terra Nova publishes its work free of charge to a wide audience via its website and social networks. The association is currently chaired by Lionel Zinsou and managed by Thierry Pech.

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