

ELISE action
Webinar Series

Emerging Trends and Technologies

*How they impact digital
government transformation
processes?*

Massimo PEDROLI, Deloitte IT
Lorena HERNANDEZ, European Commission JRC
Simon VREČAR, European Commission JRC (consultant)

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European Location Interoperability Solutions for e-
Government

*Enabling Digital Government through
Geospatial and Location Intelligence*



What is ELISE?

A BIT OF HISTORY...

2004

IDABC: Interoperable Delivery of European eGovernment Services

2010

ISA: Interoperability solutions for public administrations

Actions:
EULF
ARE3NA

2016

ISA²: Interoperability Solutions for European Public Administrations, Businesses and Citizens

ELISE

2021

DIGITAL: Digital Europe Programme

ELISE builds upon the outcomes of the former ISA actions EULF and ARE3NA. It is the only action of the ISA² Programme, aiming to improve Digital Government through Location Interoperability.



WHAT?

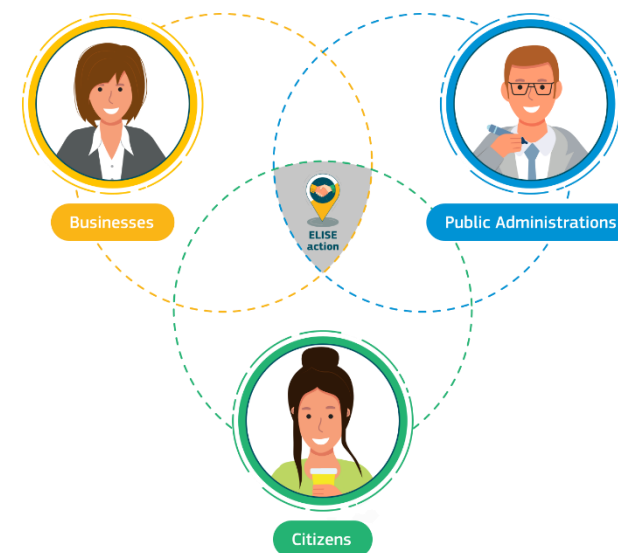
ELISE stands for **E**uropean **L**ocation **I**nteroperability **S**olutions for e-Government. It is one of the more than 50 actions in the European Interoperability Programme ISA2

WHAT FOR?

To support Digital Government Transformation by making the best use of location data and technologies in an interoperable manner

FOR WHOM?

For all: citizens, businesses and public administrations



ELISE action objectives



ELISE action



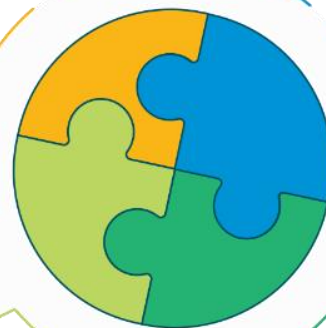
Policy support

Supporting different policy initiatives at European and national levels



Interoperable frameworks and solutions

Providing reusable interoperable cross-border and cross-sector frameworks and solutions for public administrations, business and citizens



Emerging trends and technologies

Discovering how emerging trends and technologies enable more effective use of location data for policy and digital public services



Building a Knowledge base

Building a Geo-Knowledge base to inform and train stakeholders and promote the adoption of good practices and innovations in location data

ELISE outputs and topics



STUDIES



APPLICATIONS



FRAMEWORKS AND SOLUTIONS



GEO KNOWLEDGE
BASE SERVICE

Evolution of Spatial Data
Infrastructures

Support of data ecosystems

Technologies for location
-enabled innovation

Collaboration models

Spatial skills for Digital
Government Transformation

Location data privacy

Improving access to spatial
datasets

Supporting cross-border
and cross-sector data sharing

Location intelligence for policy
and digital public services

Supporting innovation, growth
and Return of Investment

Managing data quality

Supporting the creation of
common EU public services

5 Years

SOME ACHIEVEMENTS

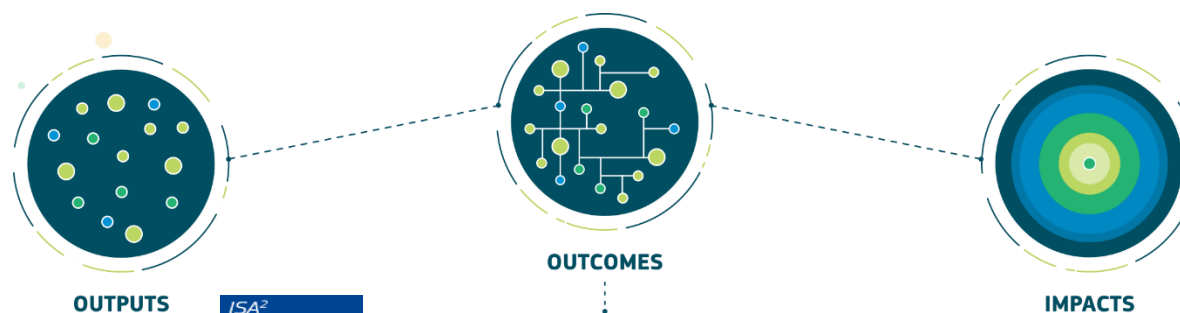
Active
engagement of
ISA² Member
States

- ✓ Complemented the EIF and NIFO with an extensive location interoperability framework and state of play assessments
- ✓ Helped put the INSPIRE Directive into practice with tools for data providers and a strong focus on use cases
- ✓ Built an extensive community of European and international stakeholders
- ✓ Raised awareness on new approaches to location-enabled digital transformation
- ✓ Helped to assess the role of SDIs in evolving business models, e.g. data ecosystems, digital platforms.
- ✓ Assessed new policies (e.g. GDPR, European Data Strategy) and technologies (e.g. Artificial Intelligence, Blockchain, API...)
- ✓ Promoted and facilitated better links on location data between public and private actors
- ✓ Provided guidance on improving spatial awareness and analytical skills for best use of data

3 EIF
Toolbox
solutions

Aims of Knowledge Transfer

ELISE ACTION STAKEHOLDERS COMMUNITY





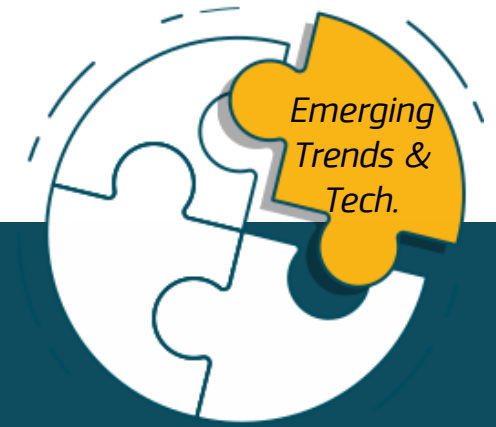
Our speaker

Massimo PEDROLI







Senior consultant in Public
Sector

Deloitte.

The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.



What we will cover today

-  1. Supporting digital government transformation applying location data combined with new trends and technologies
-  2. Review of key trends and emerging technologies related to the geospatial domain
-  3. User journeys: Leveraging on emerging technologies and location
-  4. ELISE Action outcomes: emerging technologies fostering innovation & digital government transformation
-  5. Key messages, remaining challenges and future outlook
-  6. Q&A
-  7. References

1

*Supporting digital government
transformation applying location
data combined with new trends and
technologies*

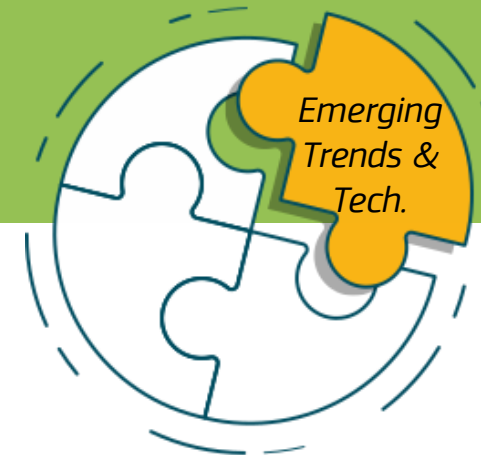
BUT... WHY THE FOCUS ON “LOCATION”?

Location data or geospatial data can comprise anything from addresses, buildings, road networks, bus stops and public spaces to distribution of population, species or diseases and dynamic data such as weather, traffic, air quality and more. In this respect, we can say, “Location is all around us” or “spatial is everywhere”.

Moreover, location data:

- 01** Facilitates data integration
- 02** Allows taking data-driven decisions based on where and why things happen
- 03** Eases communication through intuitive map representations
- 04** Enables visualisation of sophisticated models and simulations





Location contributing to emerging trends and technologies

Location data

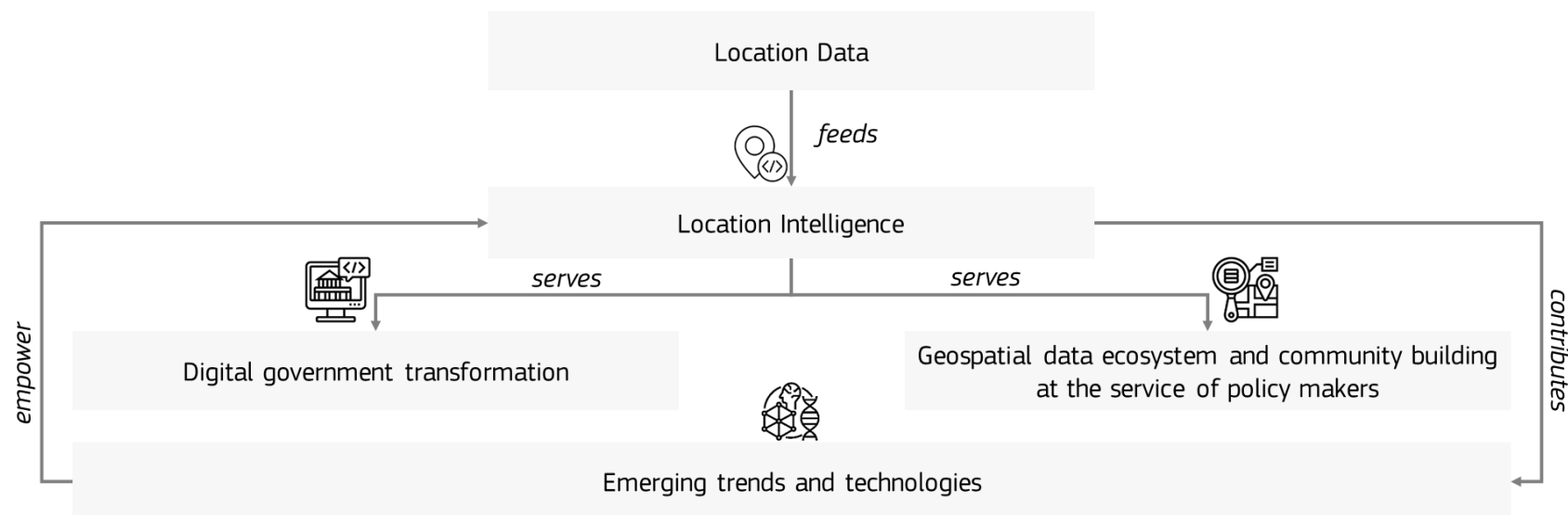
Data with a direct or indirect reference to a specific location or geographical area (cf. the legal definition in the INSPIRE directive, Directive 2007/2/EC). This term can be interchanged with location data, geospatial data or geodata.

Location interoperability

Location interoperability is the ability of organisations, systems and devices to exchange and make use of location data with a coherent and consistent approach

Location intelligence

The process of deriving meaningful insight from geospatial data relationships — people, places or things — to solve particular challenges such as demographic or environmental analysis, asset tracking, and traffic planning [Gartner Research]



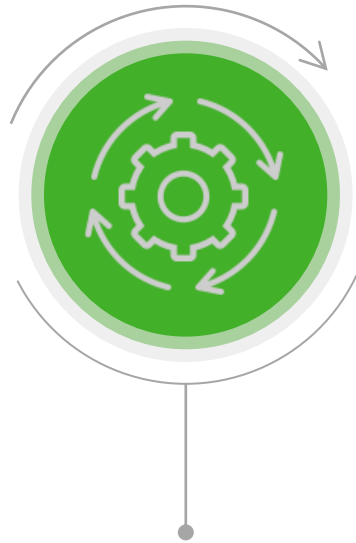
Emerging trends and technologies supporting digital government transformation journeys



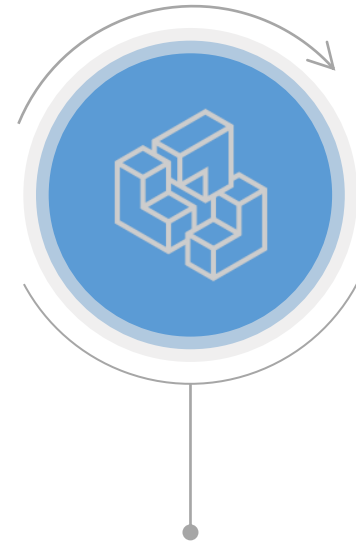
Understand citizens better to **design better policies** and **services**



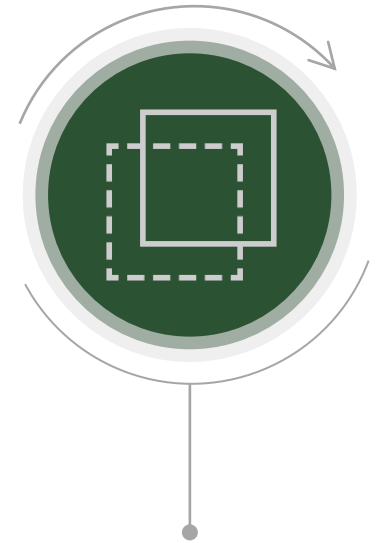
Find new solutions to policy challenges



Implement their everyday functions and **provide services more effectively and efficiently**



Engage with citizens, businesses and other external stakeholders in new ways to **develop new policies, services, delivery models**



Operate more transparently and accountably, leading to improved government legitimacy

2

Review of key trends and emerging technologies related to the geospatial domain

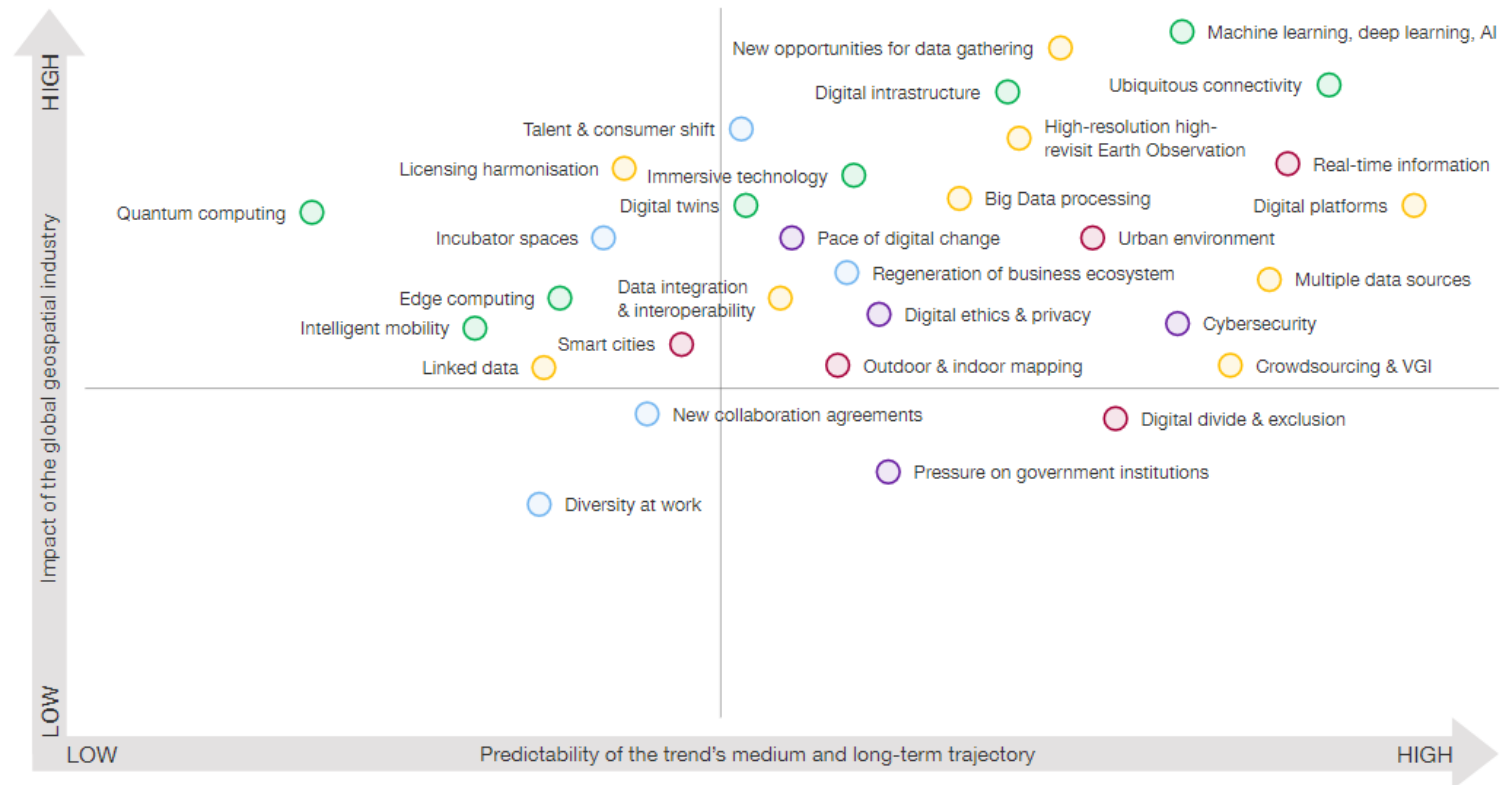
Drivers & trends 1/2

UN-GGIM Future Trends (Third Edition, 2020) identifies **5 key drivers** and **31 related trends**

1. New data sources & analytical methods
2. Technological advancements
3. Evolution of user requirements
4. Industry structural shift
5. Legislative environment

Graphic 1.

Five drivers will advance change in the global geospatial information management landscape over the next 5 to 10 years



Five prevailing drivers and an underlying set of trends

Technological advancements

Rise of new data sources & analytical methods

Industry structural shift

Evolution of user requirements

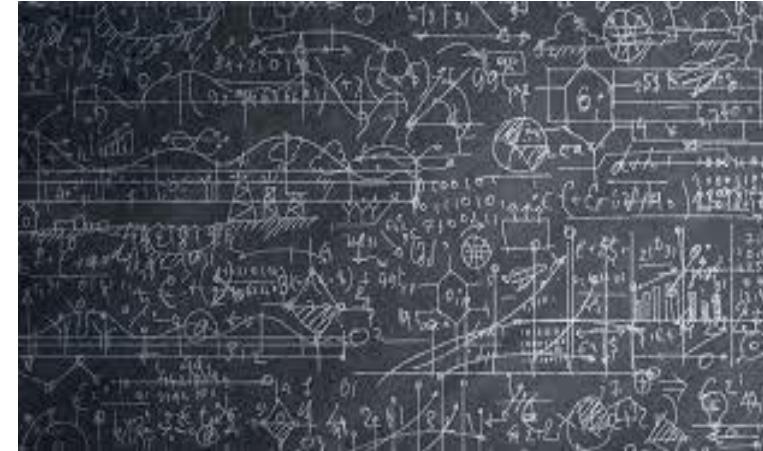
Legislative environment

Drivers & trends 2/2



New data sources and
analytical methods

Technological advancement:
not one but many developments



“Technological disruption in the geospatial industry is driven by automation, Artificial Intelligence, sensor technology, and the Internet of Things”

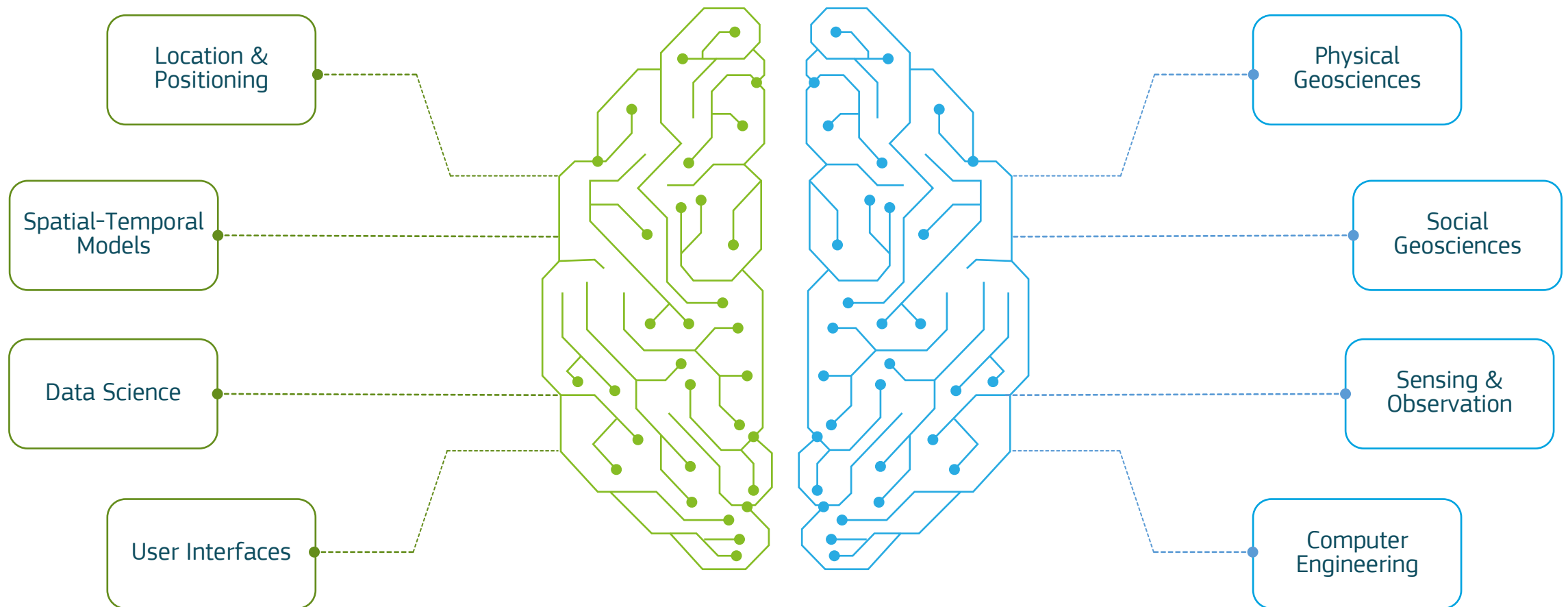
(UN-GGIM, 2020)



“It is anticipated that mobile data collection, crowdsourcing, and social media are likely to have the greatest impact over the coming decade”

(UN-GGIM, 2020)

Geospatial Tech Trends – Top Level Categories



Emerging Trend Clusters –June 2020



Responding to COVID-19



Spatial Data on the Web



AI and Machine Learning



Connected Autonomous Vehicles



New Space Exploration



Geo IT Ethics



Cloud Native and Edge Computing



Geospatial Data Science



Immersive Geo: AR XR



Urban Digital Twin



Open API Management



Model Interoperability

Emerging Trends and Technologies identified by ELISE 1/2



	Less than 2 years	2 to 5 years	5 to 10 years
Transformational	<ul style="list-style-type: none"> Cloud Services for Government 	<ul style="list-style-type: none"> IoT Event Stream Processing Deep Learning Networks Machine Learning Edge AI Digital Government Platforms 	<ul style="list-style-type: none"> Data Marketplace Immersive Analytics IoT-Enabled Applications Smart Monitoring for Public Infrastructures Digital twins Blockchain GeoAI AI
High	<ul style="list-style-type: none"> Multichannel Communications Tools Geocoding Services Web-Mapping Tools Smart Lighting Indoor Location 	<ul style="list-style-type: none"> Social Analytics Video/Image Analytics Open Data and APIs Predictive Analytics Building Information Modelling Commercial Drones 3D/4D Maps 	<ul style="list-style-type: none"> Real-Time Analytics Smart Transportation Explainable AI IoT Platforms
Moderate		<ul style="list-style-type: none"> Privacy Design 	<ul style="list-style-type: none"> Advanced Anomaly Detection

Emerging Trends and Technologies identified by ELISE 2/2

Artificial Intelligence

Blockchain

**Application
Programming Interface
(API)**

Digital Platforms

Digital Twins

Benefits

Elaborating information from large numbers of data
Interacting with service users or conducting analyses
Analysing huge volumes of data to make prediction

Reduced economic costs, time and complexity
Reduction of bureaucracy, discretionary power and corruption
Increased trust in governmental processes

Enable the public sector to create 'ecosystems'
Overcoming complex integration of large systems in public sector
Supporting Open Government initiatives

Reuse of open government data
Creation of an ecosystem around the data shared
Transparency of governments

Mirror, predict and control activities and performances of its twin
Simulating scenarios to mitigate risks and increase resilience
Possibility to allow real time information intervention

Examples

Chatbot to answer frequently asked questions
Interviewer robots to efficient recruitment process
System to detect welfare fraud more effectively

Citizens' ID management;
Taxation reporting;
eVoting;

The Statistical Institute of Catalonia.
Denmark Central Business Register (CVR)
European Data Portal

Government as a owner of Digital Platforms – Copernicus DIAS
Government as a provider of Digital Platforms – Nam.R
Government as a consumer of Digital Platforms

Digital Underground
Digital Twins for various types of buildings by considering places, people and devices
Destination Earth initiative

3

*User journeys: Leveraging on
emerging technologies and location*

“User journeys” to illustrate **real needs** of

- Data scientist
- Chief Technology Officer (CTO) of PA
- CEO car sharing company (data controller/owner)
- Citizen

Challenges and
Risks



Usage of emerging technologies seen by different “personas”

Representatives of different stakeholders groups covering:

- National and local level
- Private and public sector



Claire

Data Scientist



Andrew

*Chief Technology
Officer (CTO) of PA*



Paul

*CEO private taxi
cab company (data
controller/owner)*



Sophie

Citizen

Claire



Data scientist



About

Claire is a data scientist working on social policy initiatives in her city's administration. She has to help set up a voucher system for public transport (trams, buses, smart mobility). She wants to understand **how to link the vouchers to a specific target of beneficiaries based on where they live** (considering, e.g. the most disadvantaged areas).



Challenges and Risks

- She cannot keep up to date on the latest **technology trends that may best** fit her purpose
- She has to face the **constraints** imposed by current administrative processes and regulations (e.g. on the profiling of potential beneficiaries)



ELISE Guidance

ELISE has identified the following advantages in the use of blockchain technology for location intelligence:

- It facilitates **better targeting** and **management** of redistribution programs
- It permits both **new public service delivery** and **interaction models**
- It faces **fewer challenges in the implementation process** of services in respect to other disruptive solutions



Andrew



Chief
Technology
Officer (CTO) of
Public
Administration



About

Andrew is a Chief Technology Officer in public administration. He has been asked to provide a solution to better planning new green areas in his city. Andrew is considering implementing an urban digital twin model, but **he wants to understand first the technological implications as he is not sure of the adequate SDI to support digital twin models.**



Challenges and Risks

- Digital Twins are based on **different and dynamic data sources** that need to be combined, visualized and understood
- Technical, semantic, organizational **interoperability challenges**
- Necessity of **'simplified' standards** and **common building blocks**



ELISE Guidance

- Existing **spatial data infrastructures & ecosystems** should be further **upgraded** to better enable the creation and use of digital twins
- **Assessment** needed of the **current state of geospatial data, standards and technologies** relevant to Digital Twins
- The creation and operation of these digital twins require **new skills and competencies**



Sophie



Citizen



About

Sophie wants **to understand the benefits and risks** she could face in light of the announcement made by the mayor of her city on the application of **a new AI system to support the local police to surveil the neighborhoods of the city.**



Challenges and Risks

- Risks of **violations** regarding **personal data, privacy protection** and **nondiscrimination**.
- Risk of receiving **a low-quality service**.



ELISE Guidance

In order to address Sophie's concerns, public administrations should transparently consider to:

- Provide **human-centric AI-based** services for individuals
- **Approach the Government as a Platform**, catalysing AI development in Europe
- Make strategic use of public procurement **to fund innovation** and **ensure trustworthy AI**
- **Safeguard fundamental rights** in AI-based public services and protect societal infrastructures



Paul



CEO private taxi
cab company
(data controller)



About

Paul is the CEO of a private taxi cab company. He has to get data from various sources related to traffic flows and roadworks, but these data are not easily manageable due to their origin from various sources. He would like **to tap into this seamless data but doesn't know how to do it technically.**



Challenges and Risks

- Find **where** to **gathered data**
- Develop a **simple** and **not expensive** solution based on existing standards
- **Inadequacy** of data and service quality



ELISE Guidance

- Rely on **authoritative sources** that should allow data to be **accessed** and **used** via **APIs**
- **APIs based on common standards** (see Open API initiative) are recommended for the development of reusable solutions
- APIs can help **overcoming complex integration of large systems**



4

*ELISE Action outcomes:
emerging technologies to
fostering innovation & digital
government transformation*

Monitoring and understanding emerging geospatial technologies

ELISE spotted the need for a **consistent technology trends monitoring system**, allowing analysis of emerging technologies, how they are interconnected and might be applied in different contexts



ELISE's insights on Artificial Intelligence



1 study



5 events

AI Watch - Artificial Intelligence in public sector

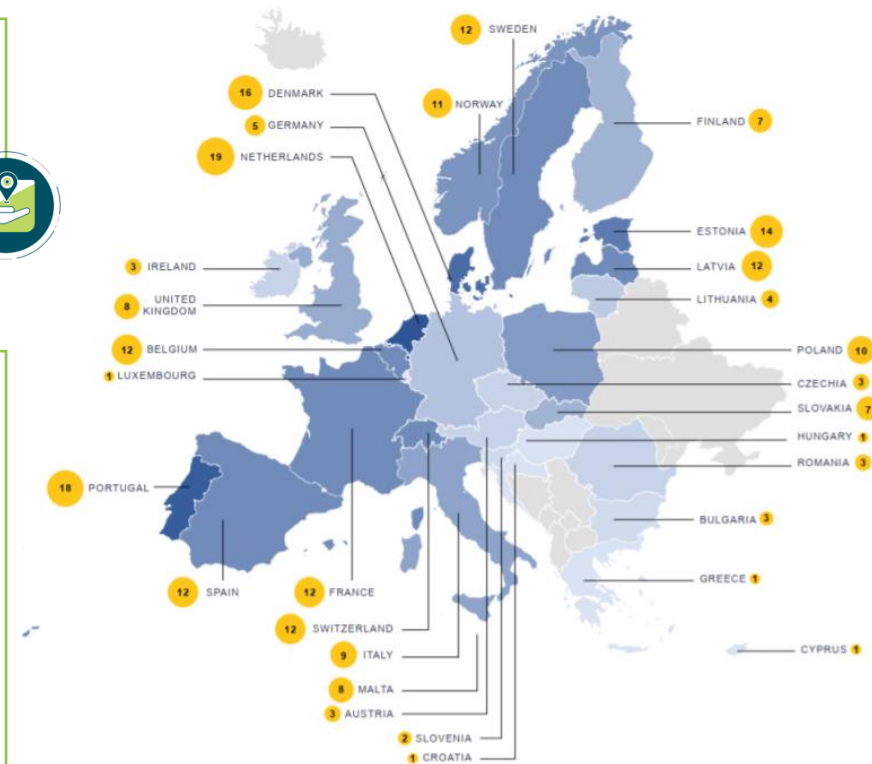


- **Privacy** may be at **risk**
- **Algorithms, data** and **computing power** as enhancers of AI
- **Balance** in regulating the use of AI
- Ensuring **reusability, technological neutrality, security & privacy, and openness**

Geospatial Data and Artificial Intelligence
- a deep dive into GeoAI



- **New opportunities** to integrate, exploit and make use of geospatial data
- GeoAI techniques moving **from reactive to predictive**
- GeoAI as a tool for **increased growth, efficiency, security**



Mapping the use of AI in public services
across Europe



1 study



2 events

Blockchain's potential according to ELISE

Blockchain for Digital Government

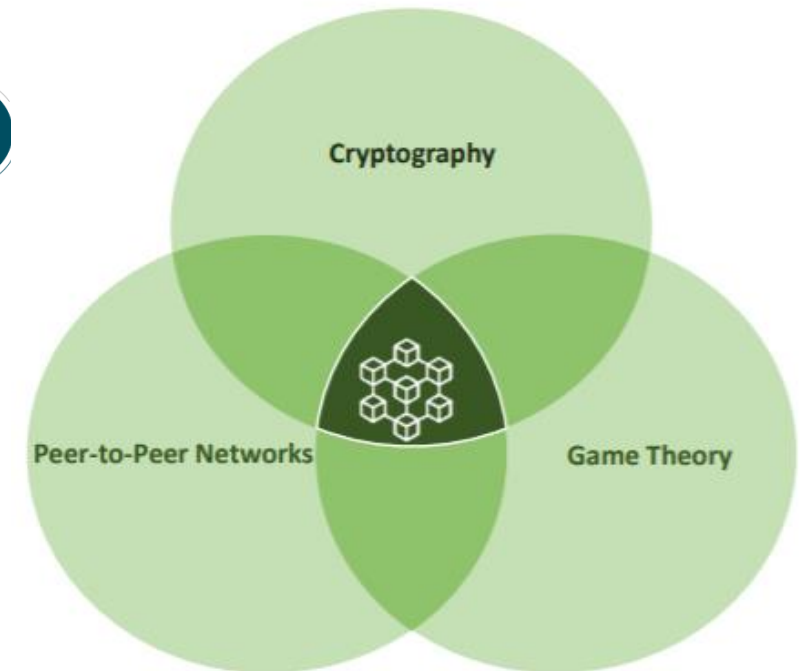


- **Increasing reliability** of public institutions
- **New** public service **delivery** and **interaction models**
- Potential of Blockchain is **not fully expressed** yet

Blockchain and proof of location supporting digital government



- Benefits from **proof of location**, **smart contracts** and **location-enabled** Blockchain services
- Increased trust and security from **proof of location** and **smart contracts**
- Further work on **standards**, **interoperability** and an **enabling policy environment** are required



What is Blockchain?



2 study



6 events

ELISE's insights on Application Programming Interface (API)

Application Programming Interfaces in Governments: Why, what and how

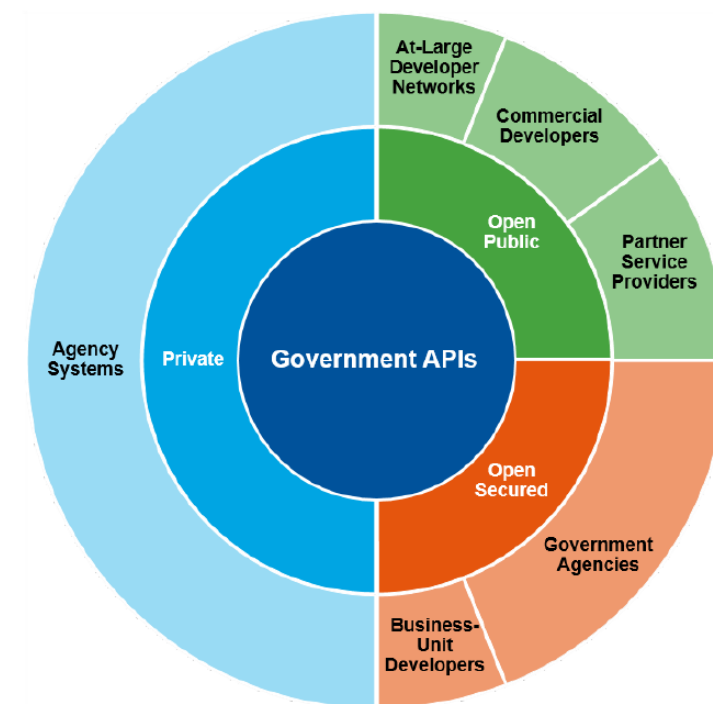


- API strategies is crucial for the **wiring** of a **functioning digital ecosystem**.
- **Access to digital assets** is key to designing the transformational roadmap
- API to **increase the reach potential** of digital assets

Governance models, ecosystems and benefits of APIs for public sector organisations



- Publishing and consuming APIs as an organisation results in **significant advantages** in terms of:
- Delivering **better (digital) services** to citizen and businesses
 - Supporting **interoperability** and **reuse**
 - **Complying** with legislation and regulatory guidelines



Ecosystems enabled by government API

ELISE's insights on Digital Platforms and Digital Twins

Digital Platforms



1 study



1 event

Digital Platform for public services



- Location information is **inherent for the value creation** of Digital Platforms
- **Government data is often leveraged** in private Digital Platforms and thereby creates value for citizens and society

Digital Twins

Digital Twins – Are they ready to embrace the benefits of Location Information?



2 events

- **Geospatial data, tools and technologies** as the fuel to digital twins
- **Assessment needed** of the current state of geospatial data, standards and technologies
- **SDIs and ecosystems** should be further upgraded

Other major new emerging technologies and trends analysed by ELISE

Geospatially enabled
Modelling, Simulation and
Prediction



- **Specific efforts** are needed for reaching interoperability in modelling, simulation and prediction
- **Many sectors are evolving** towards the integration of models, simulation and predictive techniques

Exploring Digital Government
Transformation in the EU -
DIGIGOV



- **Efficiency** and productivity gains, **cost-savings**
- Effectiveness and **quality improvements**
- Transparency, accountability, **trust** and **legitimacy**.

Immersive realities and
location for better public
services



- **VR, AR, MR** can be exploited fully when dedicated hardware devices is used.
- Public Authorities and Governments can use VR, AR, MR to **enhance existing public services or create** new innovative services for citizens in many domains

Location Intelligence -
Technology trends and case
studies in digital government



- **Maturing** and **supporting innovation** on quality of life in regions and cities
- Needs **healthy data ecosystems** to deliver high value.
- Important role to play by **standardisation bodies and EU interoperability initiatives**

5

*Key messages, remaining
challenges and future outlook*

Key messages



The use of **emerging technologies is growing**: many European PAs are already experimenting these new tools to deliver public services and **target medium-term benefits** on top of monitoring longer term trends



A **coordinated action to promote emerging technologies** in Europe is of great importance to foster innovation in the European geospatial domain



Technological innovations, which are providing enhanced (location) data intelligence, must be assessed under their **compliance with data protection legislation**



Policy actions should aim **not only** at the **adaption** of the technologies to existing processes, organisations and structures but also at **transforming** those processes, organisations and structures to fully exploit the **disruptive potential** of new technologies



Trust is extremely important to **stimulate the adoption** of emerging technologies in the public sector, necessity to ensure an **ethical and transparent usage**

Challenges



Responsible usage - Emerging technologies could radically improve the operations of the government if used in a responsible way



Increasing Trust - Ensure that all stakeholders are working together in a safe environment to provide solutions that fit for purpose and accepted by all in order to increase trust



“Sharing” - Address how the data used could be shared with other administrations



Further development of methodology assessment - Exploring current assessment methodologies to create shared frameworks and identify potential benefits and/or bottlenecks



Scale-up - The majority of the analysed emerging technology is not ready for scaling-up in their current form. This is caused by insufficient technical maturity or noncompliance with legal environment



Data selection - Understanding data labelling plus semantics, which algorithms or models are best fit for purpose, how to do clean data, knowing which technology to choose and others

Building on ELISE for the Digital Europe Programme

Digital Europe Programme (DIGITAL), Objective 5: Deployment, best use of digital capacities and Interoperability.



Monitoring the design, piloting, deployment, maintenance and promotion of a coherent eco-system of cross-border spatial data infrastructure for digital services



Assessment of pioneering implementations of Blockchain technologies in public services to set the basis for a trusted European ecosystem of infrastructures and fostering the deployment of location enabled cross-border applications.



Facilitating the access to AI large scale testing facilities and to advanced cybersecurity tools, regarding the private sector.

Building on ELISE for the Digital Europe Programme



Supercomputing

Set up a true European data space

Support the design and delivery of specialised programmes and traineeships for the future experts in key capacity areas

Support the upskilling of the existing workforce through short trainings reflecting the latest developments in key capacity areas



Artificial intelligence



Advanced digital skills



ELISE action



Ensuring the wide use of digital technologies across the economy and society

Support European public administrations and industry to deploy and access state-of-the-art digital technologies and build trust in the digital transformation

Support high impact deployments in areas of public interest, such as smart communities



Cybersecurity

6 Q&A



Thank you



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