

JOINT VIRTUAL WORKSHOP ORGANISED BY EUROGEOGRAPHICS AND EUOSDR

UN-GGIM Future Trends report – Artificial Intelligence

4th February 2021

What is the Future Trends report?

The Future Trends report provides expert opinion on the mid to long term-developments in geospatial information and is a strategic insight document for all countries and the global geospatial information community.

It is broad in nature, looking at emerging trends in technology, legal and policy, skills and training, the private and non-governmental sectors, and in the role of government.

Recognizing that disruption and change in the geospatial community are likely to occur as a result of the linking of multiple trends, the report explores a diverse set of emerging and developing trends. Among others, these include data privacy and ethics; Digital Twins; Artificial Intelligence and data analytics; and, capacity building.

The full [Future Trends report](#) can be accessed here.

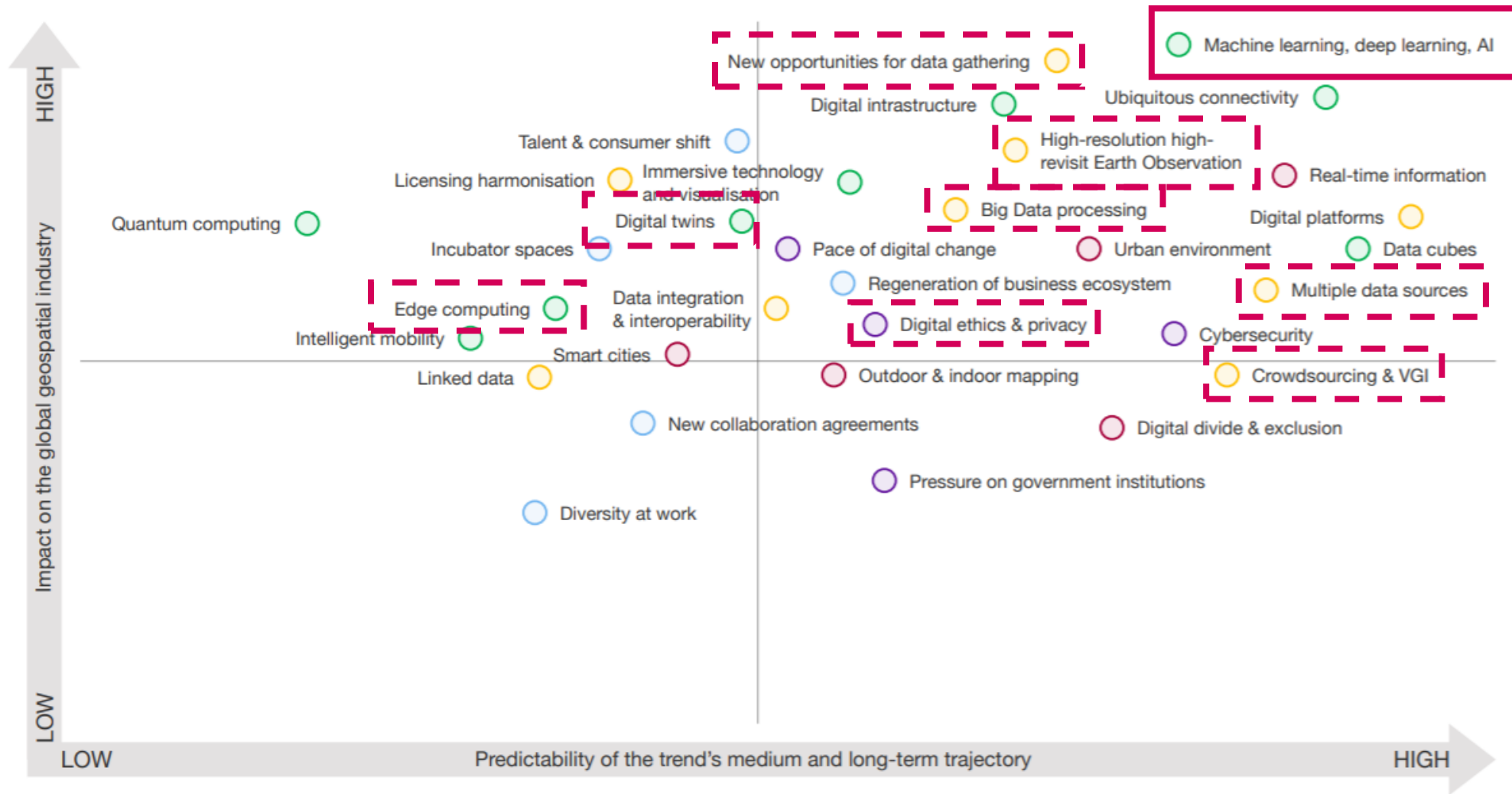


Geospatial drivers and trends

- The information received throughout the global consultation process and the views expressed during the discussion fora in 2019, have helped identify the top trends that are likely to affect the geospatial industry over the upcoming decade.
- Based on this prioritisation exercise, these trends have been divided into five overarching industry drivers and presented to forecast how these drivers are likely evolve over the next five to ten years.
- Nonetheless, the top geospatial trends and drivers highlighted in the table and graphic are not exhaustive. The individual chapters of the report provide more detail and highlight further industry developments not shown in these diagrams.
- To illustrate the different levels of impact the trends are likely to have, each trend has been ‘mapped’ on a matrix to provide an overview of its effect on the geospatial industry.



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
- Evolution of user requirements
- Rise of new data sources & analytical methods
- Legislative environment
- Industry structural shift

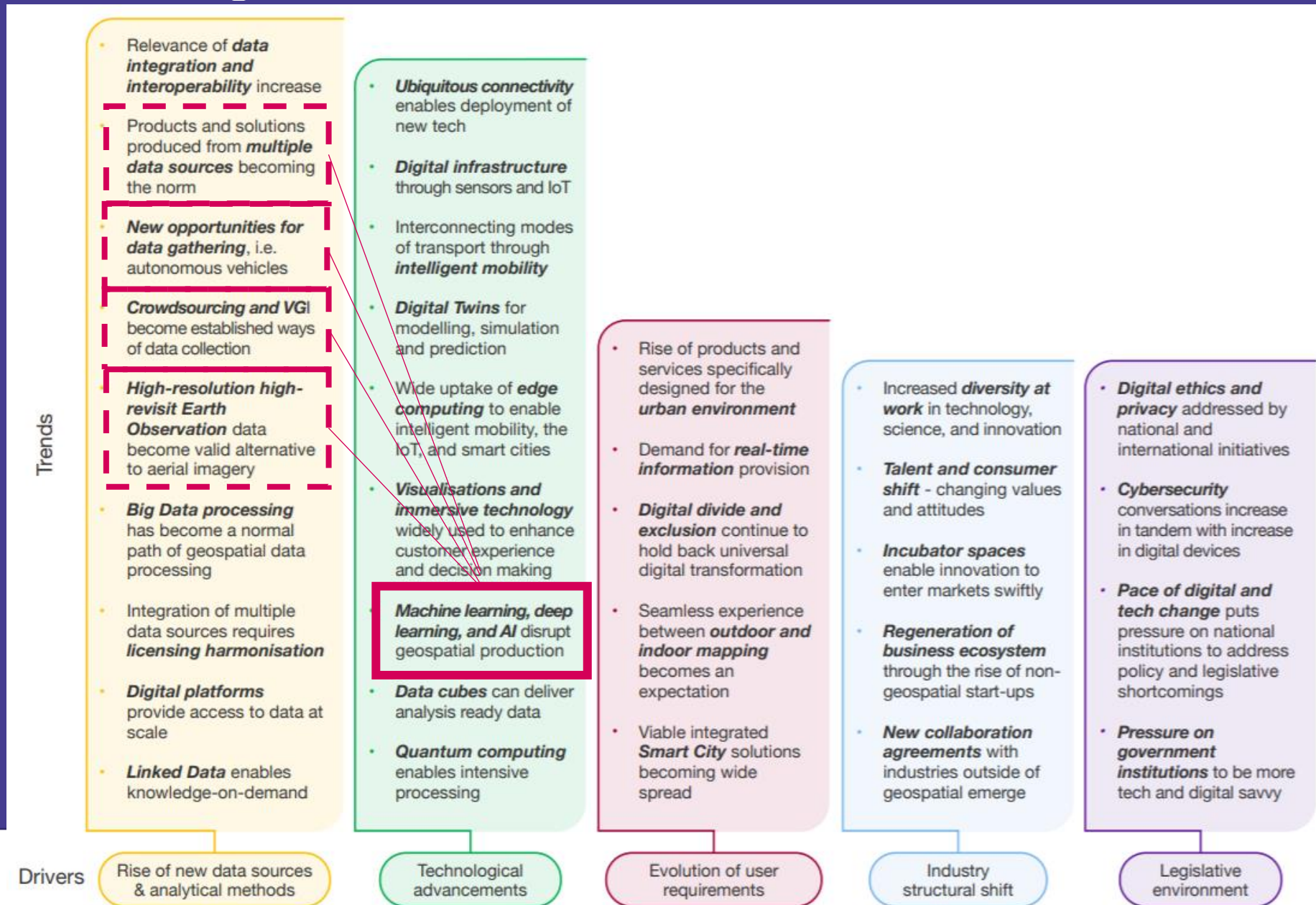
Structure

Artificial Intelligence and...

1. Geo Production
2. Geospatial Analytics
3. Ethics



Artificial Intelligence and Geo Production



Artificial Intelligence and Geo Production

- GeoAI extracts knowledge from spatial data.
- Continued developments in image recognition and feature extraction, coupled with reduced storage costs, will provide opportunities for faster data capture and maintenance of geospatial information, and will come closer in quality and usability to that which can be achieved by traditional survey methods.
- Increased automation and improvements in machine learning free up time-consuming and resource-intensive tasks leading to higher production efficiency.
- Big Data processing will be the norm as machine learning and deep learning mature and become established functions in geospatial production.



Facebook and OpenStreetMap

Map With AI started as a project to make OpenStreetMap easier to use.

OpenStreetMap has historically been updated manually with volunteers, but Facebook, which uses the open-map data, added tools such as AI to add more details.

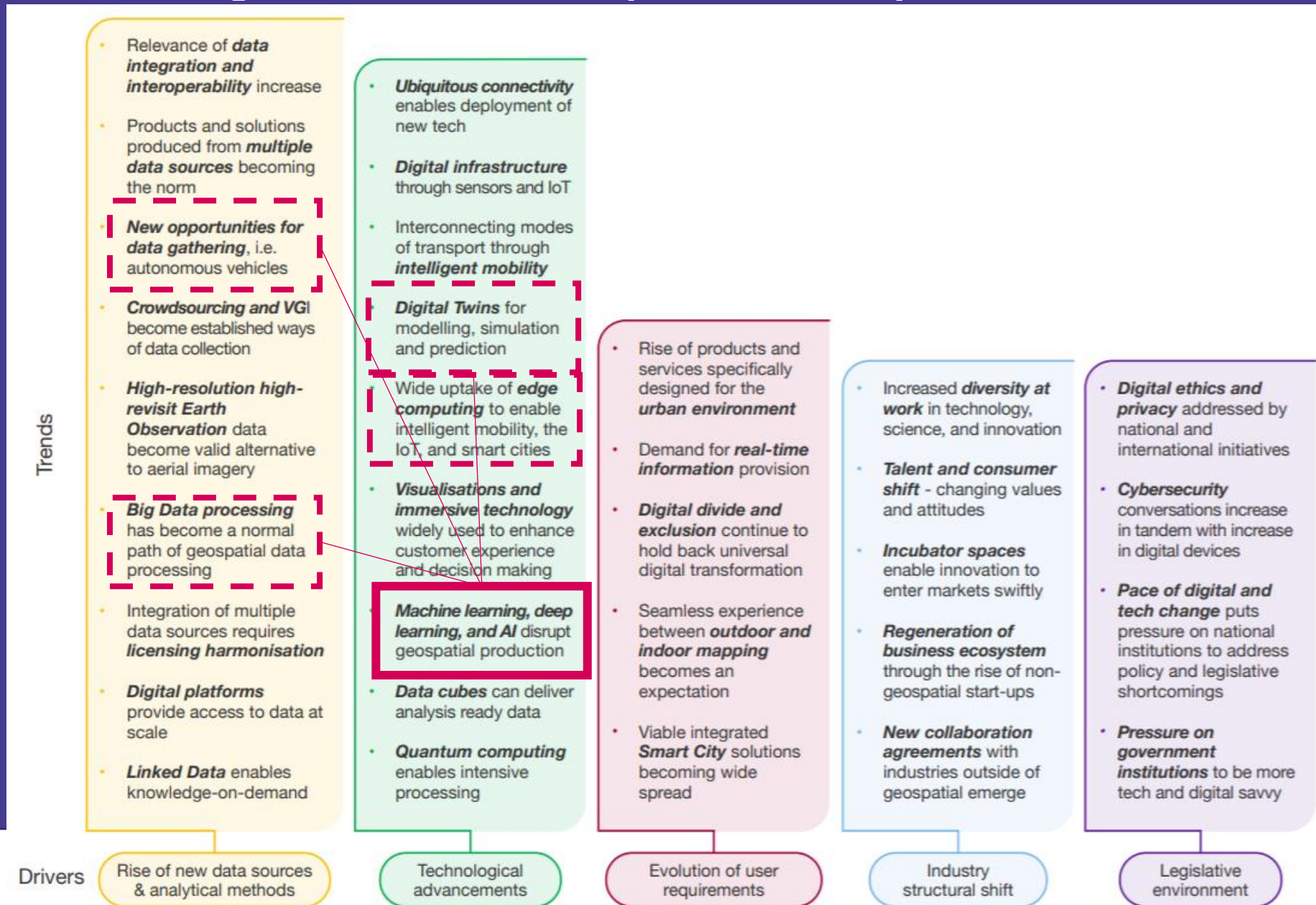


Facebook uses OSM and its Map With AI service for Marketplace, Check-ins and Local.

By March 2020, mappers from 137 countries have used the tool and contributed more than 100,000 changesets to the map.

Caption: Map With AI road data combined with Microsoft Buildings, for a more complete picture of a neighborhood.

Artificial Intelligence and Geospatial Analytics



Artificial Intelligence and Geospatial Analytics

- Many forms of technological advancement highlighted in the Future Trends report will produce new streams of geolocated data.
- For example, sensor data from smart buildings; road & vehicle state information from connected vehicles; other sensor data from the Internet of Things.
- Automation will be needed to:
 - Make sense of (summarise) these streams.
 - Highlight important changes or activity (pattern finding & then exception finding).
 - Integrate data between locations & domains.
- The right features/attributes in NMCAs' foundational geospatial data can greatly ease these analytics.



Building

Locale

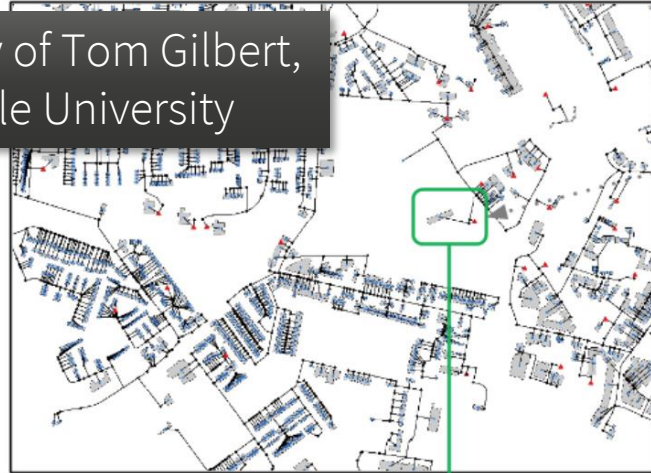
Neighbourhood

City

Region

Nation

Courtesy of Tom Gilbert, Newcastle University



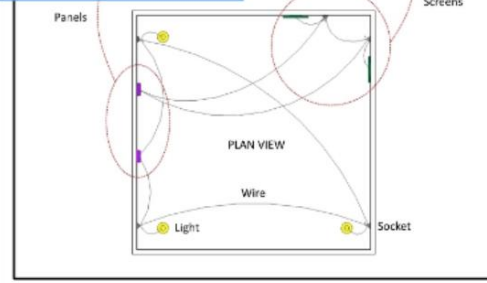
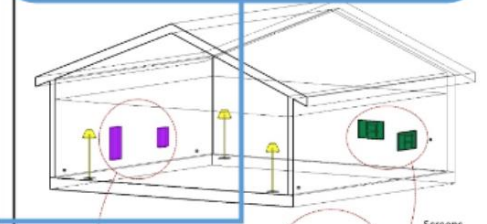
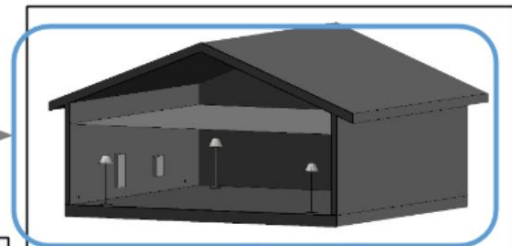
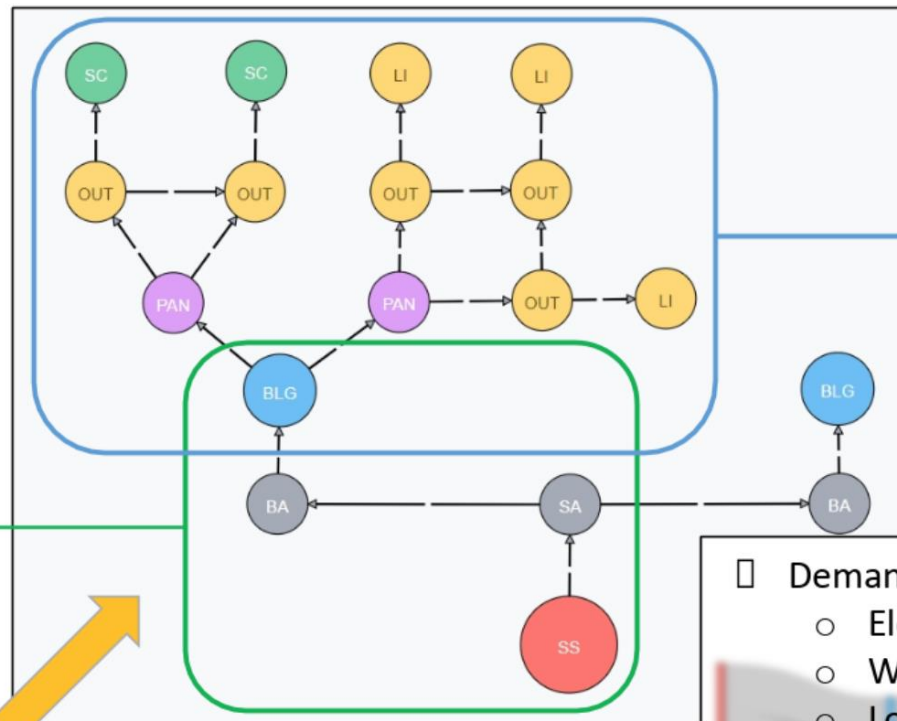
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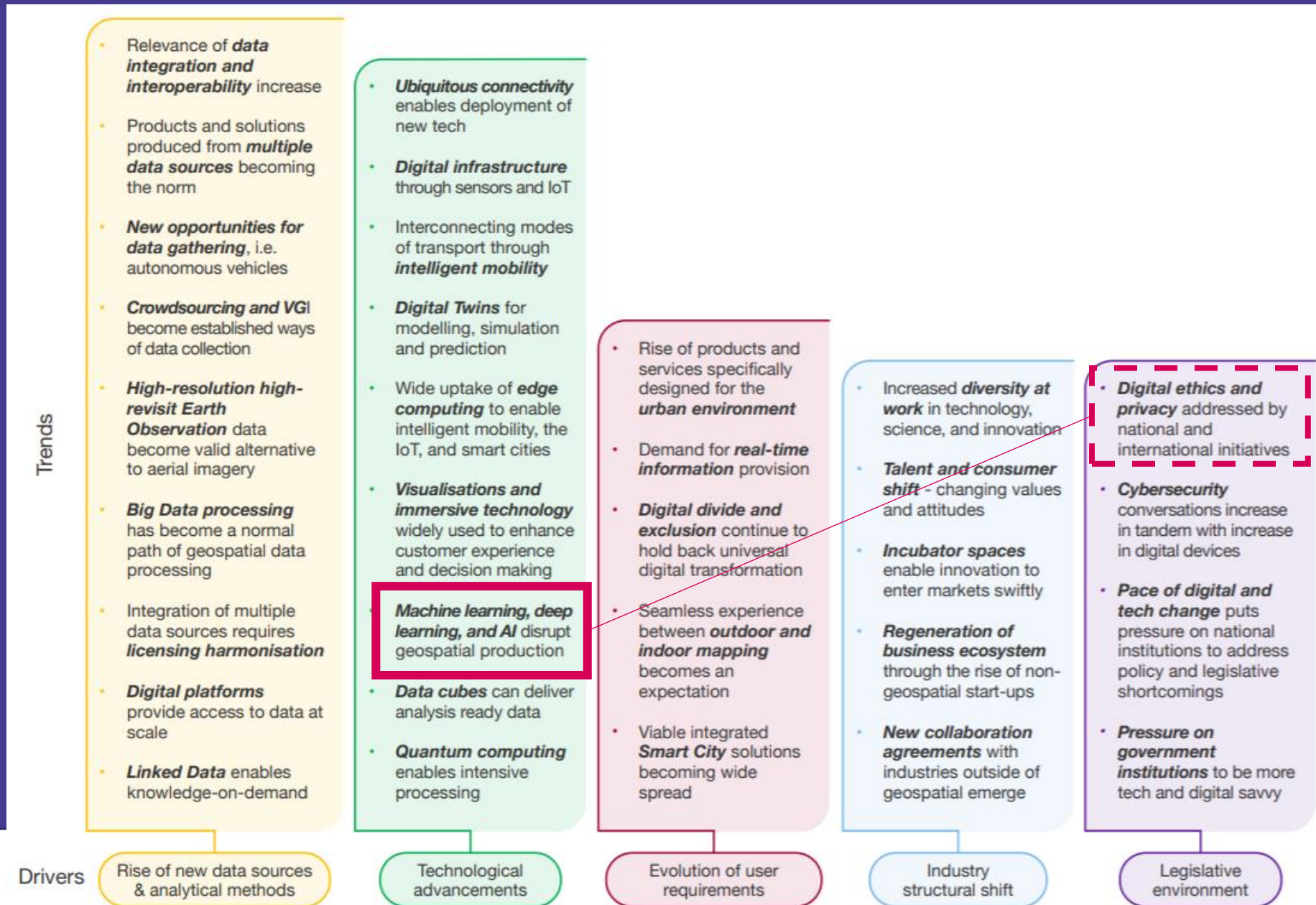
Sensor data

UUID match



- Demand-supply analysis
 - Electrical energy losses
 - Water leakage detection
 - Load balancing
- Security/stability
 - Network resilience
 - Robust design

Artificial Intelligence and Ethics



Artificial Intelligence and Ethics

OGC: *'The development of technology poses risks to social trust.'*

- Discrimination can be built into algorithms.
- Geography and the relationship between location, poverty, gender and race may result in trends and predictive models that discriminate against certain persons and populations in particular locations.
- Machine learning-based algorithms might have discriminatory outputs that would reinforce disparities in data collection/service allocation.
- International standards will ensure wide-spread interoperability and security benefits to lead to the ethical and responsible use of AI technologies in geospatial applications.

The Locus Charter

The *Locus Charter* is an international set of principles and guidance for the ethical and good practice in using location data.

Vision - *A world where location data is utilized for the betterment of the world and all species that live in it.*

The Charter is aimed at practitioners using location data and also policy and decision makers responsible for activities that create, collect, analyse and store location data.

After a series of workshops throughout 2020, undertaken by Benchmark Initiative and EthicalGEO the Locus Charter draft has now been revised to Version 2.

[Locus Charter v2.0](#) is based on 10 principles.

The logo for Benchmark, featuring a stylized white icon of three upward-pointing arrows on the left and the word "BENCHMARK" in white uppercase letters on the right, all set against a dark blue rectangular background.The logo for EthicalGEO, featuring the text "EthicalGEO" in white, with "Ethical" in a smaller font and "GEO" in a larger font, positioned above a white stylized pyramid icon, all set against a dark blue rectangular background.

Selected principles of the Locus Charter

Principle Four: The same rights that people have in the physical world must be protected in the digital world.

Principle Six: Care should be taken to understand bias in the data that is collected.

Principle Seven: The more context data that is combined with location data the more powerful. Measures should be put in place to prevent identification of a persons location.

Thank you

Questions?