

ORDNANCE SURVEY

The Future Trends in Geospatial Information Management – The Key non-Technical Trends

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Trends

- Relevance of **data integration and interoperability** increase
- Products and solutions produced from **multiple data sources** becoming the norm
- **New opportunities for data gathering**, i.e. autonomous vehicles
- **Crowdsourcing and VGI** become established ways of data collection
- **High-resolution high-revisit Earth Observation** data become valid alternative to aerial imagery
- **Big Data processing** has become a normal path of geospatial data processing
- Integration of multiple data sources requires **licensing harmonisation**
- **Digital platforms** provide access to data at scale
- **Linked Data** enables knowledge-on-demand

- **Ubiquitous connectivity** enables deployment of new tech
- **Digital infrastructure** through sensors and the Internet of Things
- Interconnecting modes of transport through **intelligent mobility**
- **Digital Twins** for modelling, simulation and prediction
- Wide uptake of **edge computing** to enable intelligent mobility, the Internet of Things, and smart cities
- Visualisations and **immersive technology** widely used to enhance customer experience and decision making
- **Machine learning, deep learning, and AI** disrupt geospatial production
- **Quantum computing** enables intensive processing

- Rise of products and services specifically designed for the **urban environment**
- Demand for **real-time information** provision
- **Digital divide and exclusion** continue to hold back universal digital transformation
- Seamless experience between **outdoor and indoor mapping** becomes an expectation
- Viable integrated **Smart City** solutions becoming wide spread

- Increased **diversity at work** in technology, science, and innovation
- **Talent and consumer shift** - changing values and attitudes
- **Incubator spaces** enable innovation to enter markets swiftly
- **Regeneration of business ecosystem** through the rise of non-geospatial start-ups
- **New collaboration agreements** with industries outside of geospatial emerge

- **Digital ethics and privacy** addressed by national and international initiatives
- **Cybersecurity** conversations increase in tandem with increase in digital devices
- **Pace of digital and tech change** puts pressure on national institutions to address policy and legislative shortcomings
- **Pressure on government institutions** to be more tech and digital savvy

Drivers

Rise of new data sources & analytical methods

Technological advancements

Evolution of user requirements

Industry structural shift

Legislative environment

Industry structural shift

The geospatial industry has undergone significant disruptive change in terms of map generation technologies, use cases, business models, and user requirements.

Developments:

- The future skillsets: data science and analytics, computer science, and data visualisation;
- Geospatial-enabled innovation programmes are set up in order to stimulate the disruptive potential of technology start-ups;
- The increasing affordability and ubiquity of mobile devices trigger new growth opportunities in 'As-A-Service' products; and,
- The quality and quantity of crowd-sourced location-based content grows.



Talent and consumer shift

- **Skills** – The rate of change in the skills required across all disciplines in the geospatial industry is accelerating. This requires changes in the education and training system as well as re-skilling of the workforce to retain knowledge.
- **Innovation programmes** – Geospatial-enabled innovation programmes and hubs are set up by national bodies and private companies alike in order to stimulate the disruptive potential of tech-start-ups
- **Digital natives** – There is an expectation that their technology experience equals their social media experience – mobile, frictionless, and convenient. The reshaping of consumer behaviour and expectations towards an outcome-focused, personalised experience that is instantly gratified will dominate the user experience of future products and services.



Regeneration of business ecosystems

- Technological advances and the advent of digital platforms have drastically reduced the barrier to entry making it easier for new players to enter the geospatial markets.
- Devices and the increase in spatially related services have ushered in an era where public users are not only consumers of geospatial information, but also act as producers of enriched geospatial data.
- Over the past decade, business models have emerged that show how geospatial data and technologies are increasingly used across a variety of industries.
- The power of platform business models has gained significantly by simply connecting producers and consumers. This shift from physical to digital is providing opportunities to digital platform companies.



Legislative environment

In the legal and policy domain, a one-size-fits-all approach cannot be applied due to differences in national legal systems and varying level of maturity of national geospatial information management.

Developments:

- National governments are increasingly developing national geospatial strategies or master plans to access the social and economic benefits that geospatial information can deliver;
- Technologies continue to generate more data, raising further questions over who controls, who owns and who benefits from the value of the data; and,
- The pace of technological and digital advances increases concerns around privacy, cyber security, and has advanced the dialogue on developing ethical principles and solutions.

Digital ethics and privacy

- In 1930, Edmond Locard determined that 12 points of a fingerprint are enough to uniquely identify an individual.
- A 2013 study established that human mobility traces are vastly unique, highlighting that four spatio-temporal points are sufficient to uniquely identify roughly 95 per cent of individuals.
- Modern information technologies and the advances in digital infrastructure shows the uniqueness of individuals.
- Advances in how data is used and the deployment of emerging technology puts increasing pressure on understanding, anticipating and responding to emerging ethical issues.
- The use of geospatial information poses serious ethical questions related to privacy, accuracy, and accessibility.

