National Spatial Data Infrastructure: why wait?

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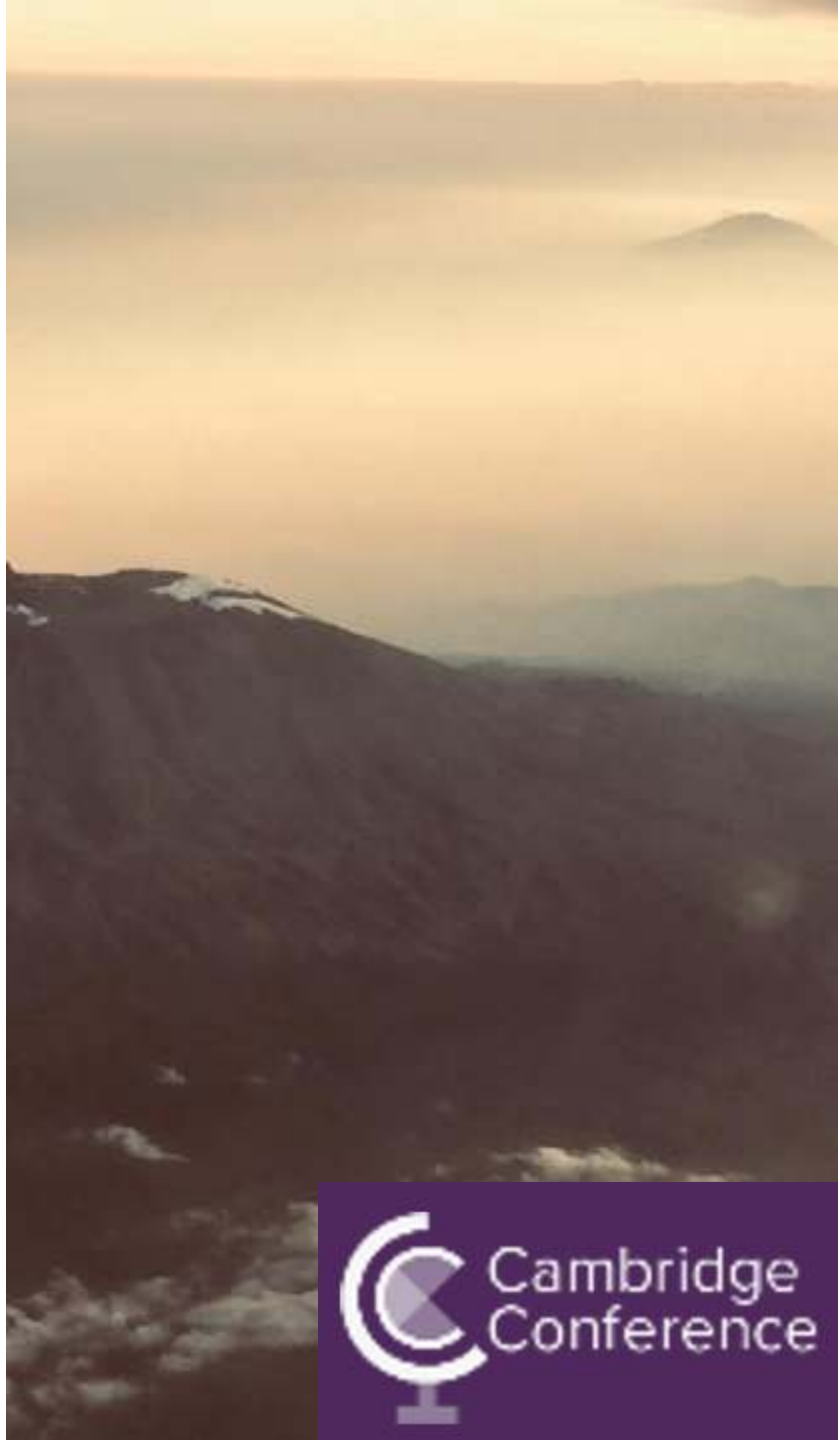
1. **<u>From the perspective of a National Mapping and Geospatial Agency</u>**
2. What is a NSDI
3. Socio-economic value of geospatial information and the Sustainable Development Goals
4. Why wait – lets take benefits early
5. Ordnance Survey experience

It’s a scary world for NMGAs

- Large amounts of raw data – This data needs to be refined so that it can be actionable.
- Pace of change in geospatial technologies.
- IoT, automation, 4th Industrial Revolution
- Maintenance – currency, accuracy, detail.
- Competition – Crowd, Google etc, other government agencies: all can bypass national mapping agencies.
- Public task v open data v commercial business.
- Access to political and fiscal investment.
- Capacity to change.



‘Geospatial is like a general-purpose technology; it’s the oil for the next generation of the digital economy.’

Nigel Clifford, CEO Ordnance Survey, opening Quadrennial Cambridge Conference, July 2017

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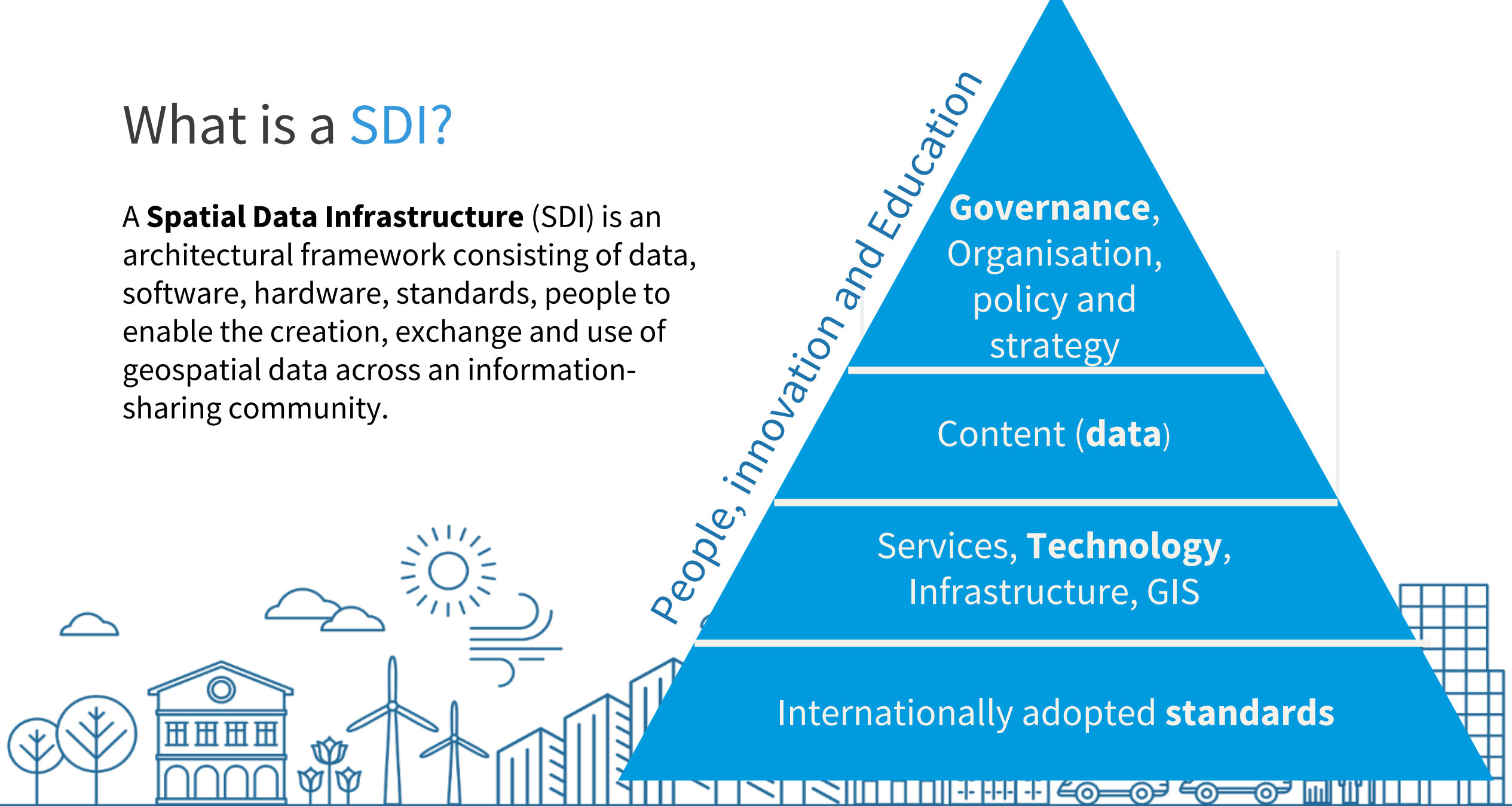
What is a SDI?

A **Spatial Data Infrastructure** (SDI) is an architectural framework consisting of data, software, hardware, standards, people to enable the creation, exchange and use of geospatial data across an information-sharing community.



What is an NSDI?

…the means to share and use location data for the benefit of Tanzania

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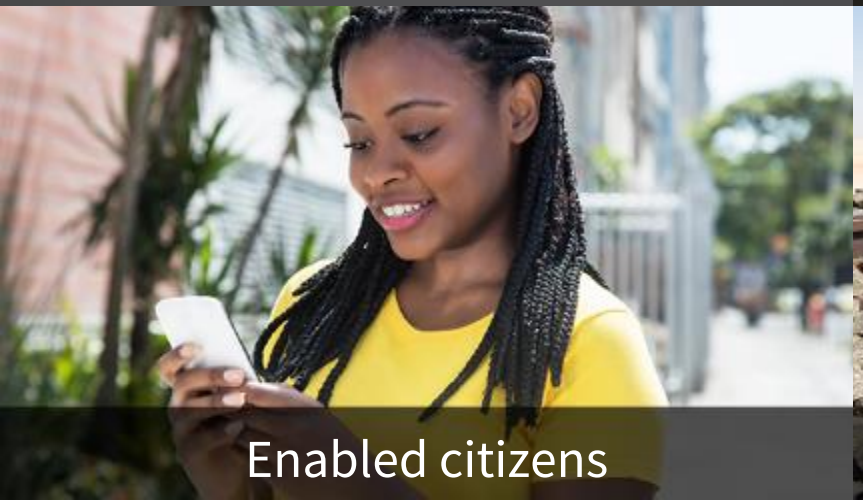
How does it help a nation?

Benefits of using geospatial data

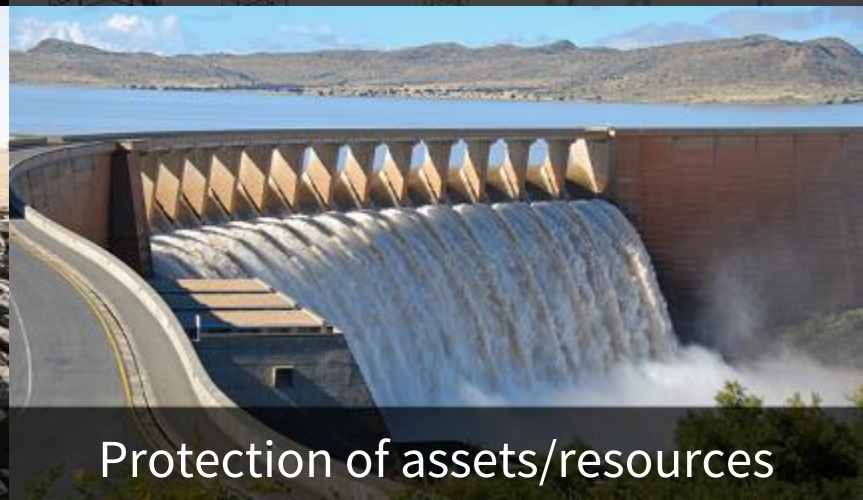

Effective government and taxation


Economic growth/digital economy


Efficiency gains


Enabled citizens


National infrastructures and cities


Protection of assets/resources

Taxation and government revenue generation

- Property tax
- Agricultural land tax
- Congestion charging
- Business and income tax

Security of land tenure underpins development

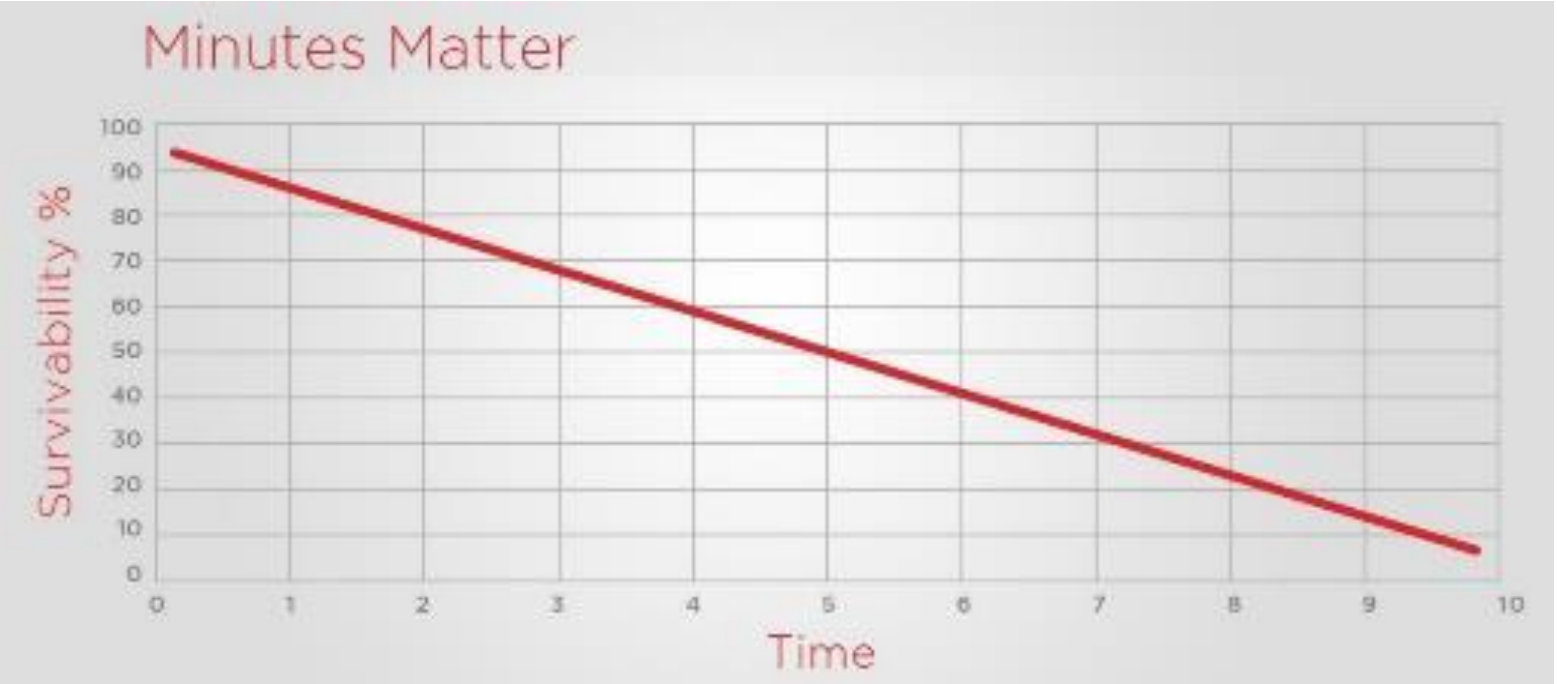
- Land is 75% of the value of world GDP
- Enable effective infrastructure planning and delivery
- Access to credit and tenure security
- Fair compensation
- Land tax

Emergency services: serious illness and accident

Time saves lives and money

Rapid urbanization has also increased the risk of deadly fires in Addis Ababa. Many of these residential occur in informal settlements, making it harder for emergency responders to contain fires once they start.

http://www.100resilientcities.org/cities/addis-ababa/

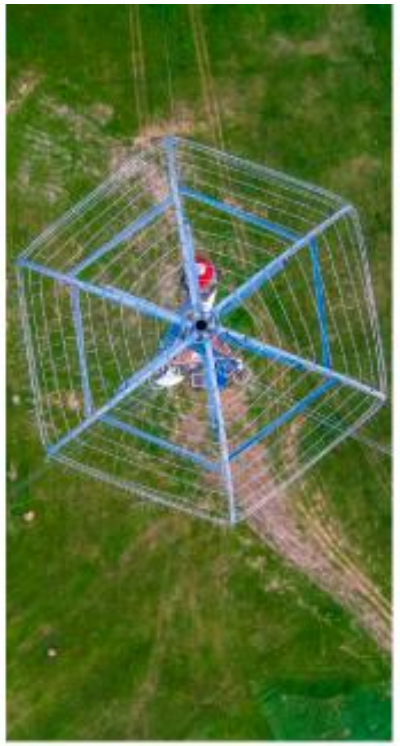


In Ireland a navigation device and geospatial data enhances the response time by 17% and reduce cardiac arrest deaths by 10%.

Agriculture

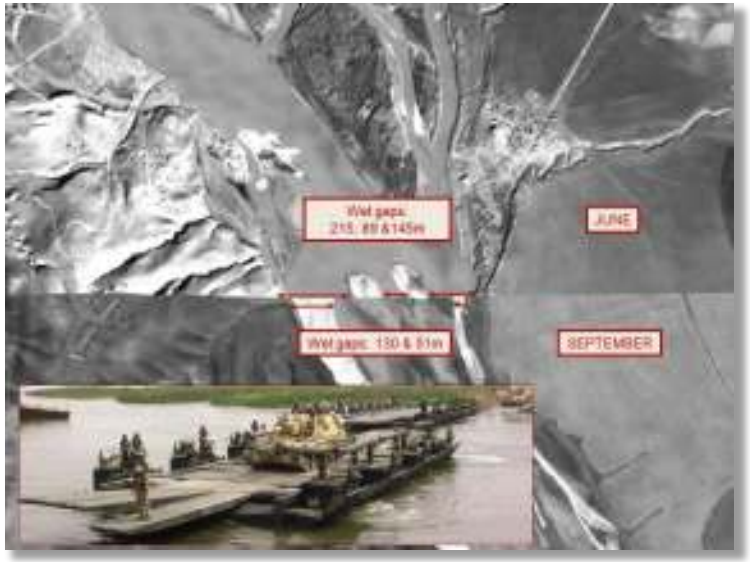
- Agricultural cadastre
- Calculation of farming subsidy or compensation payments
- Irrigation and drainage planning and maintenance
- Land use planning
- Products to market – road infrastructure
- Environmental protection
- Large-Scale Agricultural Investments and Rural Development in Tanzania

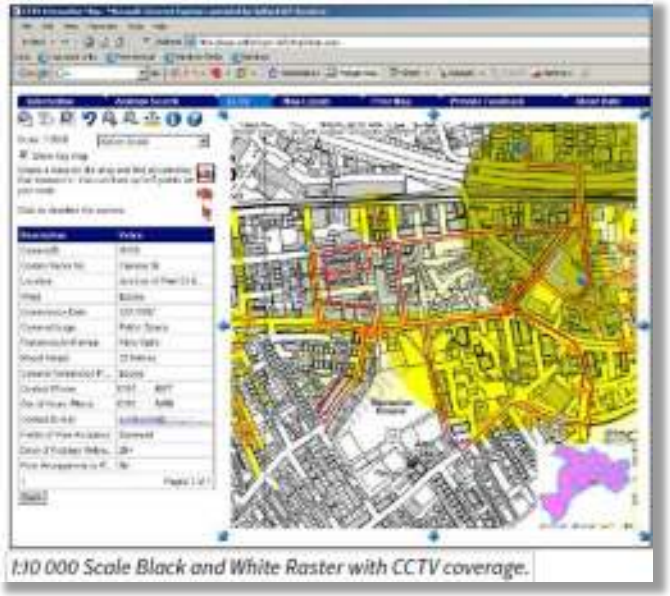
Infrastructure



The use of GI can help with:

- Managing and optimising existing assets
- Adherence to legislation and regulatory policy
- Increasing efficiency
- Integrated planning





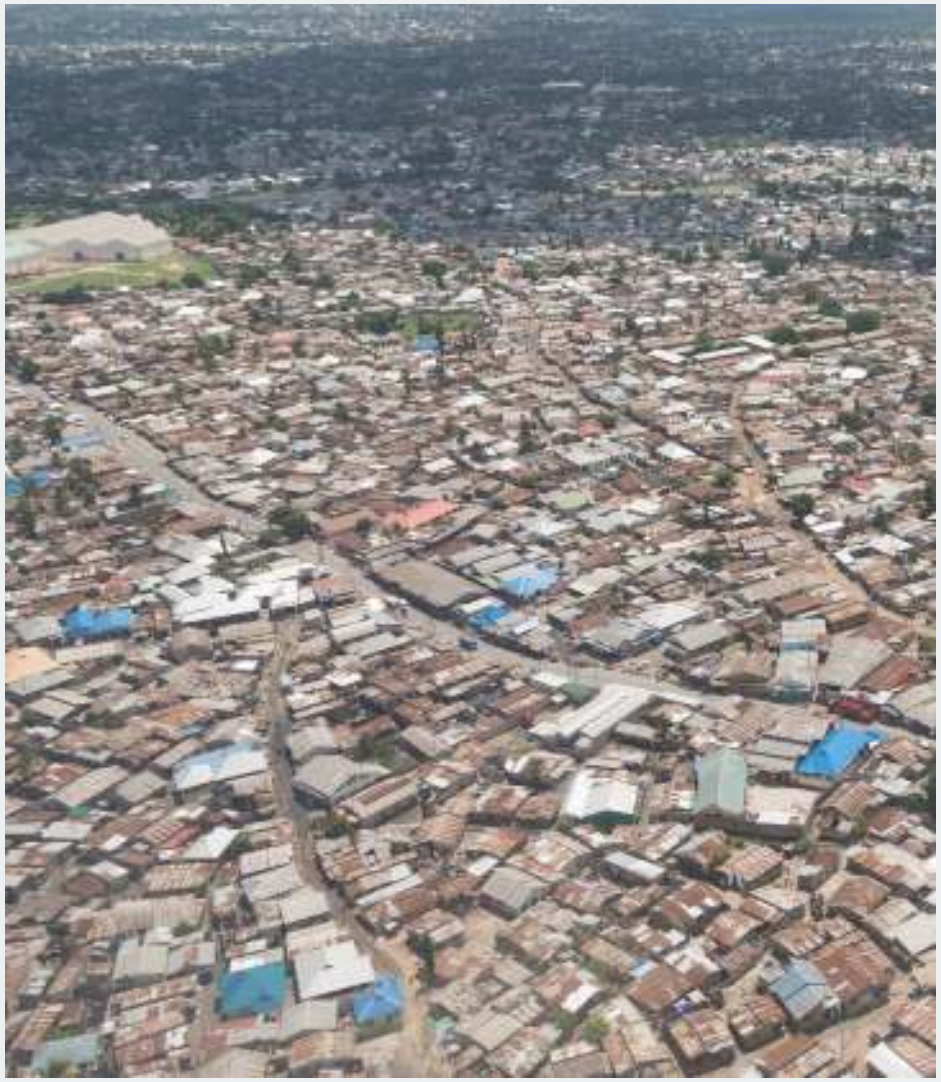
Defence and National Security

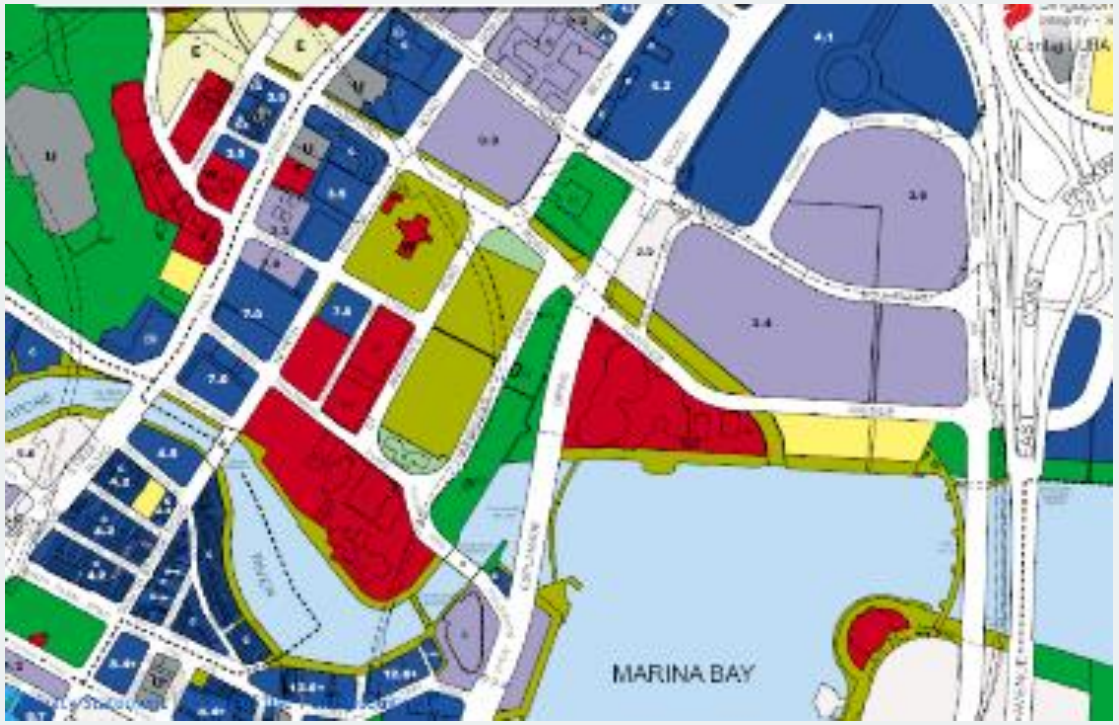
Urban development

The use of geospatial data can help enable:

- Improved Urban Planning
- Resilience planning & disaster response
- Environmental management
- Transport planning and operations
- Land tenure
- Revenue generation (tax)

Urban planning





Planning for tomorrow ……

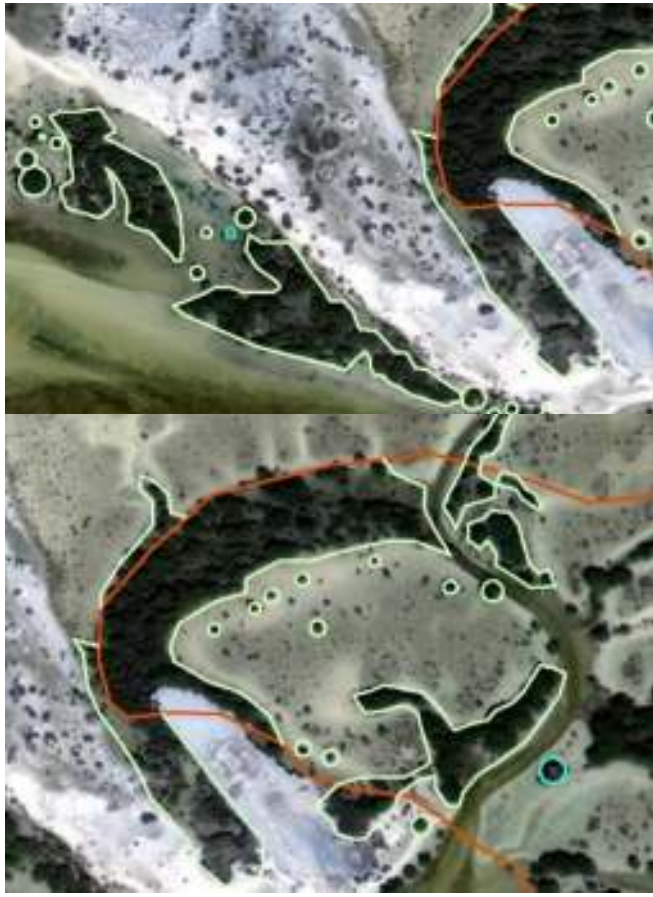
Needs a comprehensive view of today

Building a sustainable environment

Resource scarcity

Food security

Cities

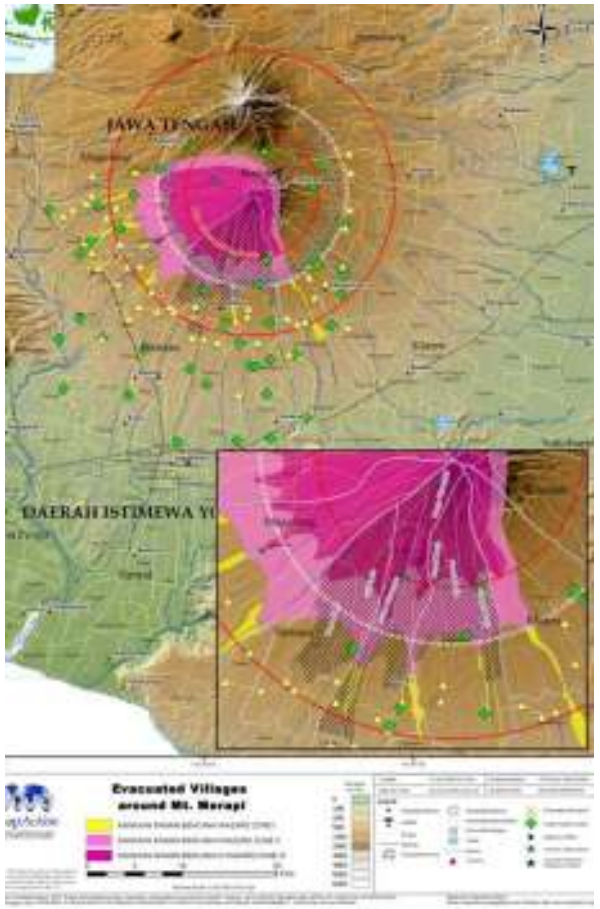


Coastal Zones

Increasing demand for scarce natural resources

- Comprehensive planning and management
- Assessment of potential crop failure, subsequent compensation and reduction in fraud
- Managing extractive industries

Resilience and disaster response



Planning

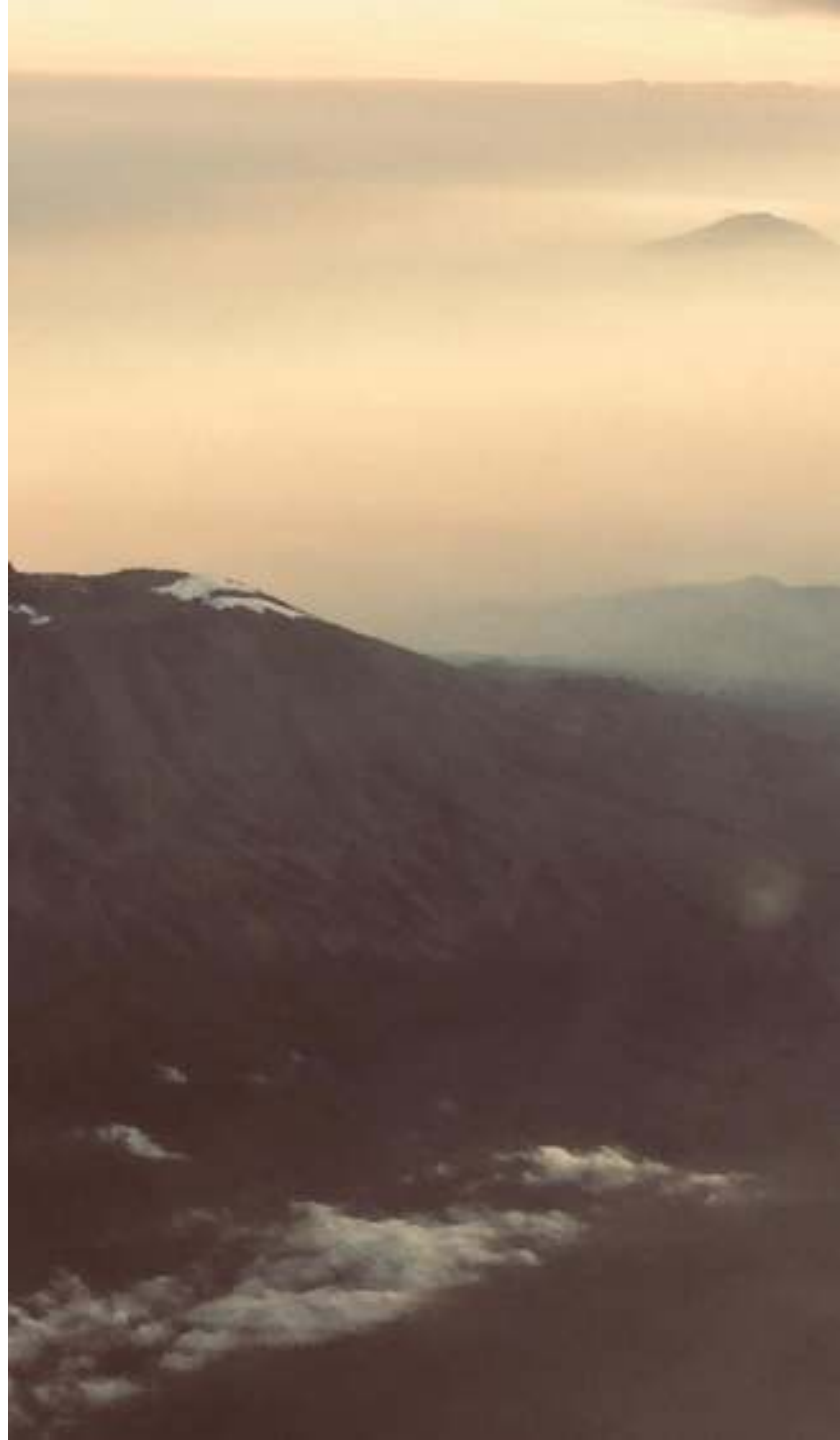
Responding

Rebuilding

Successful businesses create successful economies

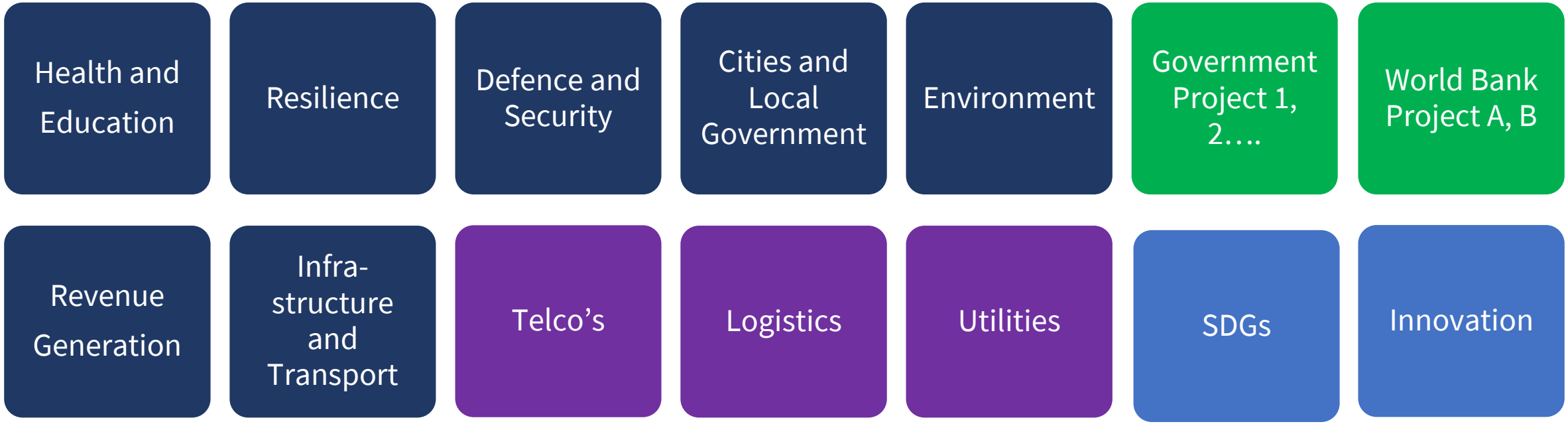
GI is used across various sectors:

- Marketing
- Logistics
- Insurance
- Utilities
- Telecoms
- Banking
- Travel and Tourism



Business Planning – locations to increase profit

The strategic funding challenge? Collect once use many



Ordnance Survey 2016.

All enabled by the same physical and digital data infrastructures

"It is not a project BUT a national infrastructure"

The economic contribution of GI to high-income nations

Year	Study	Relates to:	Country	GDP impact
2008	ACIL Tasman	Impact of modern spatial information technologies	Australia	0.6-1.2%
2008	ACIL Tasman, SKM & Ecological Associates	GI contribution to productivity	New Zealand	0.6%
2010	ConsultingWhere	7 Public Sector Services Productivity Related benefits	UK Public Sector	0.23%
2011	ACIL Tasman, Lester Fr... ConsultingWhere	Total change in real Gross State Product (GSP) due to ...	...ia	0.4%
2011	GeoBusiness Nederl...			0.25%
2012	Richard Zerbe and Associates	Net benefit of GIS alone	King County, Washington	0.09%
2012	Boston Consulting Group	Geospatial Industry (including remote sensing satellites)	USA	0.5%
2013	Oxera	Geospatial Industry as % of GDP	Global	0.2%
2014	Indecon	GI Contribution to the economy	Ireland	0.33%
2015	Hickling Arthurs Low, Acil Allen Consulting, Fujitsu & ConsultingWhere	Contribution of geospatial industries and GI to GDP	Canada	1.1%

Digital geospatial information could enhance Africa GDP by US$4 - US$10bn pa

SUSTAINABLE DEVELOPMENT GOALS

SDG and data themes

INSPIRE Theme	Sustainable Development Goal												
	1	2	3	5	6	7	8	9	11	12	13	14	15
Address	■	■	■	■	■	■	■	■	■	■	■	■	■
Administrative units	■	■	■	■	■	■	■	■	■	■	■	■	■
Cadastral parcels	■	■	■	■	■	■	■	■	■	■	■	■	■
Geographical Names	■	■	■	■	■	■	■	■	■	■	■	■	■
Hydrography		■	■		■			■	■	■	■	■	■
Transport networks (road, rail, water, air, cable)	■	■	■					■	■	■	■	■	
Protected sites							■		■	■		■	■
Elevation								■	■	■	■	■	■
Land cover		■			■		■	■	■	■	■		■
Ortho-Imagery		■			■		■		■	■	■	■	■
Geology	■		■		■				■				
Buildings	■						■	■	■		■		
Land use (existing , planned)	■	■	■	■	■	■	■	■	■	■	■		■
Soils		■	■		■		■		■				■
Human health	■	■	■		■		■		■	■			
Governmental services and utilities	■	■	■	■	■	■	■	■	■	■	■	■	
Environmental Monitoring facilities	■				■				■	■	■	■	■
Production facilities			■		■	■	■	■		■	■	■	
Agricultural facilities		■			■	■	■	■		■	■	■	■
Population distribution/ Statistical Units	■	■	■	■	■	■	■	■	■	■	■	■	
Area management - Regulated areas					■				■	■	■	■	■
Natural risk zones	■	■					■		■	■	■		■
Sea regions												■	
Oceanographic features			■						■			■	
Atmospheric conditions – meteorologic features	■		■				■		■			■	■
Biogeographical regions							■						■
Habitats and biotope							■		■	■		■	■
Species distribution		■					■		■	■		■	■
Energy resources	■	■				■	■	■	■	■			
Mineral resources							■	■		■			

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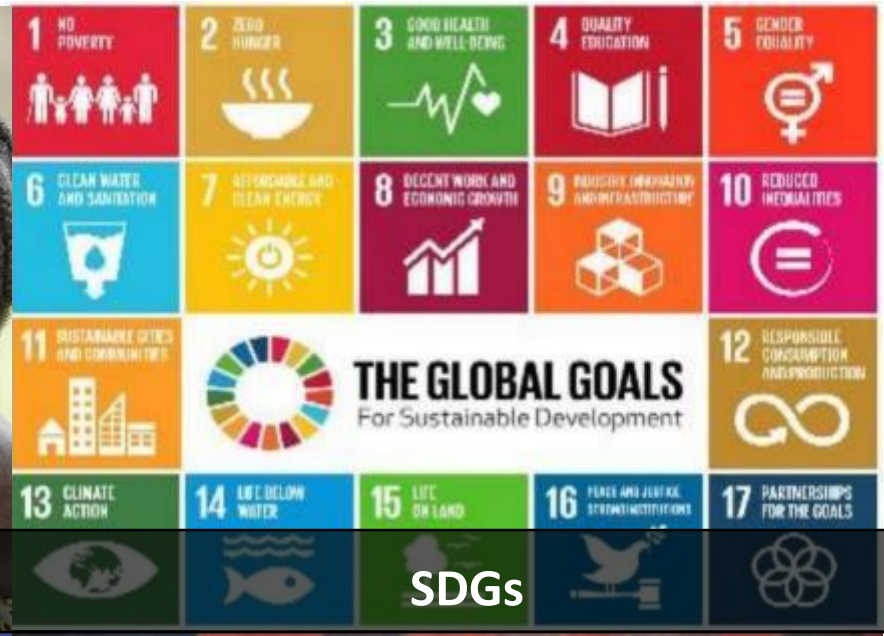
Take small steps

- Share existing data
- Natural partners wanting change?
- Key national challenge where those partners can make a difference now
- Show the benefits

"A politician is not interested in doing things that have no societal impact“ (Governor of Vihiga County, Kenya)


Education


Gender Equality



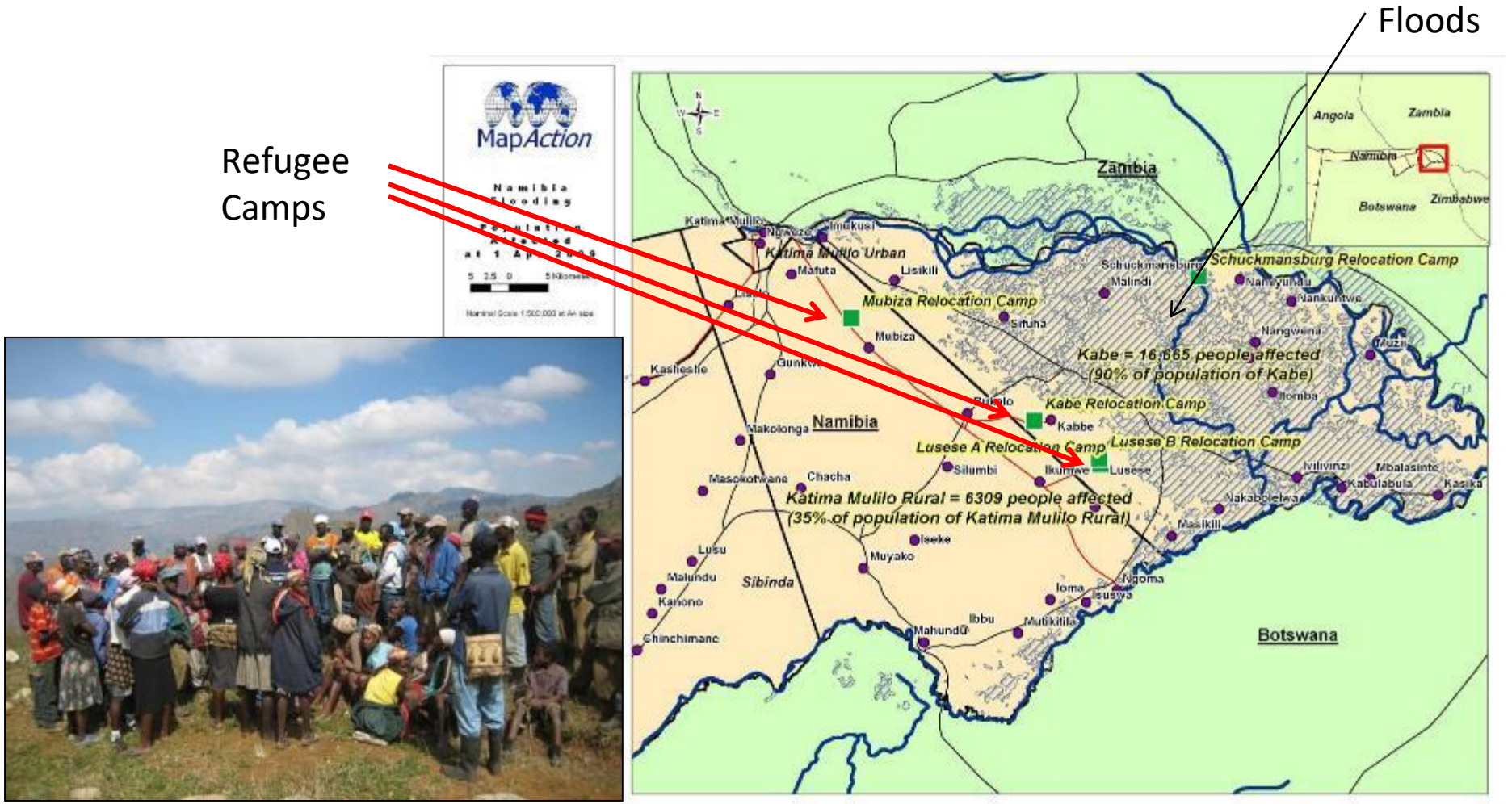
SDGs


Tenure Security

Health


Safety

Disaster response: '*where* and *who* are the affected people, places and infrastructure?'



Addis Ababa's Resilience Challenge

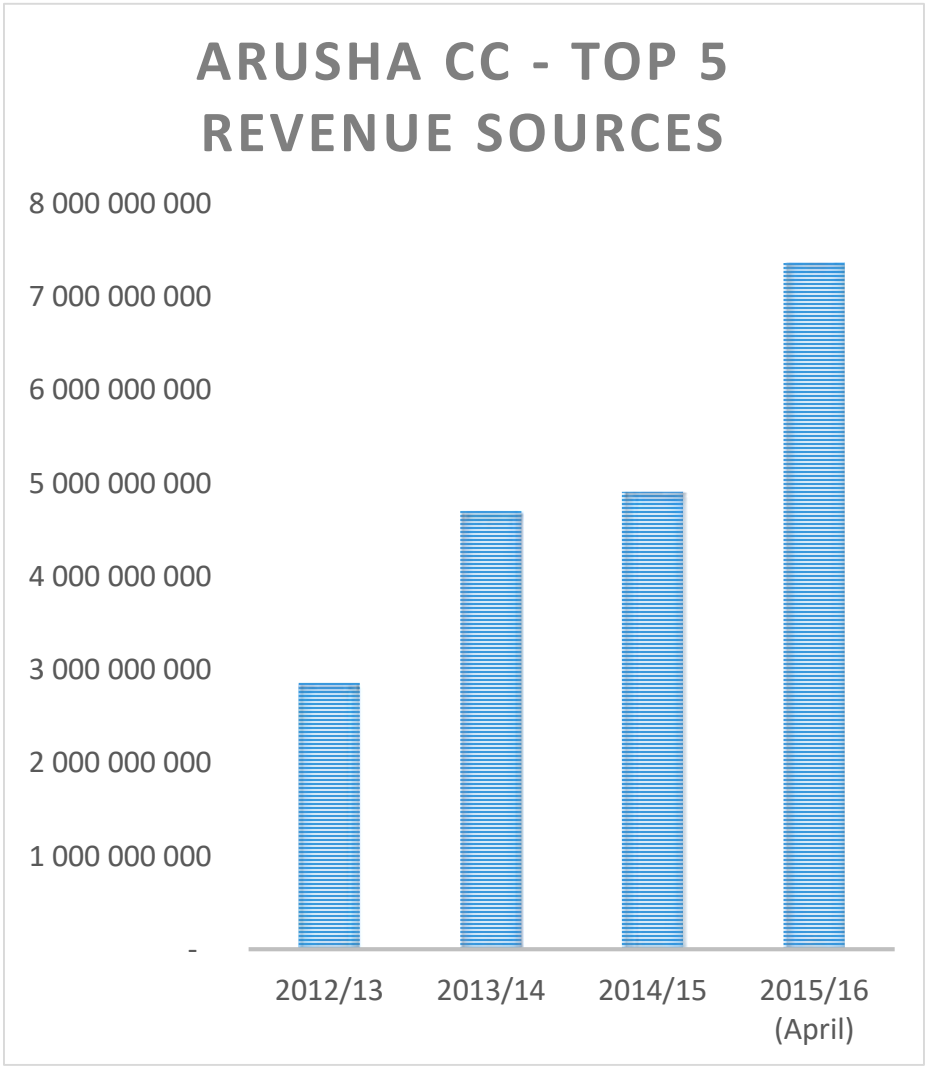
Raise living standards in the face of rapidly growing population.

- City on pace to double in size within 15 years
- Strain on existing public services, especially clean water and sanitation.
- Recent measures to increase resilience:
  - BRT line to alleviate urban congestion
  - Public work programs to address an unemployment rate above 22%.

http://www.100resilientcities.org/cities/addis-ababa/

Arusha Local Government Revenues

- Local Government Revenues: eg service levy, property tax, billboards, parking fees, income from sale or rent, market fees and charges, permits on business activities, hotel levy .
- Local Government Revenue Collection Information System (LGRCIS): Geographically locate all taxpayers and properties
- Comprehensive spatial database: satellite imagery, roads and individual buildings digitised, unique property reference number, attributes (e.g. use, condition, age)



World Bank Land and Property Conference 2017. The role of ICT in delivering efficient revenue collection in developing countries: The Tanzanian experience. Prof William McCluskey, African Tax Institute, University of Pretoria, Chyi-Yun Huang, World Bank, Patrick Doherty, Consultant, Prof Riel Franzsen, African Tax Institute, University of Pretoria

Coastal Development: land and the environment

- Sustainable Tourism
- Property rights
- Unregulated or illegal development
- Environment
- ‘Blue’ economy

Security of land tenure underpins development

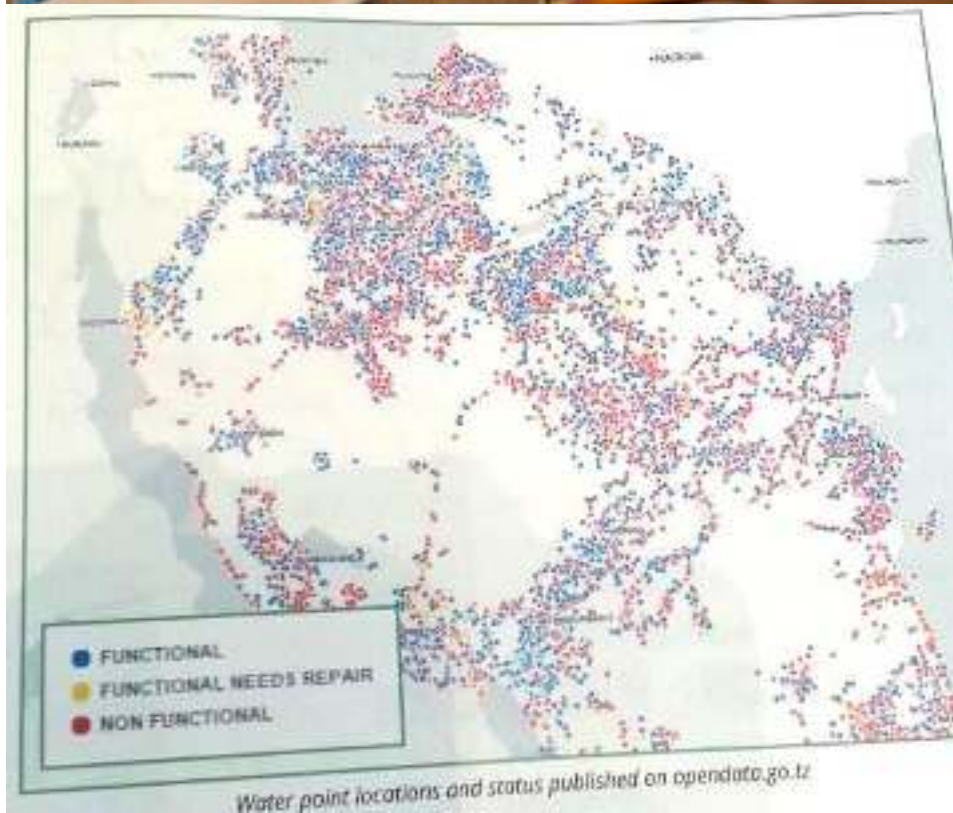
Esperance, 39, a mother of four used to be in constant dispute with her neighbours over ownership of the land she lived on. Through a DFID-funded land registration programme, the dispute is now settled and she is a proud landowner.

Water and Schools

Access to clean water
Sustainable supplies

Access to education
Transport for education: Kenya,

Tanzania Policy: 1991 Policy on Water states that everyone should have access to clean water within 400m of their home.



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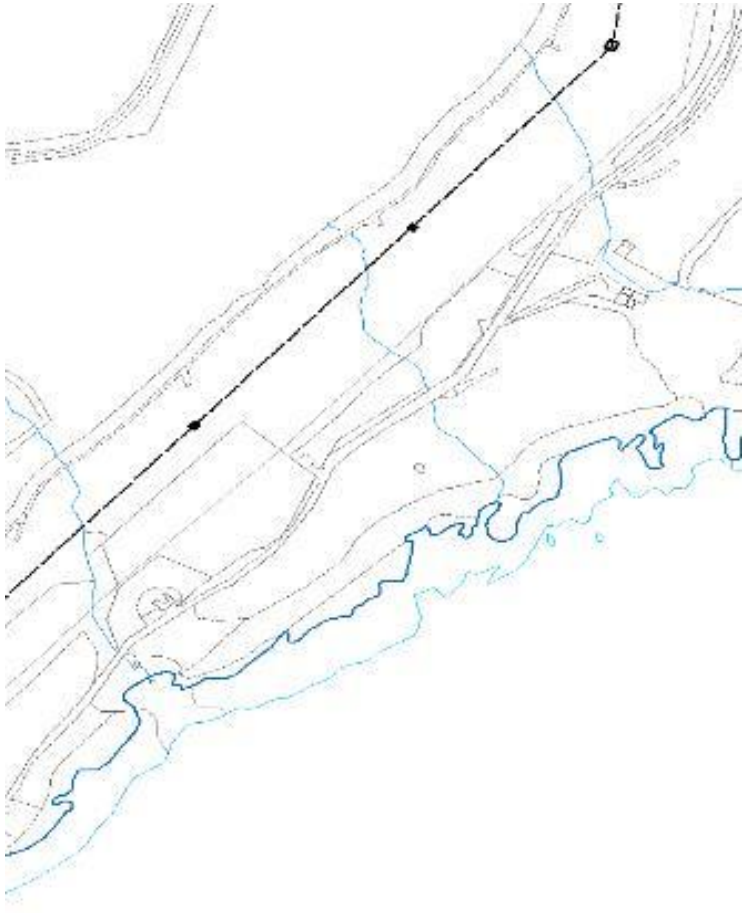
Cartography



Years

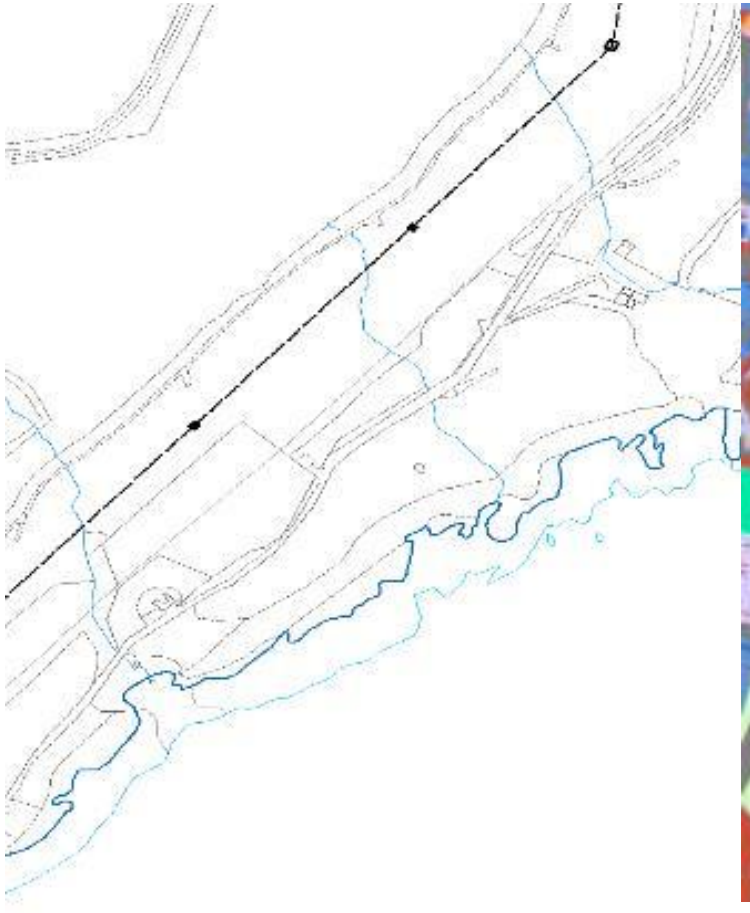
Data Currency

Weeks

Seconds

Cartography

Data



Data Currency

Years

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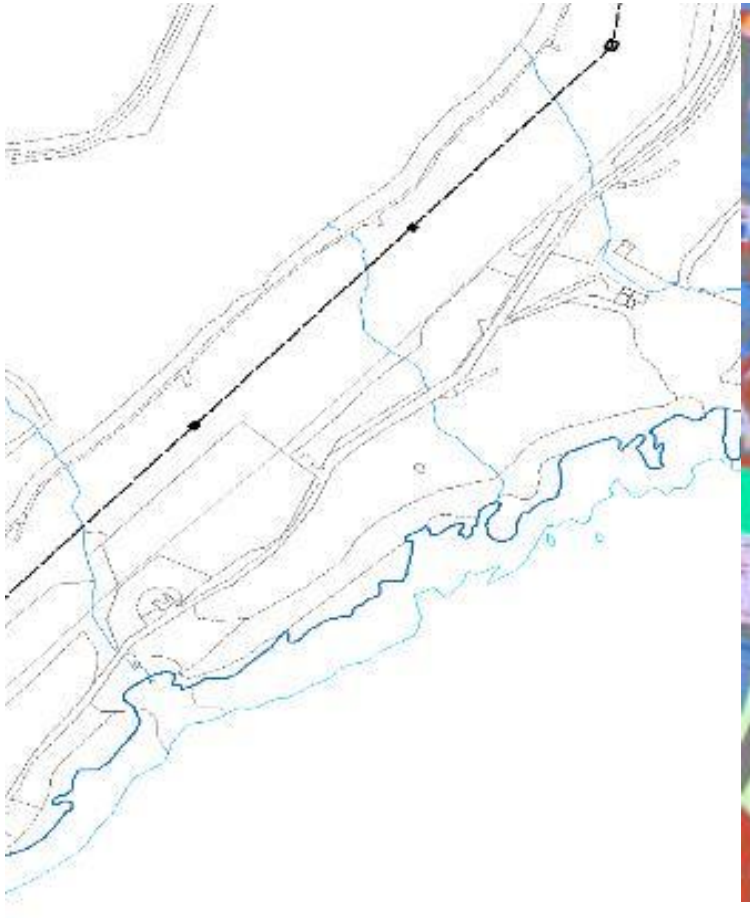
Cartography



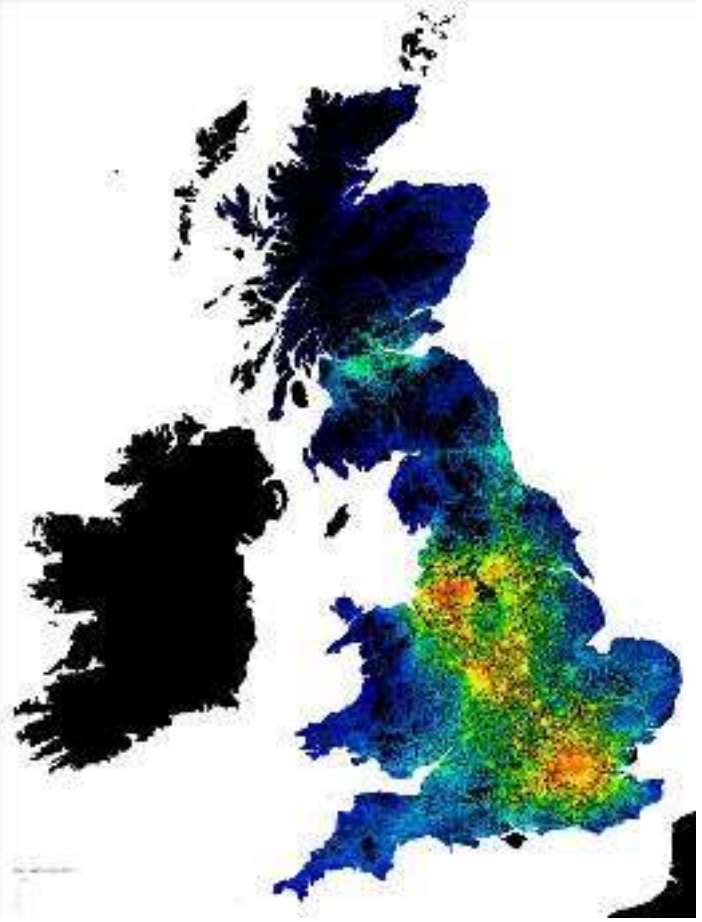
Years

Data

Data Currency

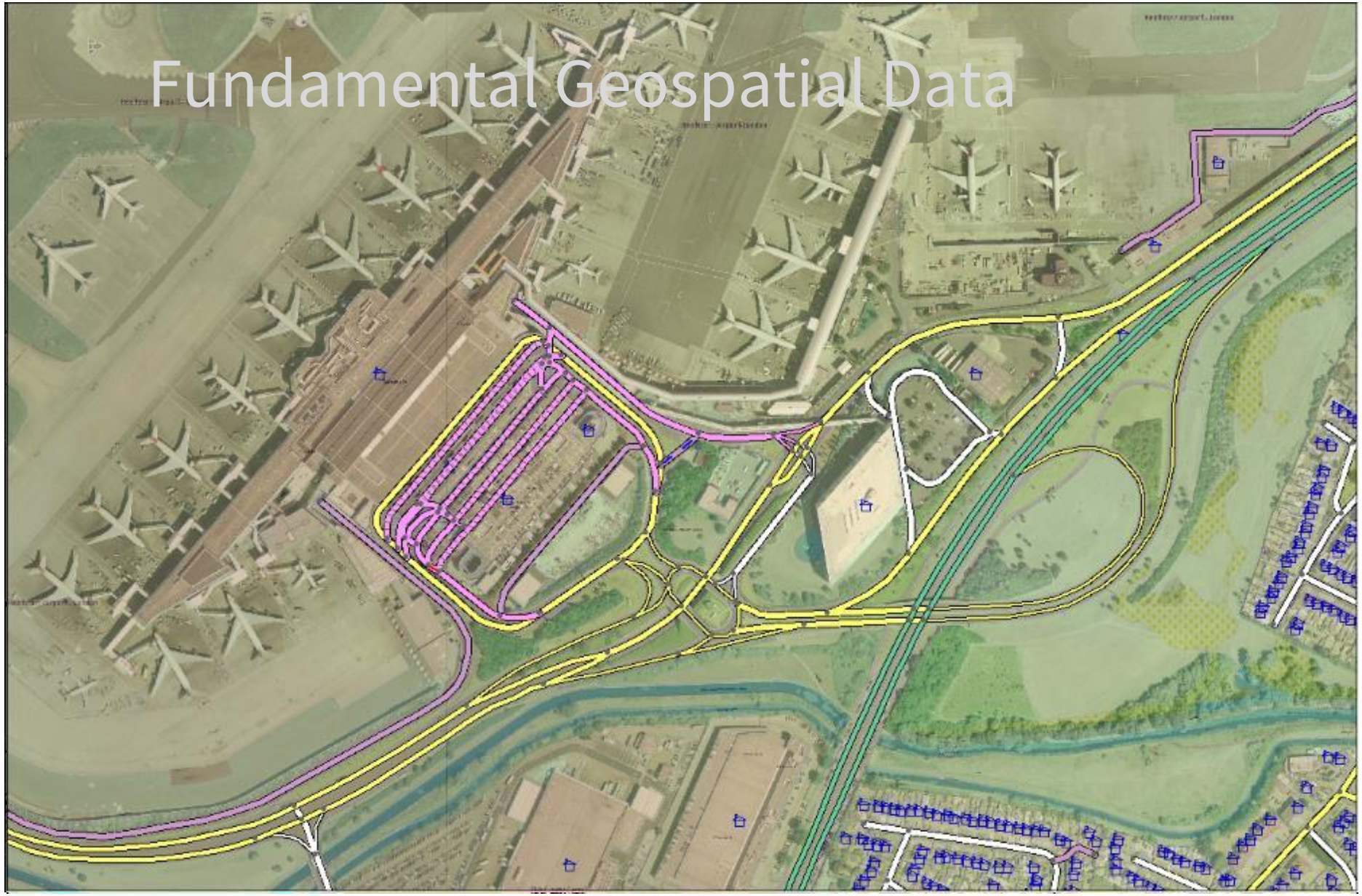
Weeks

Connectivity



Seconds

Fundamental Geospatial Data



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Unique identifiers in a city for every location

Unique property reference number for every real world object

Apartment 1st floor right **UPRN1000045233**

Apartment 1st floor left **UPRN1000045231**

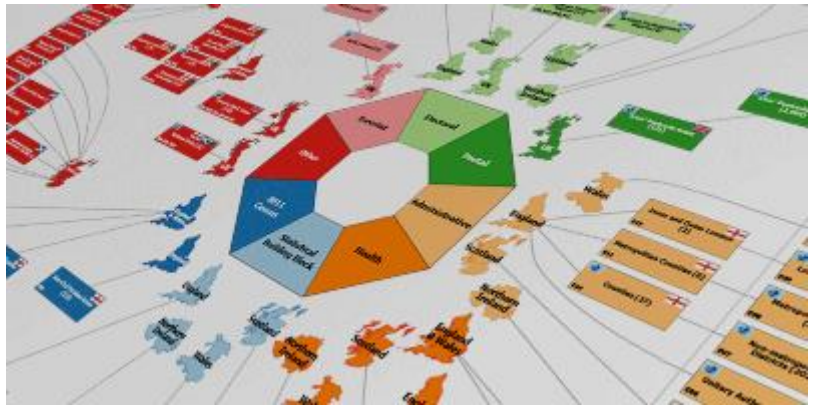
Multi-family residential building **UPRN1000045234**

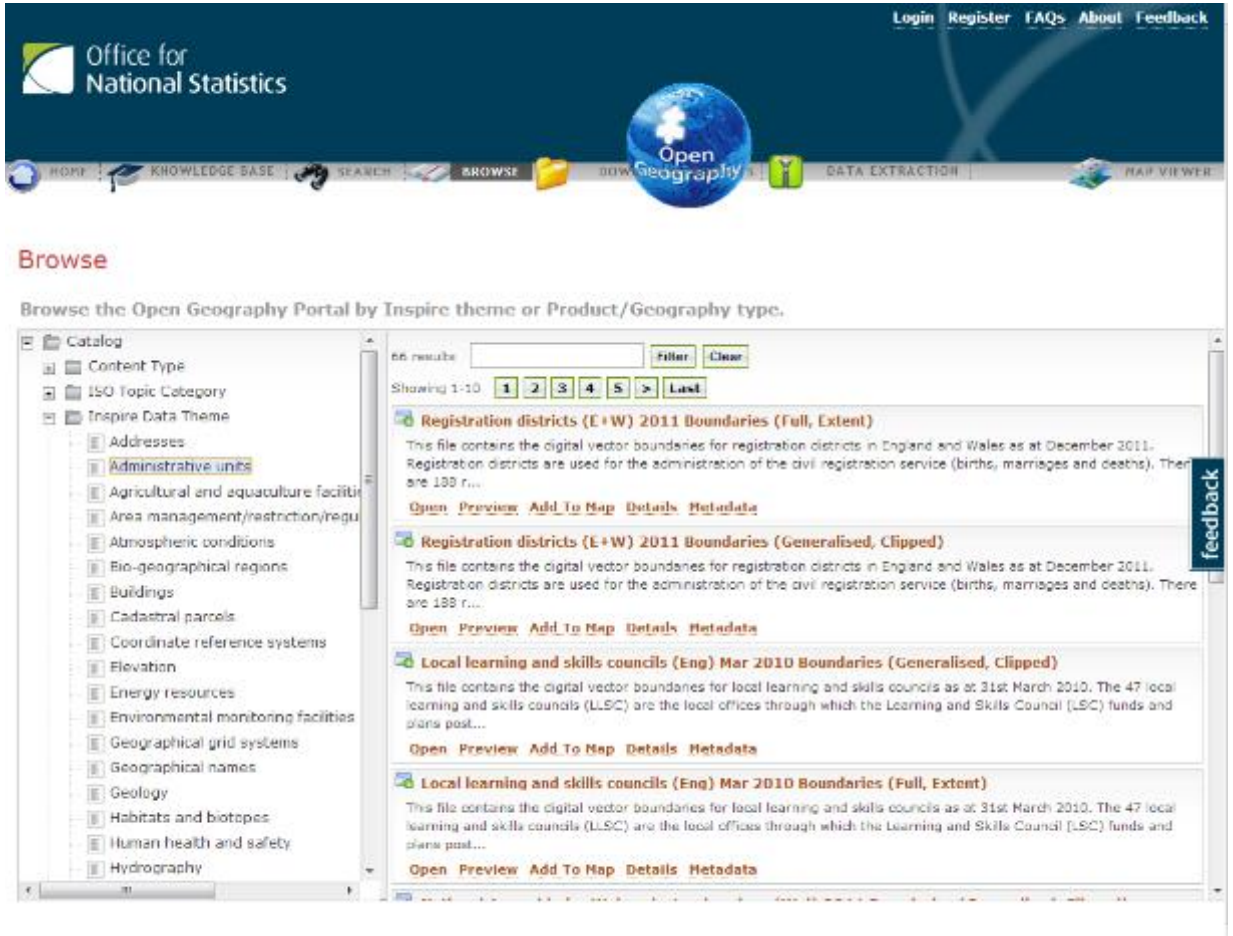
Collaboration – Office of National Statistics

EU INSPIRE compliant

Provides the route for users to search, view and download a wide range of ONS Geography products

https://geoportal.statistics.gov.uk/geoportal/

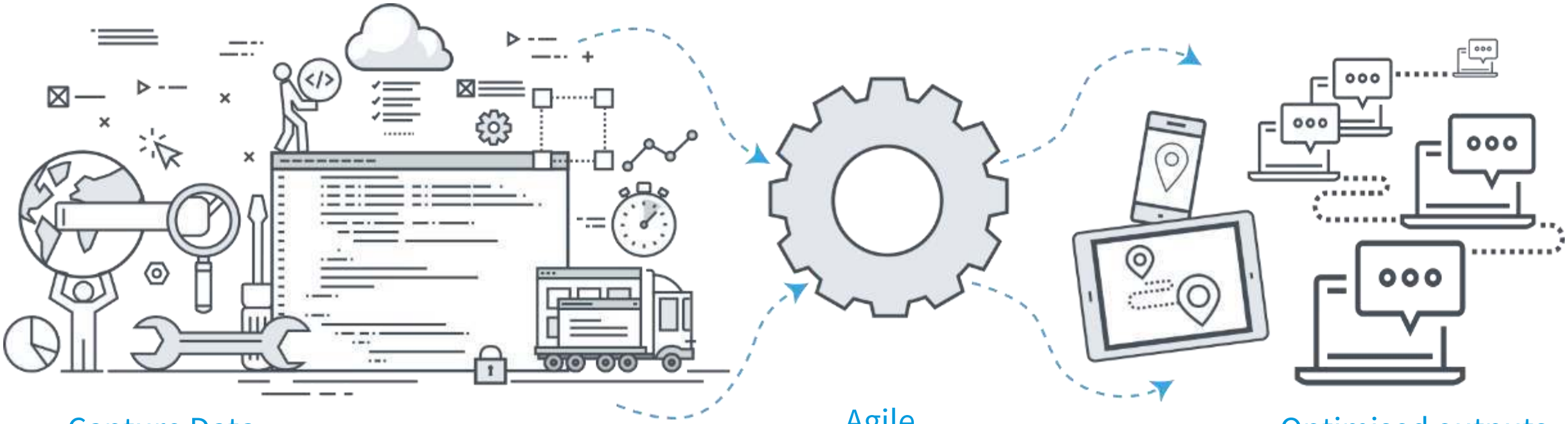




Ordnance Survey

The lungs of Ordnance Survey

…….the cloud next?



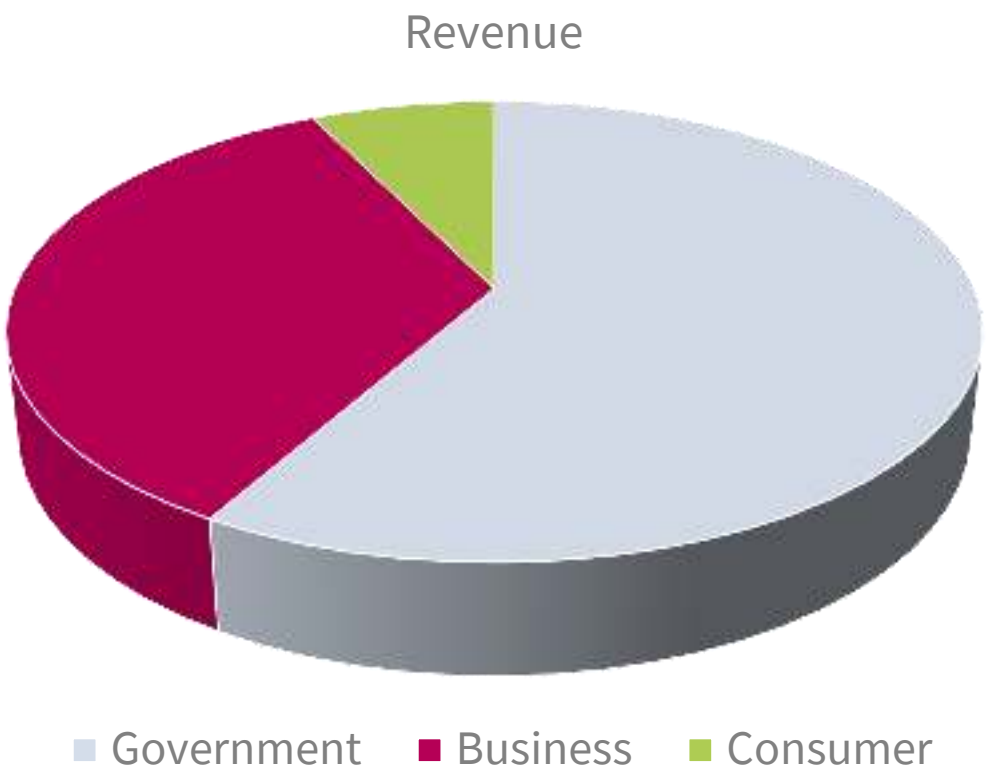
Capture Data
Multi source
Multi format

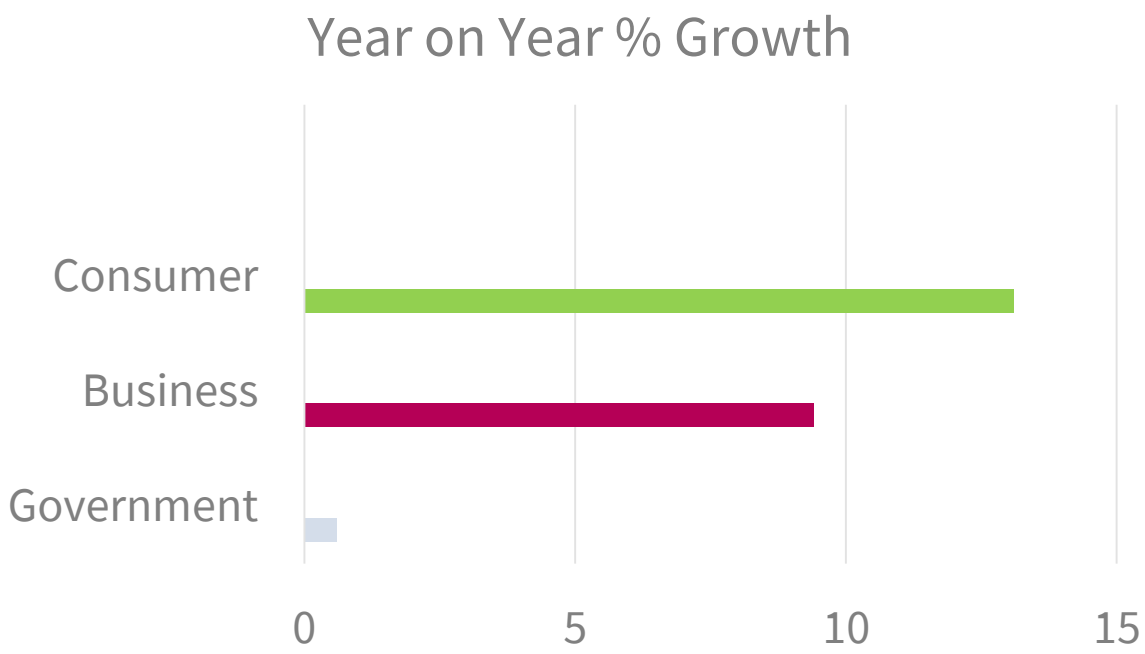
Agile Architecture
Interoperable
Maintained

Optimised outputs
In whatever shape or form you need

Ordnance Survey

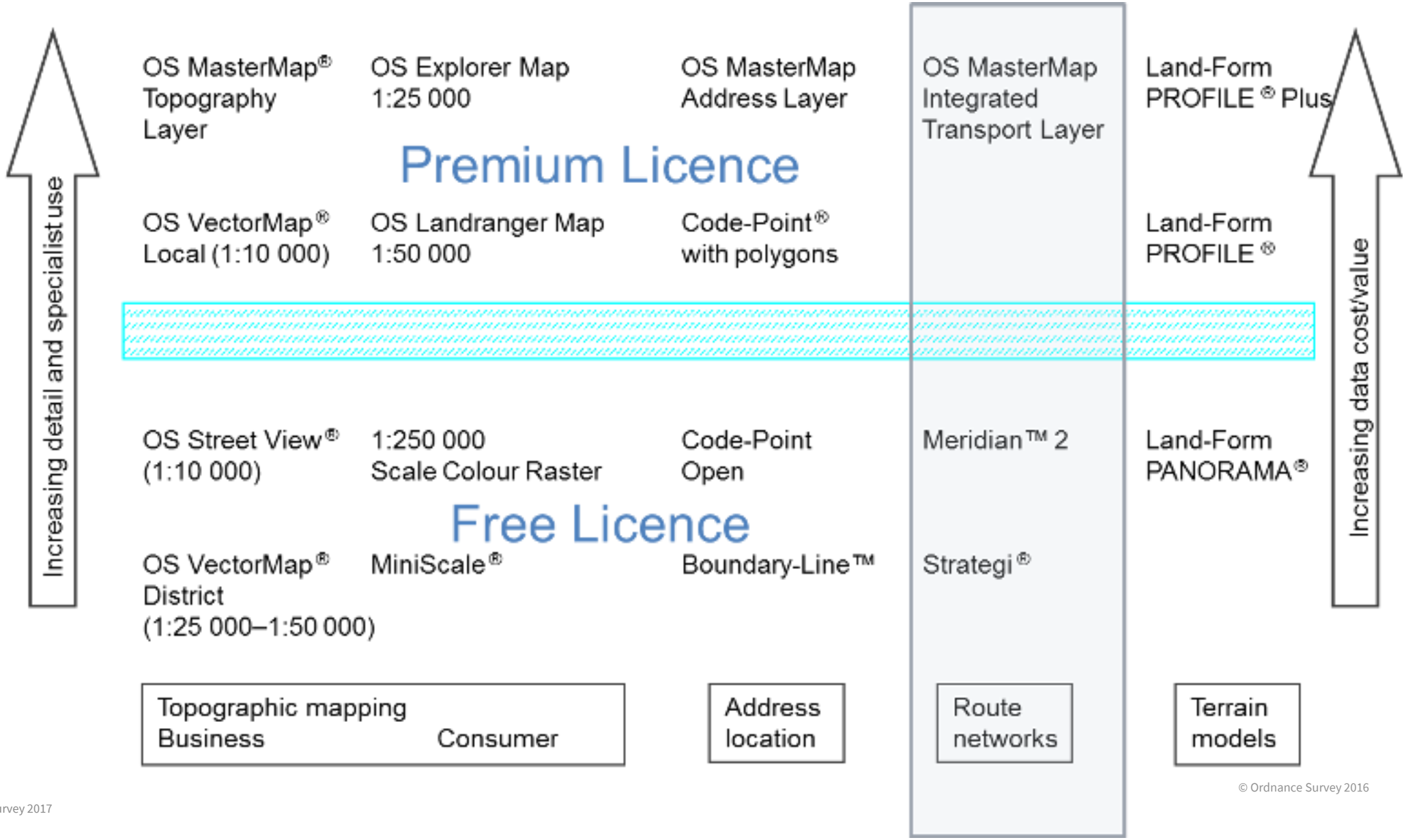
Ordnance Survey Revenue analysis (2016)





Government includes payment for open data
Only 6% is from paper maps, the rest is geospatial data

Data licences: UK *freemium* business model



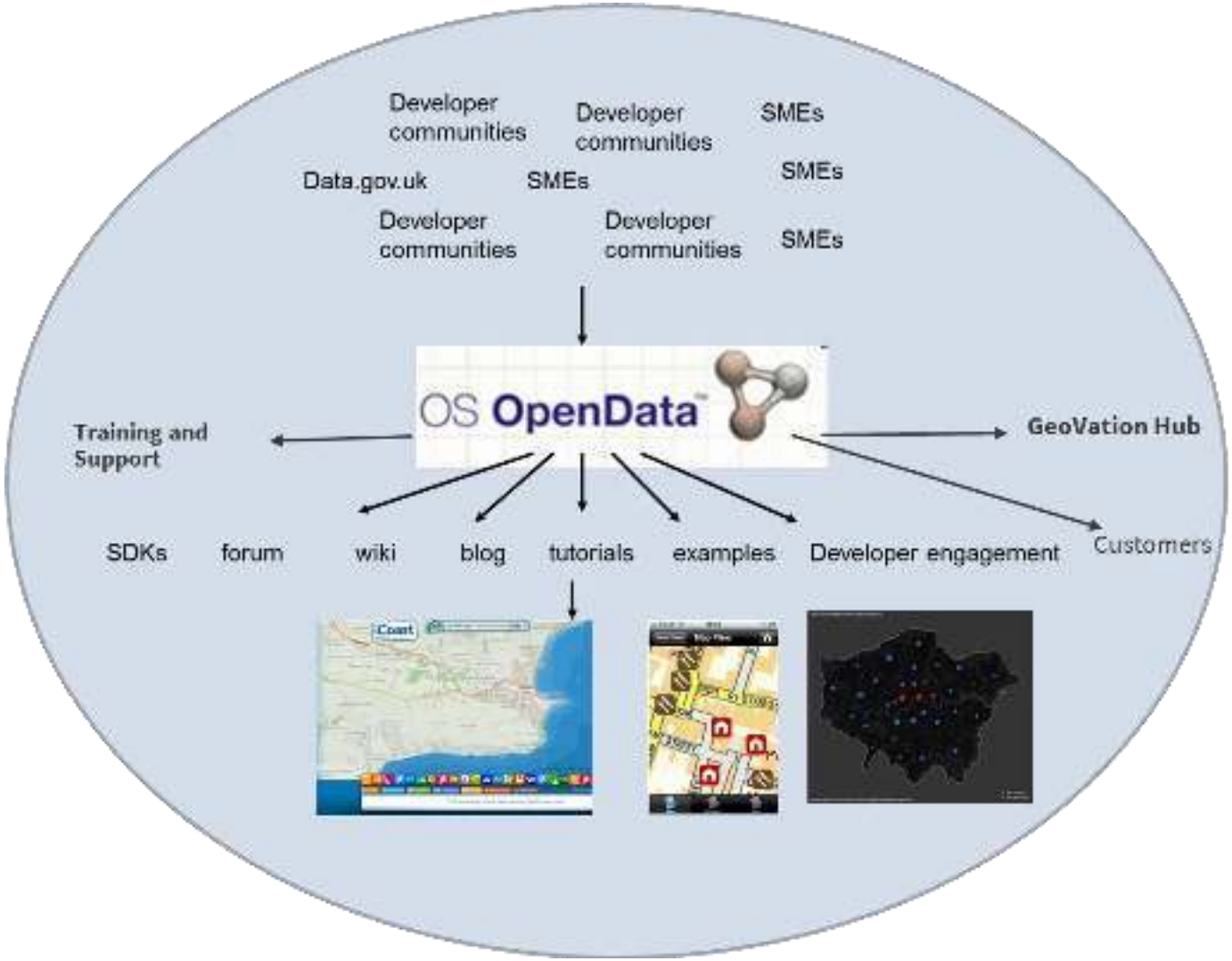
UK – Budget Announcement Wednesday

"The UK has some of the best geospatial data in the world, and much of it is held by public bodies. The potential economic value of this data is huge. To **maximise the growth of the digital economy** and consolidate the UK's position as the best place to **start and grow a digital business**, the government will establish a new Geospatial Commission to provide strategic oversight to the various public bodies who hold this data. **To further boost the digital economy, the government will work with the Ordnance Survey (OS) and the new Commission, by May 2018, to establish how to open up freely the OS MasterMap data to UK-based small businesses** in particular, under an Open Government Licence or through an alternative mechanism, while maintaining the OS's strategic strengths. The Budget provides £40 million a year over the next two years to support this work."

Open Data Ecosystem

“To grow the Opendata community there needs to be support /encouragement, easy to use tools and leadership into what is achievable.

Simply put, this requires an understanding of the customer needs. And these are diverse, ranging from tech giants to the individual citizen”



Simply removing the price-tag doesn’t create useful open data

Ordnance Survey International

Ethiopia
Geospatial maturity assessment
Extractives advice
Oman
Addressing business case
National policy
Namibia
Pre feasibility study for Land and Geospatial enhancements
Rwanda
Advisory on improving geospatial as part of Land programme
Tanzania
Training and National policy review
Singapore
Advanced 3D data model advice
Bahrain
Strategy
Underground Utilities

Supporting Business Innovation

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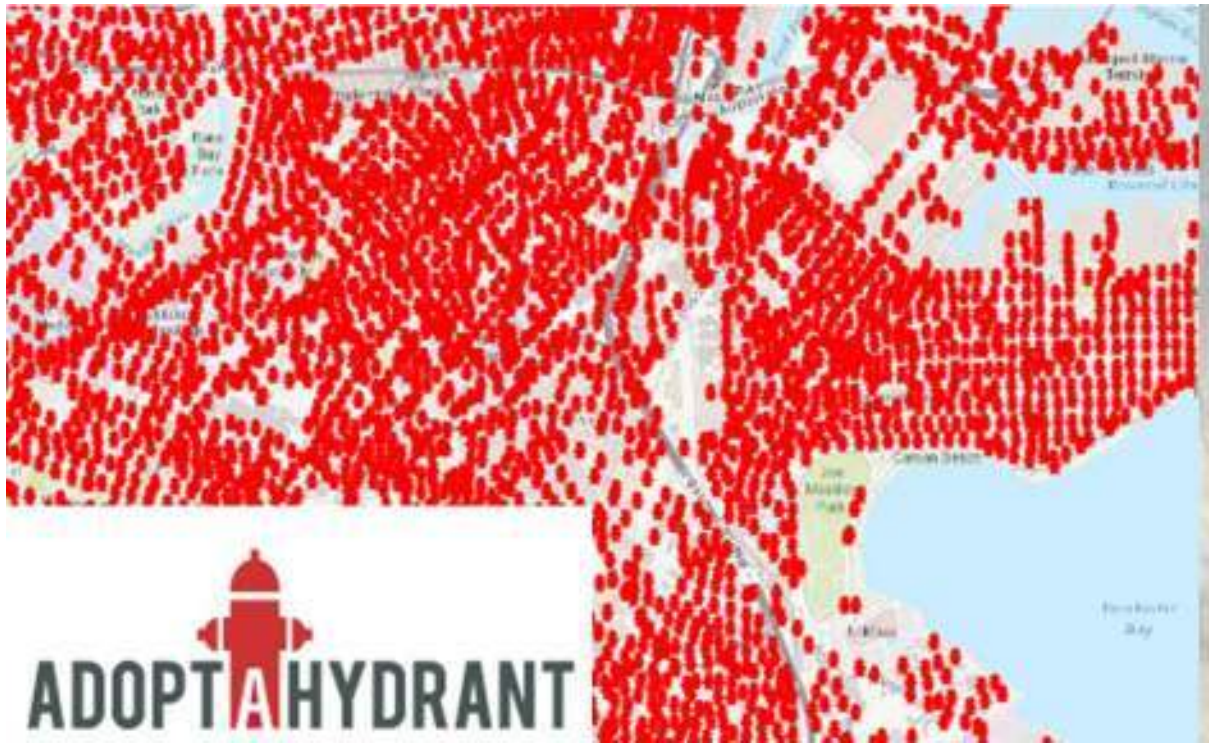
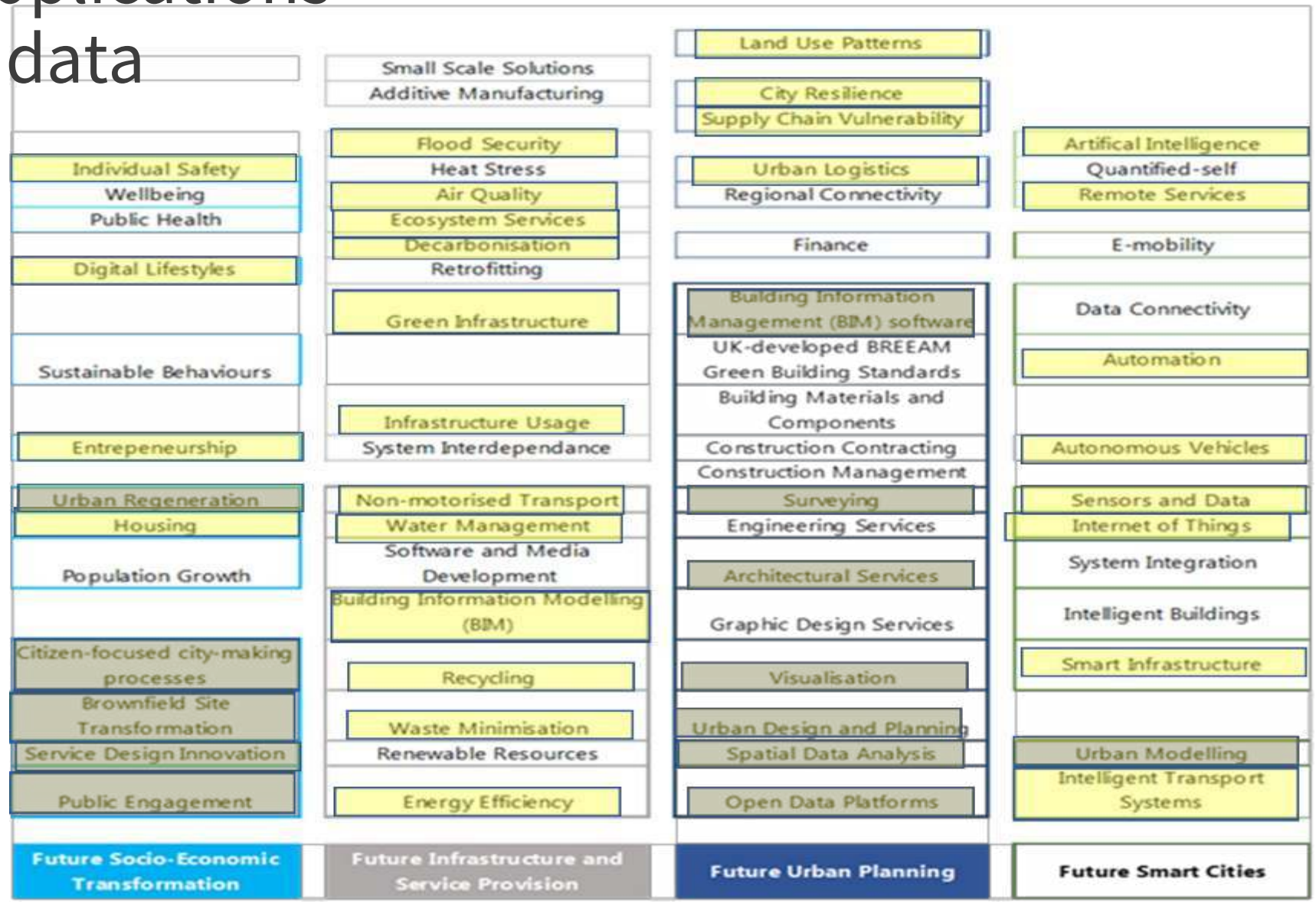
Unleash the crowd
– and the internet of things

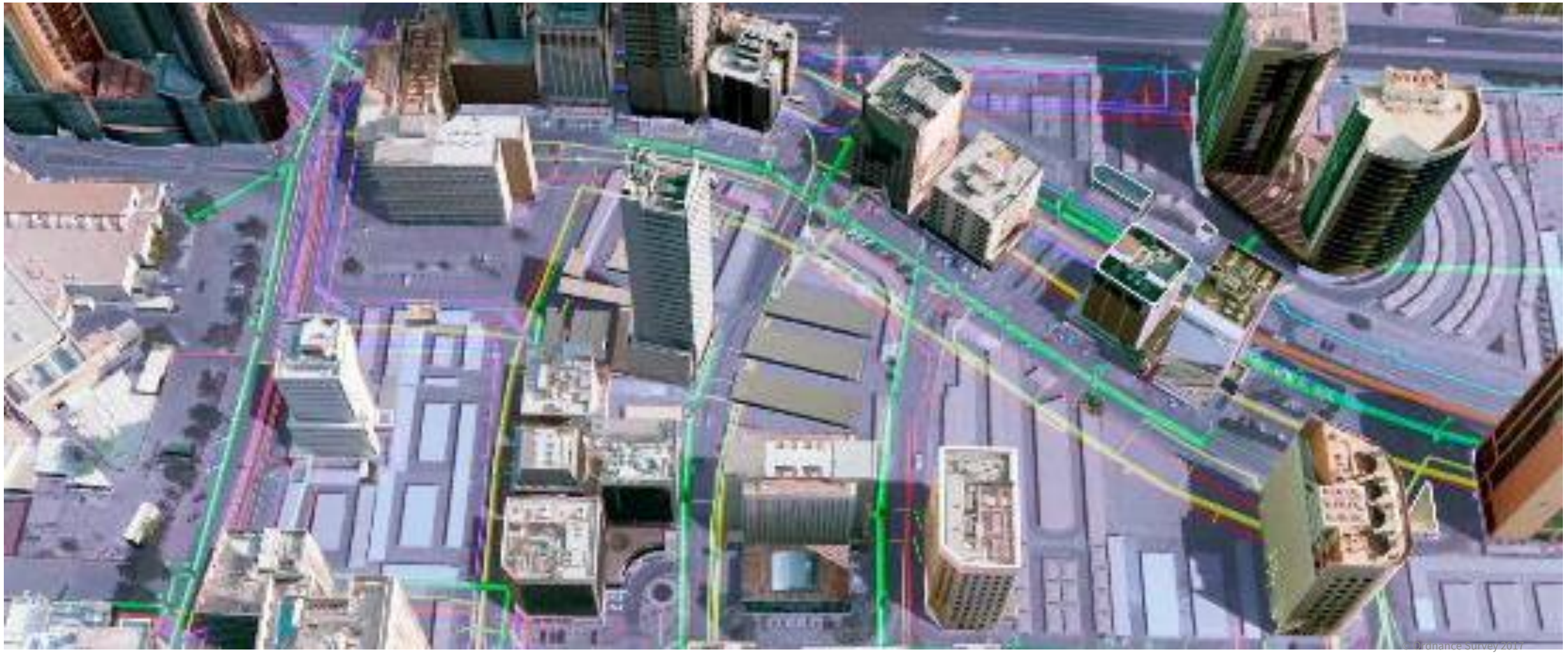


Future Cities applications use geospatial data



Mobility in 4 dimensions

a 4D model – from drones to metro, day to night




LORDS

Because our world is changing

Moving from maps to data, we **all** need:

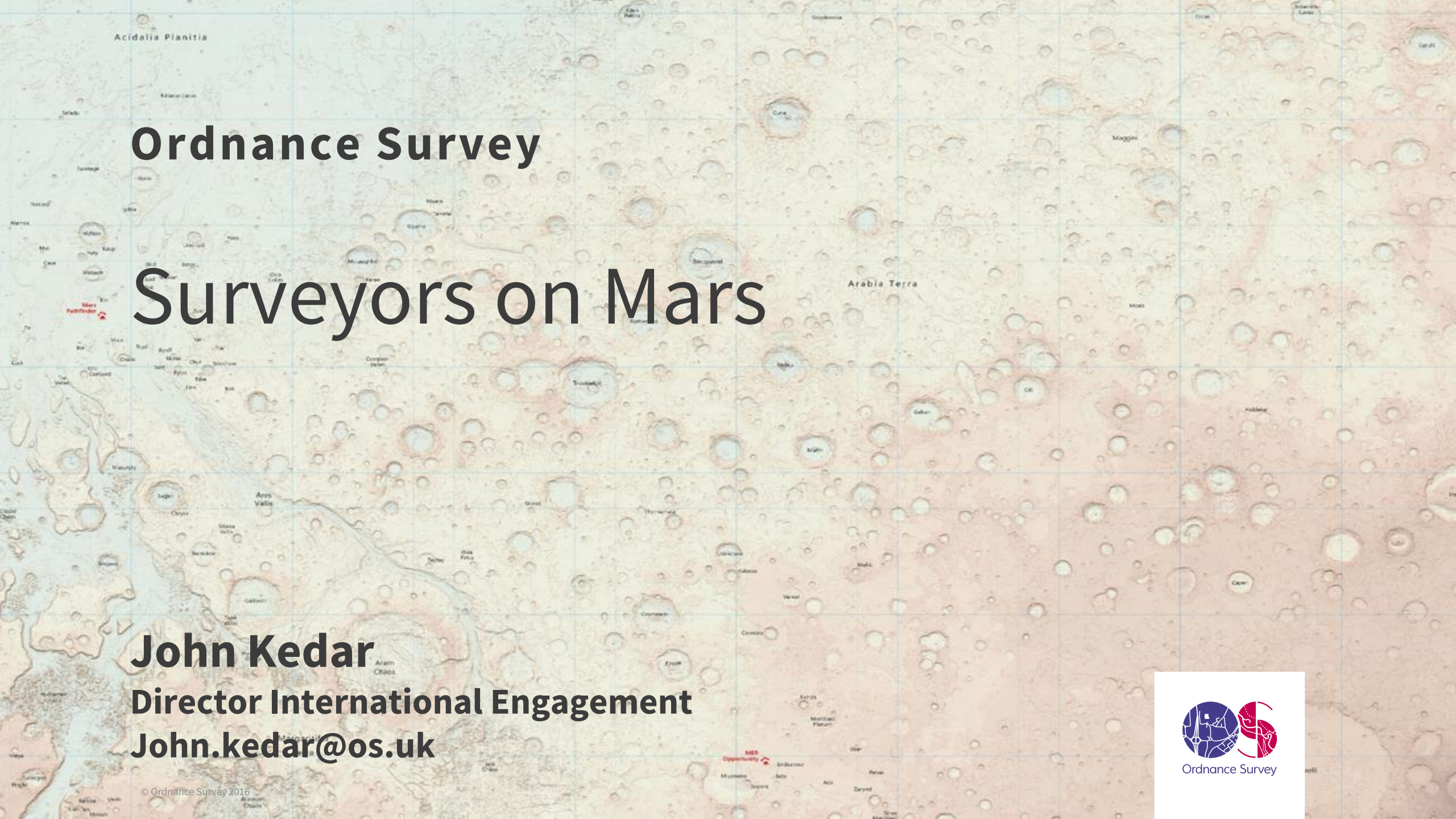
- Improved accuracy
- Faster operations
- Higher quality
- Greater quantity
- Lower risk
- More answers

It's all about trusted data.

Ordnance Survey

Do NMGAs have a future?

- Increasing reliance on location is an opportunity.
- Culture of data sharing and collaboration
- Become the ‘go to’ authorities for fundamental geospatial data - authoritative, trustworthy and widely accessible.
- Lead the ecosystem of data providers
- Data brokers as well as collectors, managers, SDI authorities, service providers/service consumers.
- Be close to our customers; focus on citizen’s needs.
- Assist users gain value and solve their problems
- Capacity building v technology change. Can managed services help?



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