ORDNANCE SURVEY

Disruptive Technology

Future trends in geographic information management: the five to ten year vision

Rollo Home, Ordnance Survey

VERSION 0.1


-2.329799, -52.014884

http://ggim.un.org/UN-GGIM-resource-documents/

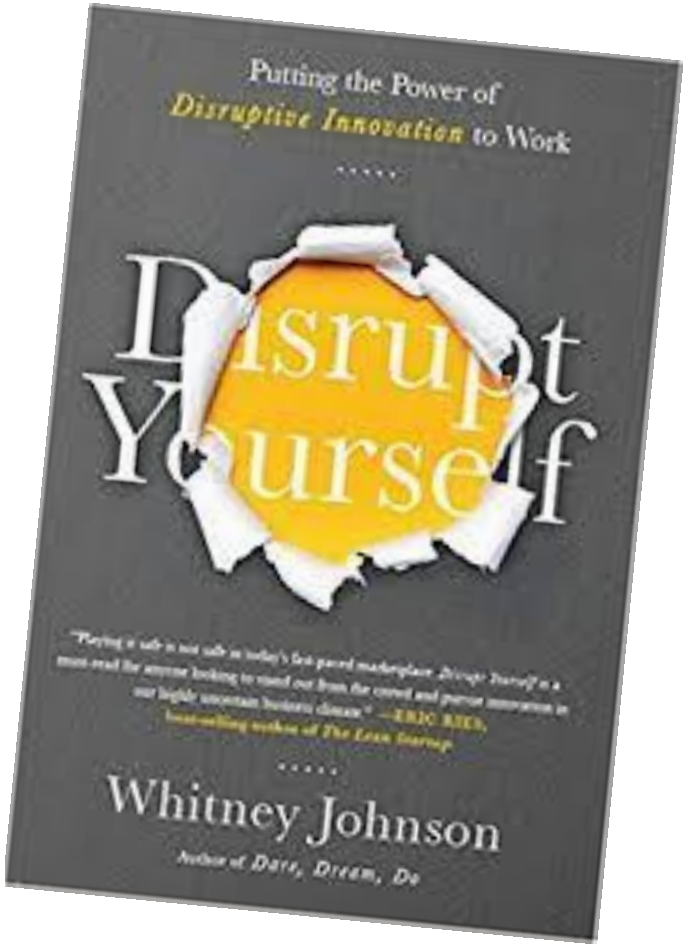
“Nuclear powered vacuum cleaners will probably be a reality within 10 years.”

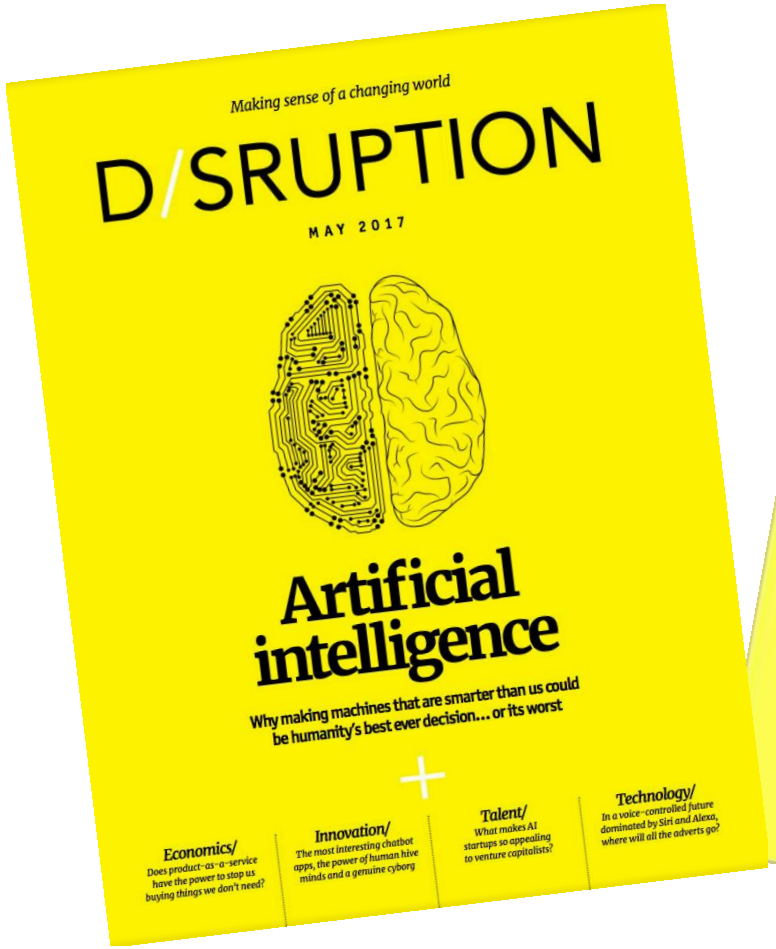
Alex Lewyt, President of Lewyt Vacuum Cleaner Company, 1955

“Before man reaches the moon, your mail will be delivered within hours from New York to Australia by guided missiles. We stand on the threshold of rocket mail.”

Arthur Summerfield, U.S. Postmaster General, 1955


3D
4D
Starting point from prediction





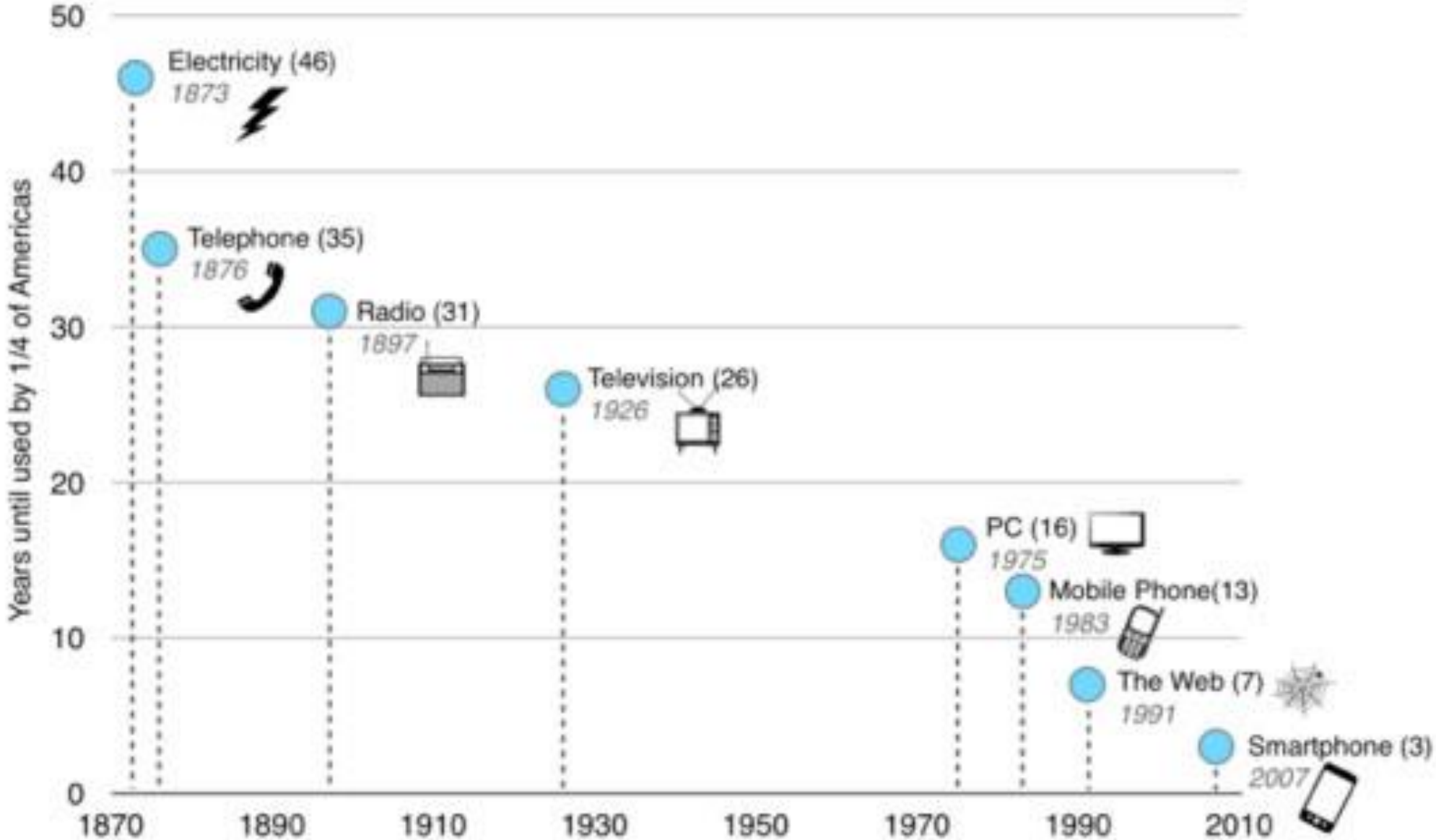
Something
(an event, technology)

that displaces something else
(a process, system,
technology, business model)

with something more
worthwhile

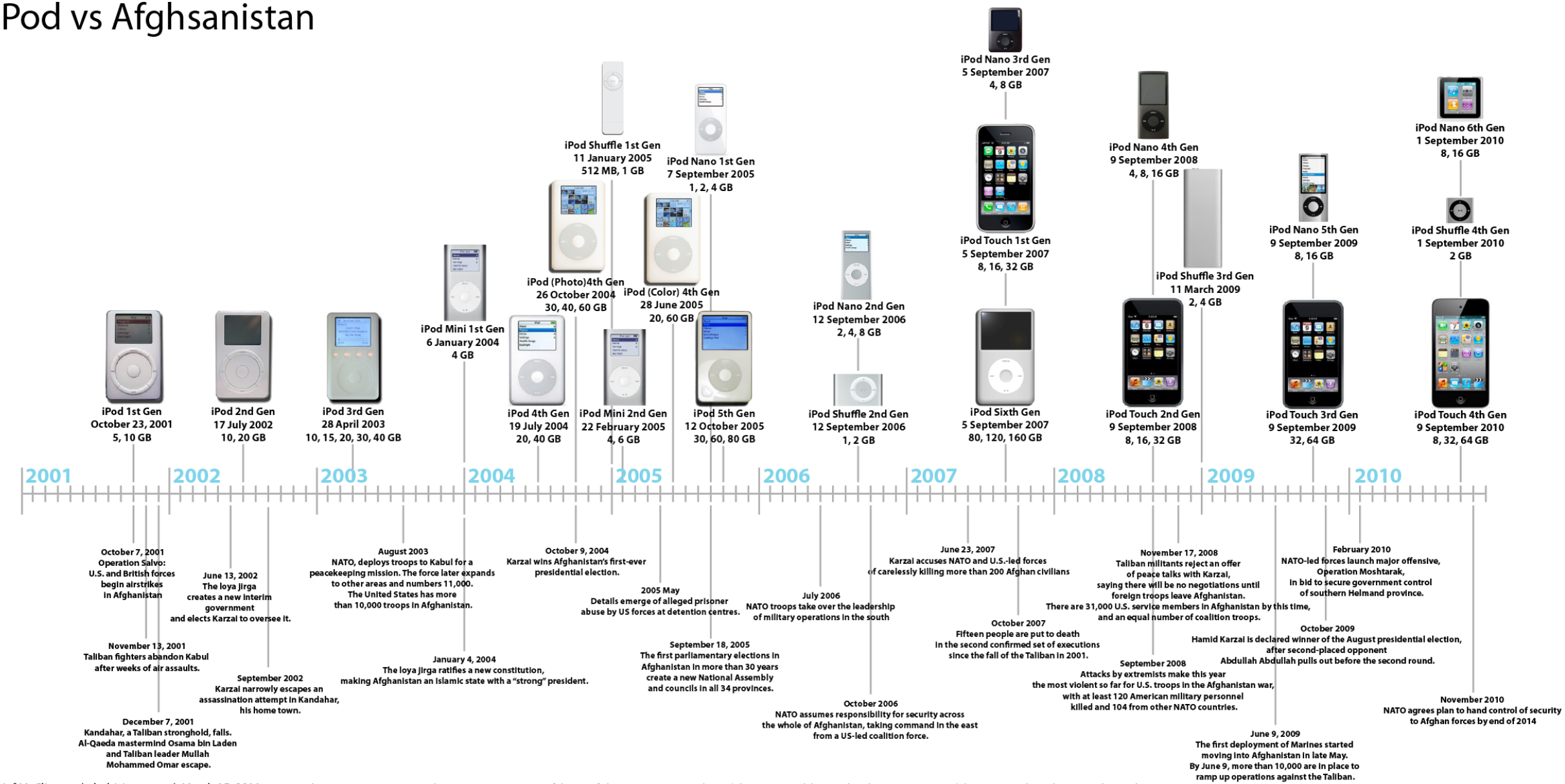
Technology Adoption

Years until technology is used by one-quarter of American Population



Source: Singularity.com and Nielsen

iPod vs Afghsanistan

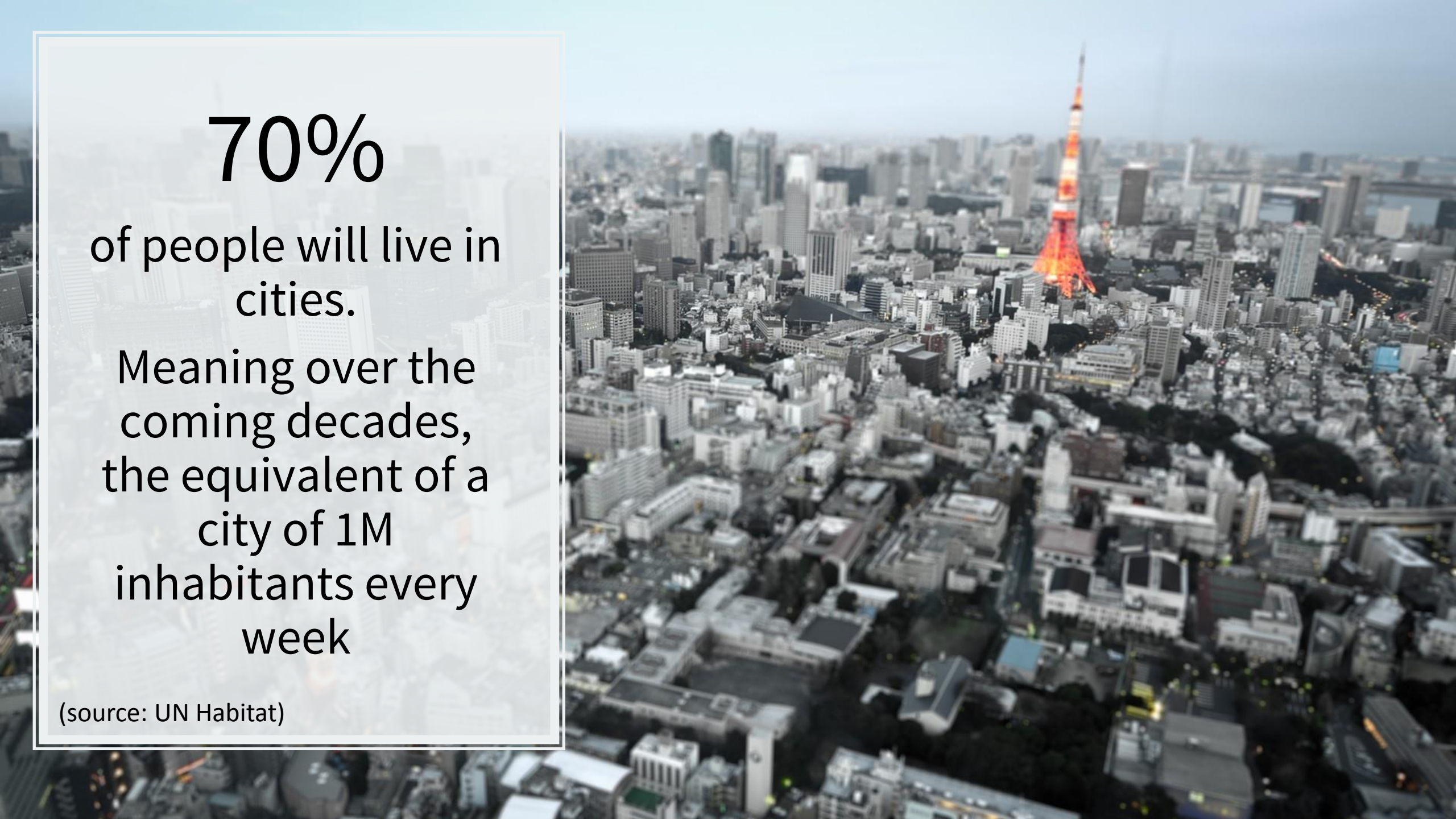


By Jef McClimans | thebizjam.com | March 15, 2011 Source: http://www.signonsandiego.com/news/2010/feb/13/afghanistan-war-timeline/ | http://news.bbc.co.uk/2/hi/1162108.stm | http://en.wikipedia.org/wiki/IPod

By 2050 the world population will have increased by

2 billion

(source: OECD environmental outlook 2050)



70%

of people will live in cities.

Meaning over the coming decades, the equivalent of a city of 1M inhabitants every week

(source: UN Habitat)

The number of people over 80 will reach

400M

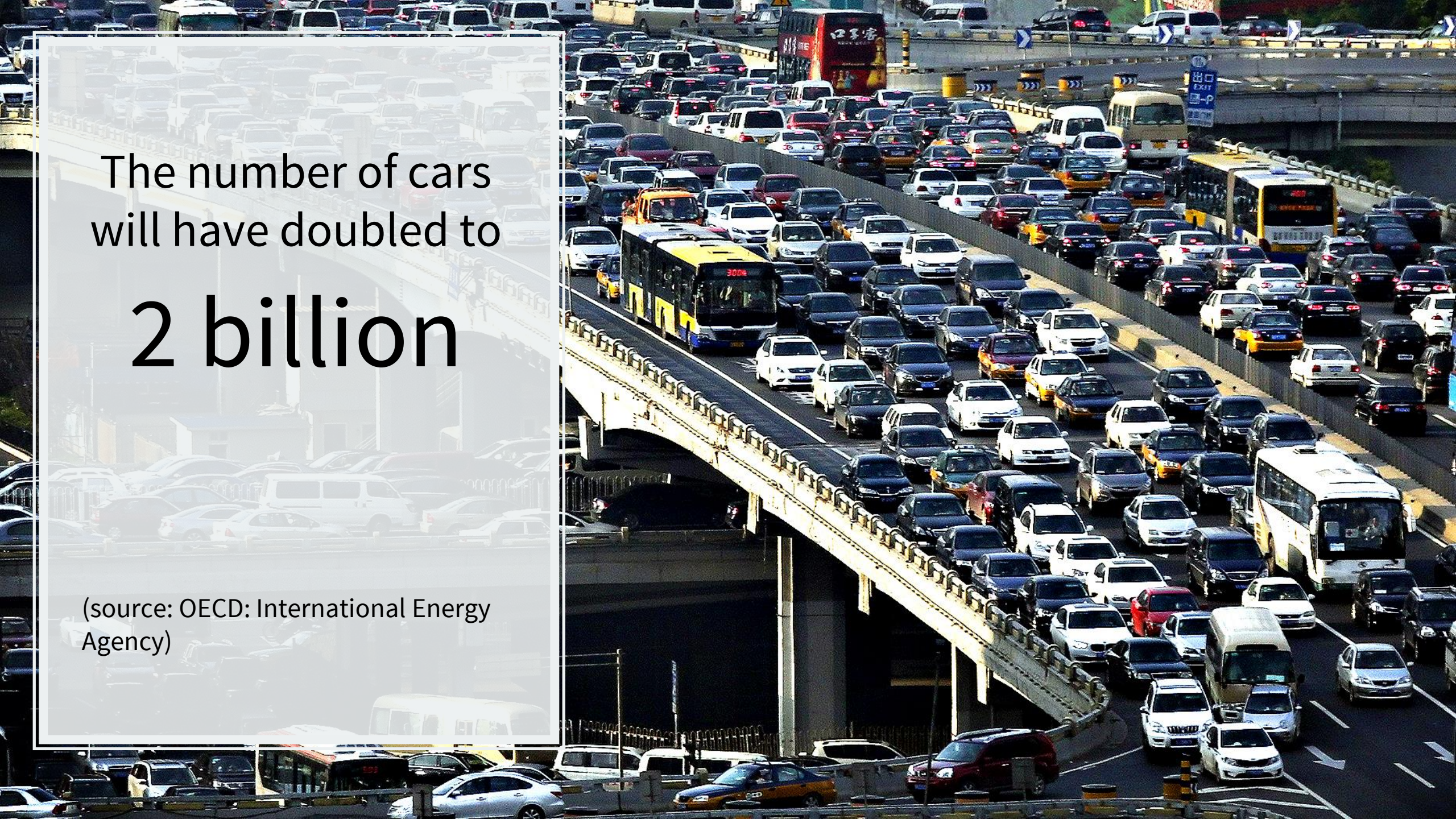
(source: WHO)

There will be over

150M

climate change refugees du to the rise in sea level.

(source: International Organisation for Migration)



The number of cars will have doubled to

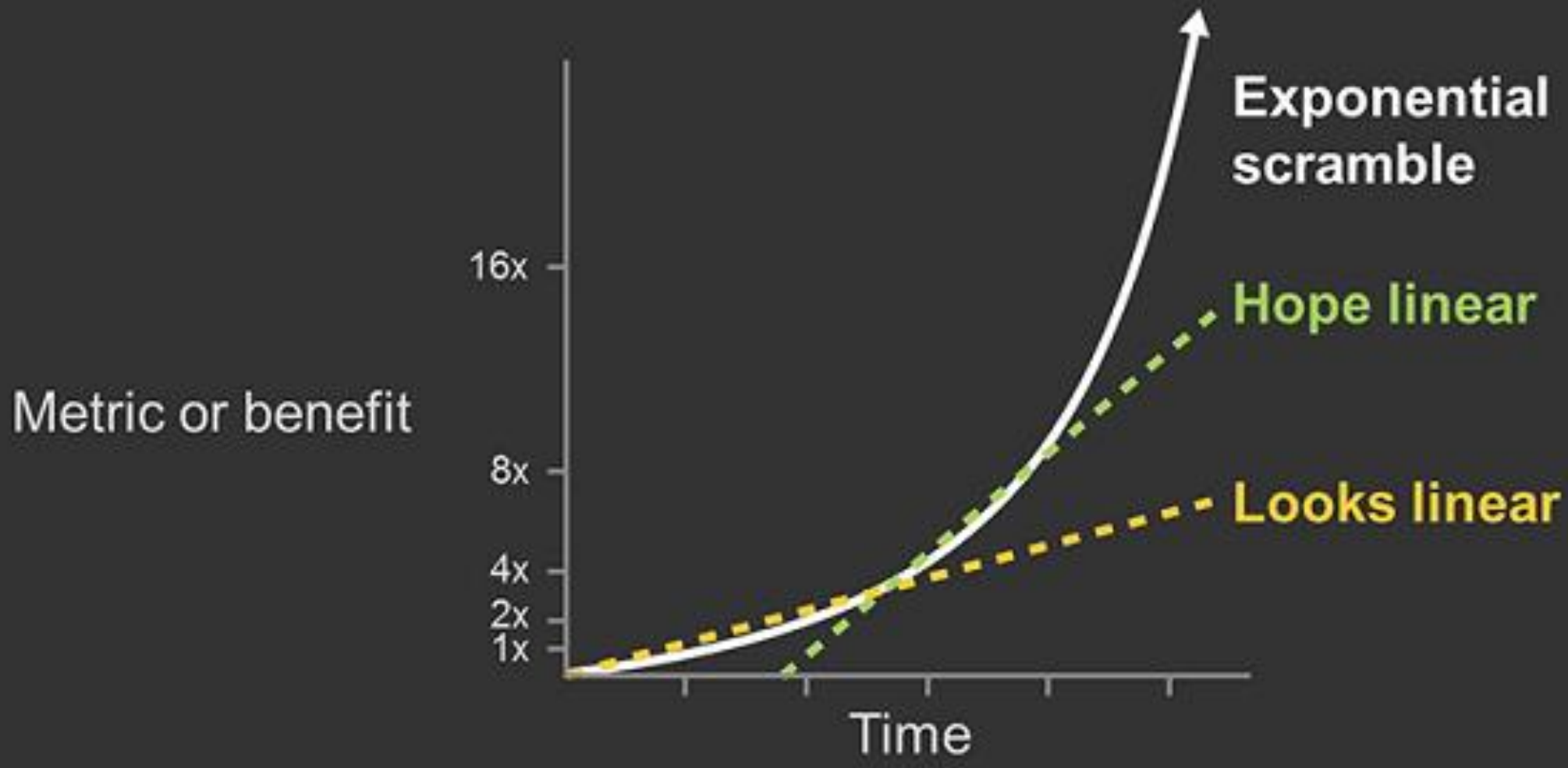
2 billion

(source: OECD: International Energy Agency)


THIS STORE
IS NOW
CLOSED
Buy on-line
www.hellbeds.co.uk
Or on the phone
08448 80 60 70


Search
20:10

The deceptive nature of exponential change



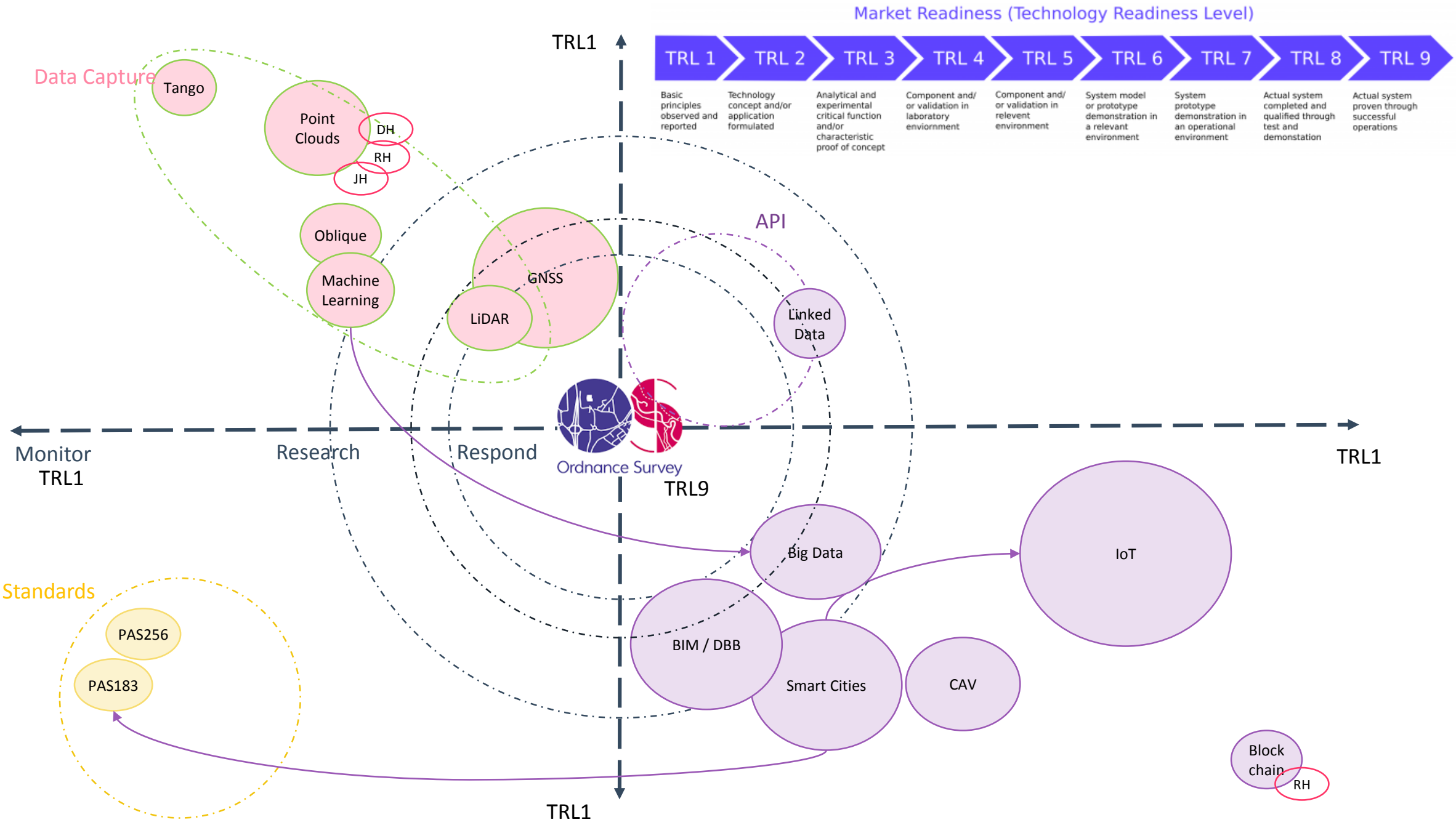
Source: Upcoming "Move Your Big Data Into The Cloud" report

Staying ahead of the curve:

Rising supply: 90% world data generated in past two years
Decreasing costs of storages and processing: stored & managed in the cloud

Business Model Disruption

- Data ‘sharing’ economy,
- machine to machine (M2M)
- New eco systems and data management
- From working silos to collaboration (Smart)
- Wider use of spatial data – from GIS to apps
- Product sell to answers to questions – value add


Market Readiness (Technology Readiness Level)
TRL 1
TRL 2
TRL 3
TRL 4
TRL 5
TRL 6
TRL 7
TRL 8
TRL 9
Basic principles observed and reported
Technology concept and/or application formulated
Analytical and experimental critical function and/or characteristic proof of concept
Component and/ or validation in laboratory enviornment
Component and/ or validation in relevent environment
System model or prototype demonstration in a relevant environment
System prototype demonstration in an operational environment
Actual system completed and qualified through test and demonstation
Actual system proven through successful operations
TRL1
Data Capture
Tango
Point Clouds
DH
RH
JH
Oblique
Machine Learning
GNSS
LiDAR
API
Linked Data
Monitor
TRL1
Research
Respond
Ordnance Survey
TRL9
TRL1
Big Data
IoT
BIM / DBB
Smart Cities
CAV
Standards
PAS256
PAS183
Block chain
RH
TRL1

Towards ‘Smart’

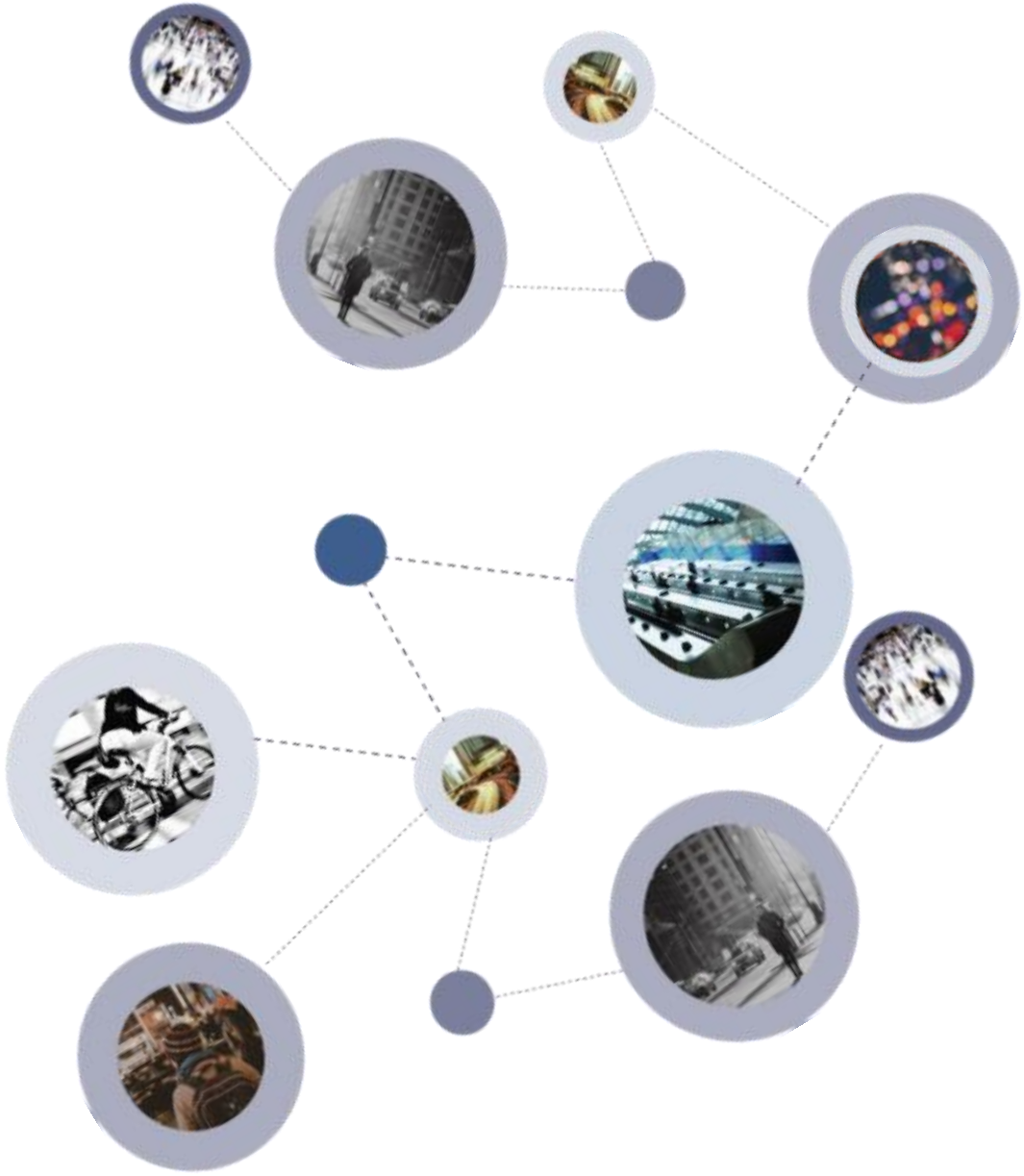
Done → Doing → Future

Smart Pilots - exploring the case for new data content in the **built environment, subsurface, supporting place making**

Enabling new technology to be more cost effectively implemented, maintained and to deliver an improved customer experience; specifically 5G, IoT and CAV

New business models – e.g. City Data Exchanges, Mobility as a Service

Places need an understanding of what is available and where they are starting from. We are evolving **city smart** packages of services



CityVerve

Done → Doing → Future

IoT demonstrator, Innovate UK part-funded, 20 strong consortium MCC leading
24 months duration, from 1st July 2016

Ordnance Survey will provide the
geospatial glue
Capturing new and **enhancing** existing content
API suite and **web services**
Research and analysis of content requirements, emerging technologies and systems
Geospatial platform of CityVerve activity, services and assets

Future Cities Pilot

Done → Doing → Future

Interoperability between city level and building level open standards
Provision of **better services** to citizens using shared data

Local and central govt. depts. sharing and **coordinating data** more effectively
Challenging silo mentalities in departments and groups

Developing insight and enabling more **effective decision making** with improved sharing and collaboration

OGC®
Making location count.

IGN
INSTITUT NATIONAL DE L'INFORMATION GÉOGRAPHIQUE ET FORESTIÈRE

Ajuntament de SantCugat

DIGITAL GREENWICH

Atlas/E-CAVE

Done → Doing → Future

Connected and Autonomous Vehicles feasibility study

Determine if mapping content is required to support autonomy and if so, the data model

How best will data be **served and shared**

Cloud based?

Onboard?

Vehicle to vehicle?

Evaluating the **creation of mapping** from on-board technology

Westfield Autonomous Vehicles - powered by Ordnance Survey

10 May 2018

Westfield Technology Group, a pioneering British vehicle manufacturer, and Ordnance Survey have signed a Memorandum of Understanding (MoU) to support future Autonomous Vehicle development.

The MoU will support a wider range of Autonomous Vehicle operations by improving access to detailed and accurate mapping. With a history of a strong working relationship, Julian Turner, Chief Executive Officer at Westfield Technology Group, said: "We're very excited about

LATEST NEWS

10 May 2018

Westfield Autonomous Vehicles - powered by Ordnance Survey

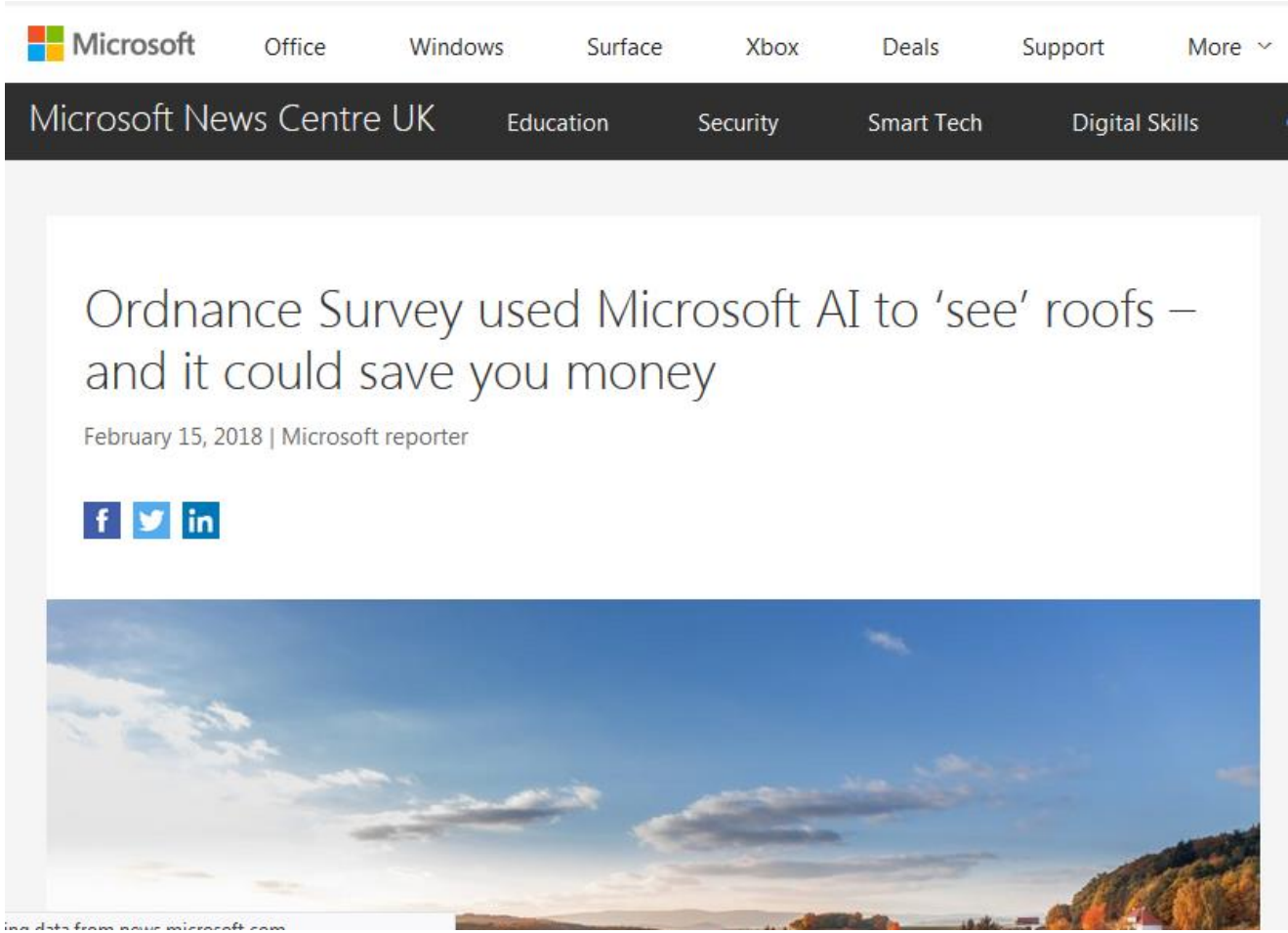
AI / ML

Done → Doing → Future

A deep learning programme in which OS are training a model on our **RGB imagery**, and using **MasterMap topography layer** as a highly detailed labelling method for the landscape.

To assist with:

- Mobile Mapping and automated feature extraction
- Rules based-classification: change detection, feature identifcation (roof models)



5G Planning

Done → Doing → Future

Planning tool to aid network operators to plan 5G rollout

5G is essential to enhance and support a **connected environment**
Develop a **3D test bed to** help simulate radio propagation
High frequency 5G can be affected by leaves on trees and atmospheric changes
Smart map of the future
OS data, meteorological data and radio spectrum data will be **interoperable**
Develop standards for future network planning

OS and BIM L3

Done → Doing → Future

Government-led national strategy

OS as **subject matter experts** for geospatial.

A geospatial ecosystem of **connected** data and content.

Virtual design through merging the inside/ outside/above/below world

Underpinned by a **Real World Object Model** – the **“digital twin”**

Supports and improves **connectivity and interoperability.**

THE GEOVATION HUB

Britain’s pioneering location-data lab.

Collaborate, exchange ideas, innovate and be inspired by access to world-leading geospatial data.

imagine. explore. create. discover.

Geovation Challenge: Underground Assets
https://geovation.uk/challenge/

Drivers for change to data

Driver:

- Infrastructure is becoming more complex
- Infrastructure costs are escalating, leading to complex ownership and supply chains
- Faster physical change: Infrastructure needs to be more flexible – life of assets will reduce (repurpose, rescope) to meet changing demand. Faster construction practices.
- Dynamic pricing for infrastructure (road tolls, train tickets).
- Need to balance more factors: environmental, economic, social, technology (hyperloop?)

Data Response:

- Sensed data: more abundant & timely data is a key component to managing assets effectively
- Open sharing of data across stakeholders (IP will fade)
- Higher currency, additional attribution of function of assets (3rd party integration: data eco-systems)
- Real time data integration
- Need future scenarios for planning national infrastructure – requires more inputs (more complex system of system thinking)

Summary

- Change is constant: need to be constantly vigilant
- Don’t do it all yourself: find partners, work outside of your normal networks
- Need to focus efforts (or it will consume all your resource!): meet the user requirement (don’t assume users are happy with your offer)
- Manage change holistically: not as isolated projects (maximise the layering effect)
- Be open to ideas: especially those that challenge your thinking

Rollo Home
Senior Product Manager
Ordnance Survey

rollo.home@os.uk
@rollohome
www.os.uk