

# Space derived data: What next?

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**A collaborative, not-for-profit, partner driven,  
applied spatial research and innovation centre.**

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# Why do we exist and what do we do?

## Vision

We will be the spatial organisation of choice to lead, formulate, broker and deliver collaborative solutions with government, industry and universities.

## Technical capabilities

Geodesy

Positioning

Spatial data infrastructures

Analytics

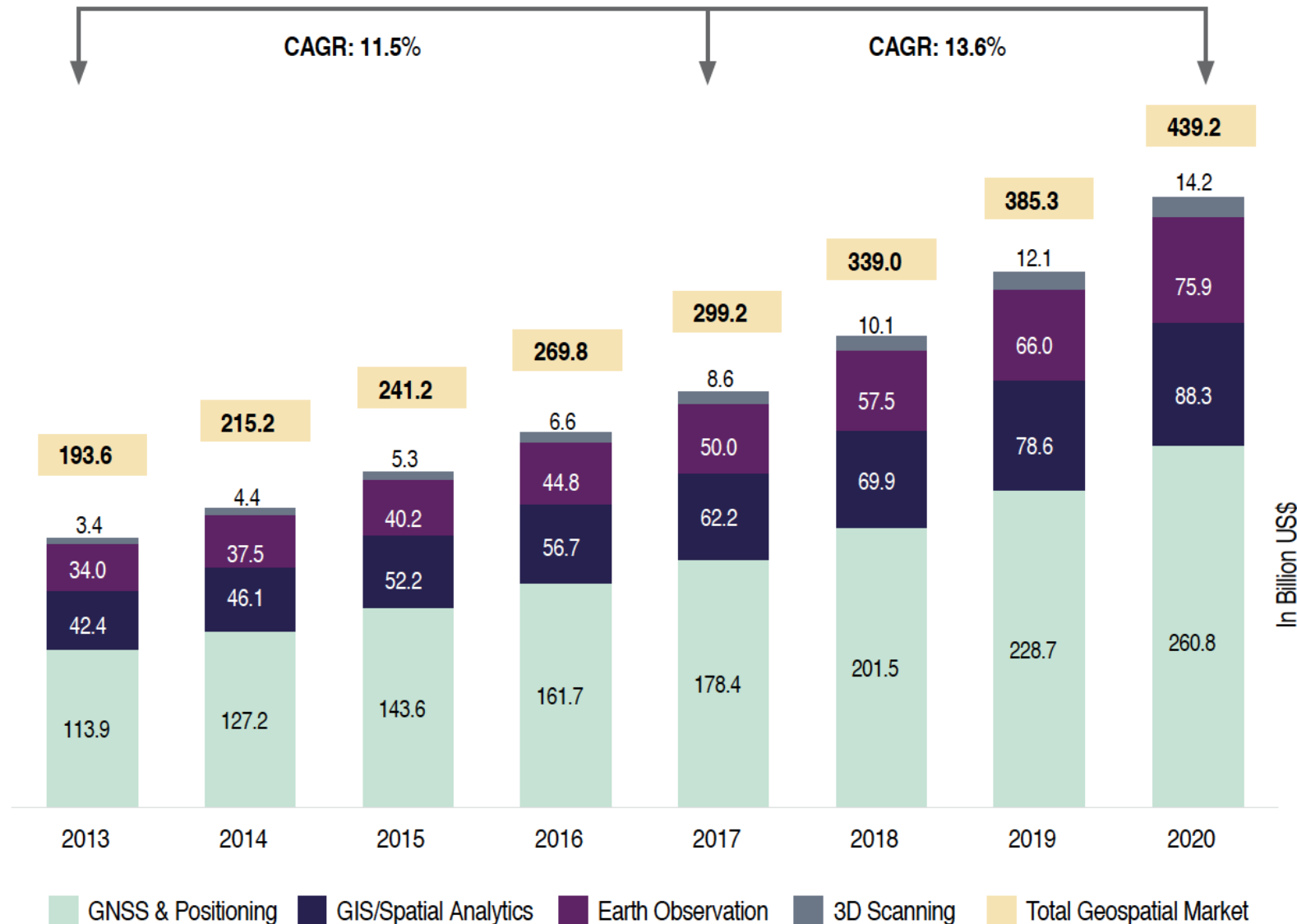
## Sectors

Transport (road, rail, maritime, aviation), resources, planning, construction, natural resources, defence, utilities, agriculture, health, government services



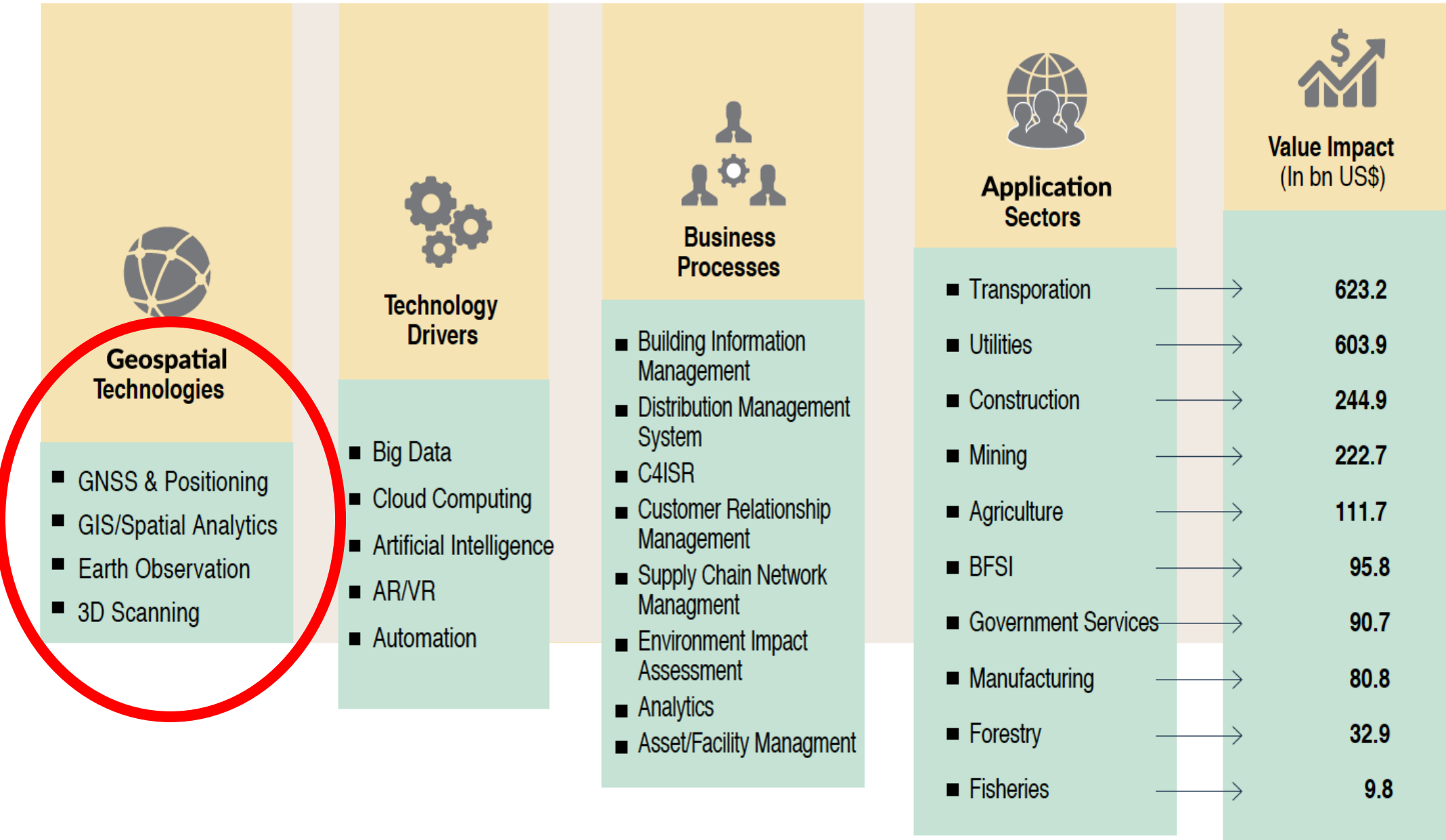
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# Global Geospatial Market Size (\$USB)



Source: Geospatial Media and Communications

# Creating High Value Impact



Source: Geospatial Media and Communications

# Geospatial Industry Data Sources

## GEOSPATIAL DATA

### Earth Observation

Space	SAR Satellites	Optical Satellites	Video Satellites
Aerial	Aircraft	Unmanned Aerial Vehicle	Balloon
	Camera, LiDAR		
Terrain	Static	Mobile	Handheld Devices
	LiDAR, Scanner, Total Stations		Mappers, Geo Taggers
Sub Surface	Ground Penetrating RADAR		Locator
Under Water	Submarine	Boat/Ship	Unmanned
	Bathymetric LiDAR, SONAR, Camera, Eco -Sounder		

## LOCATION DATA

### Outdoor Positioning/Navigation

Space	<b>Satellite-based Navigation Systems</b> (USA-GPS, EU-Galileo, Russia- GLONASS, China-BEIDOU, India-IRNSS)
	<b>Satellite-based Augmentation Systems</b> (India-CAGAN, VAS, IGNOS, MSAS, Japan-QZSS)
Terrain	<b>Ground-based Augmentation Systems</b> (RTK Stations, CORS Networks)

### Indoor Positioning/Navigation

Short-range Radio Technology (Ultra-Wide Band)
Magnetic Positioning
RFID
Indoor LiDAR/Scanner + Spherical Camera +SLAM
Blue Tooth Beacon
Wi-Fi and Cellular Signals
Camera Systems
SLAM

### Others Sources

Digital Transaction Data
Connected Devices/Sensors Data
Business & Operation Data
Census-Demography Data
Crowd Source Data

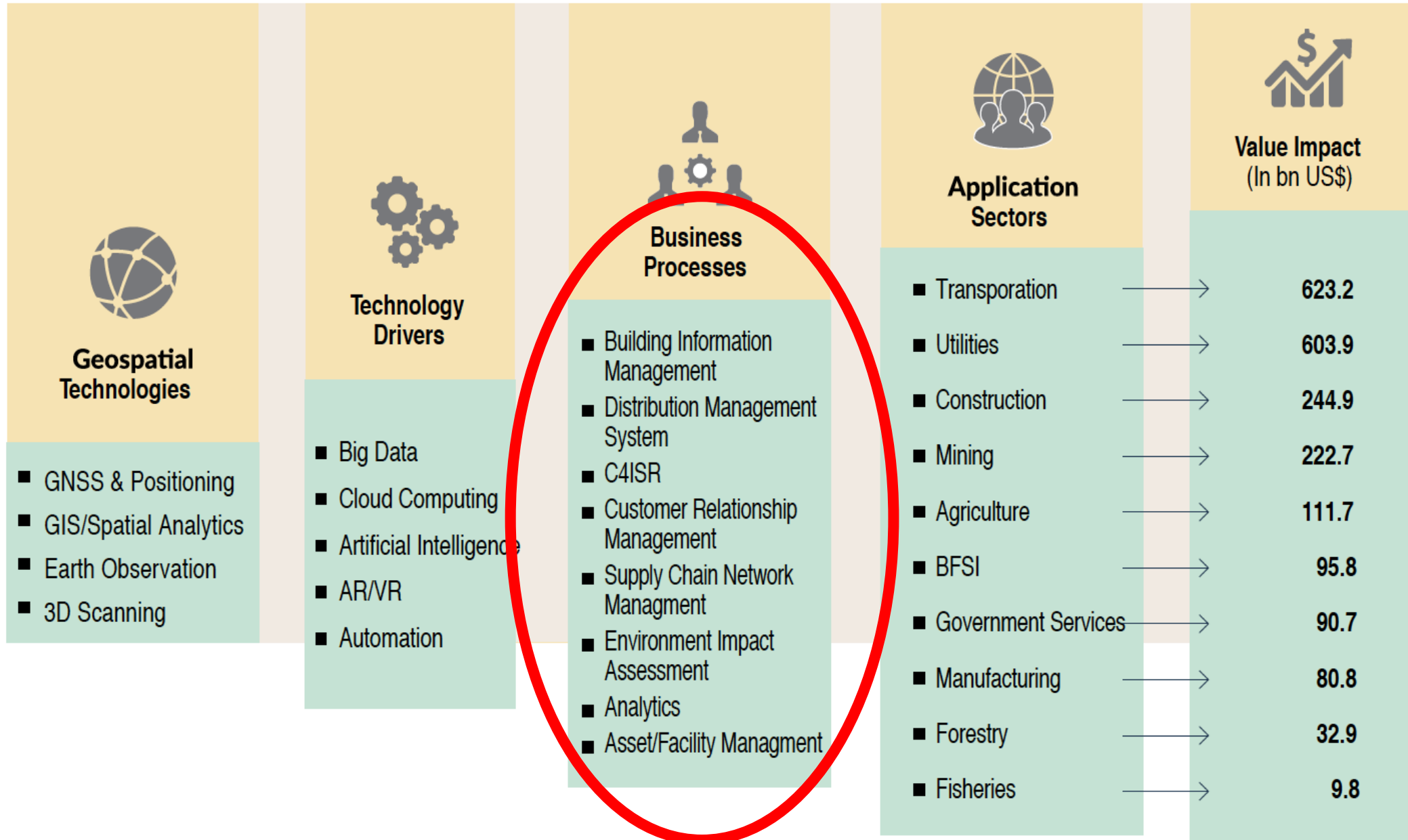


# Geospatial Technology Maturity



Source: UK Geospatial Commission Future Technologies Review September 2019

# Creating High Value Impact



Source: Geospatial Media and Communications



# AI based object identification / classification



## Machine Extraction

**CPU time:** 15min

Machine Learning + LiDAR

**Human time:** 10min (1 person)



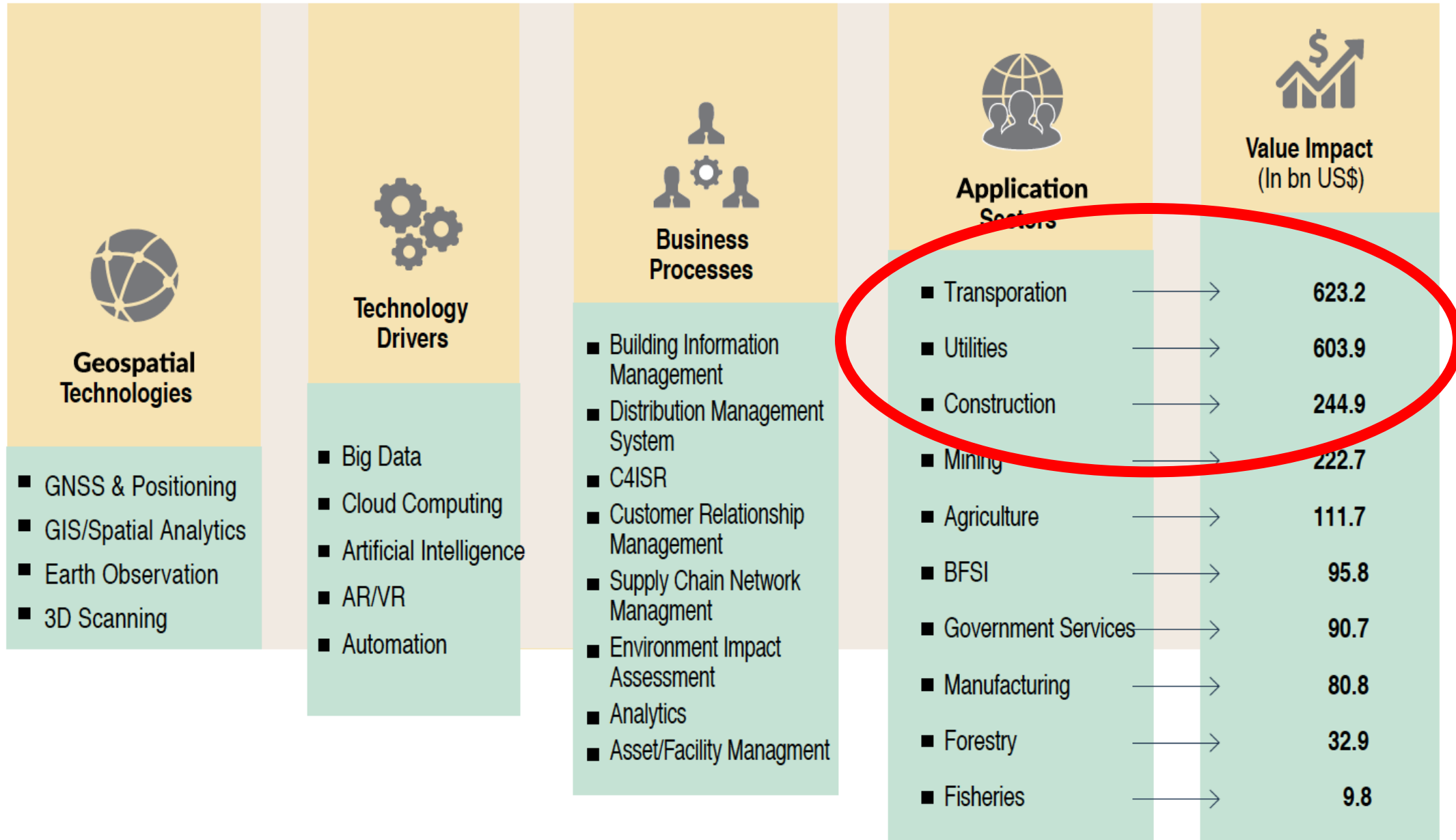
## Human Extraction

**Human time:** 14 Hours (1 person)

Number of trees 9,878



# Creating High Value Impact

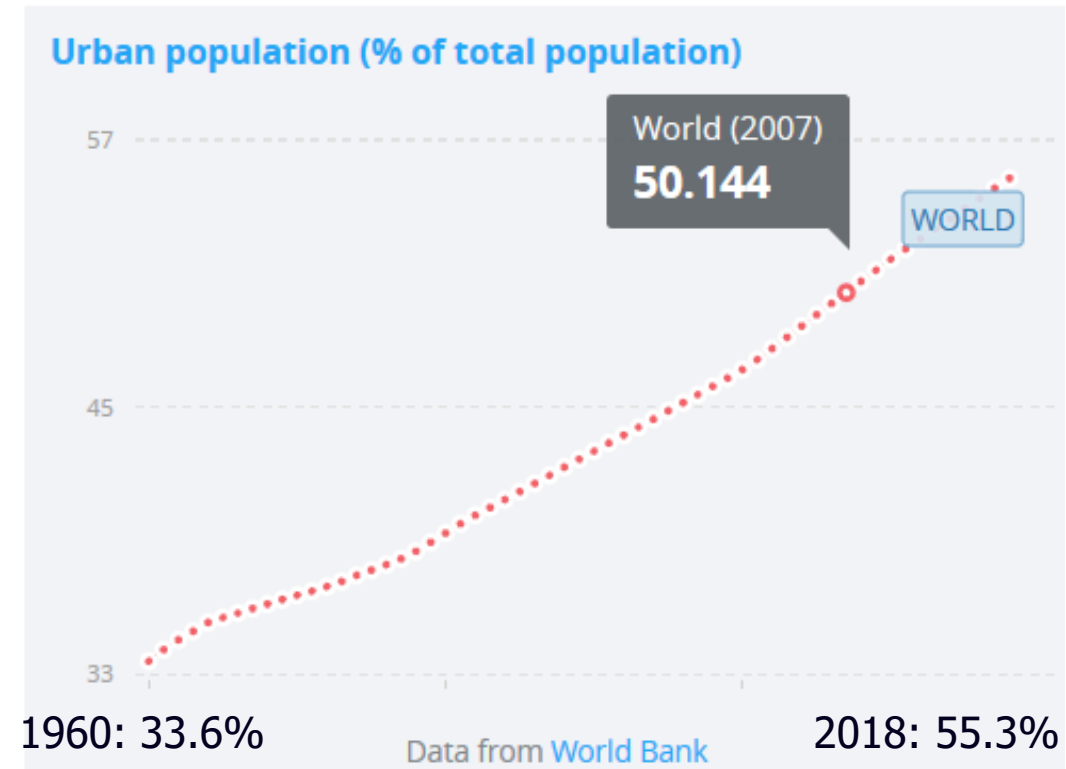


Source: Geospatial Media and Communications

# Urbanisation means more and improved infrastructure

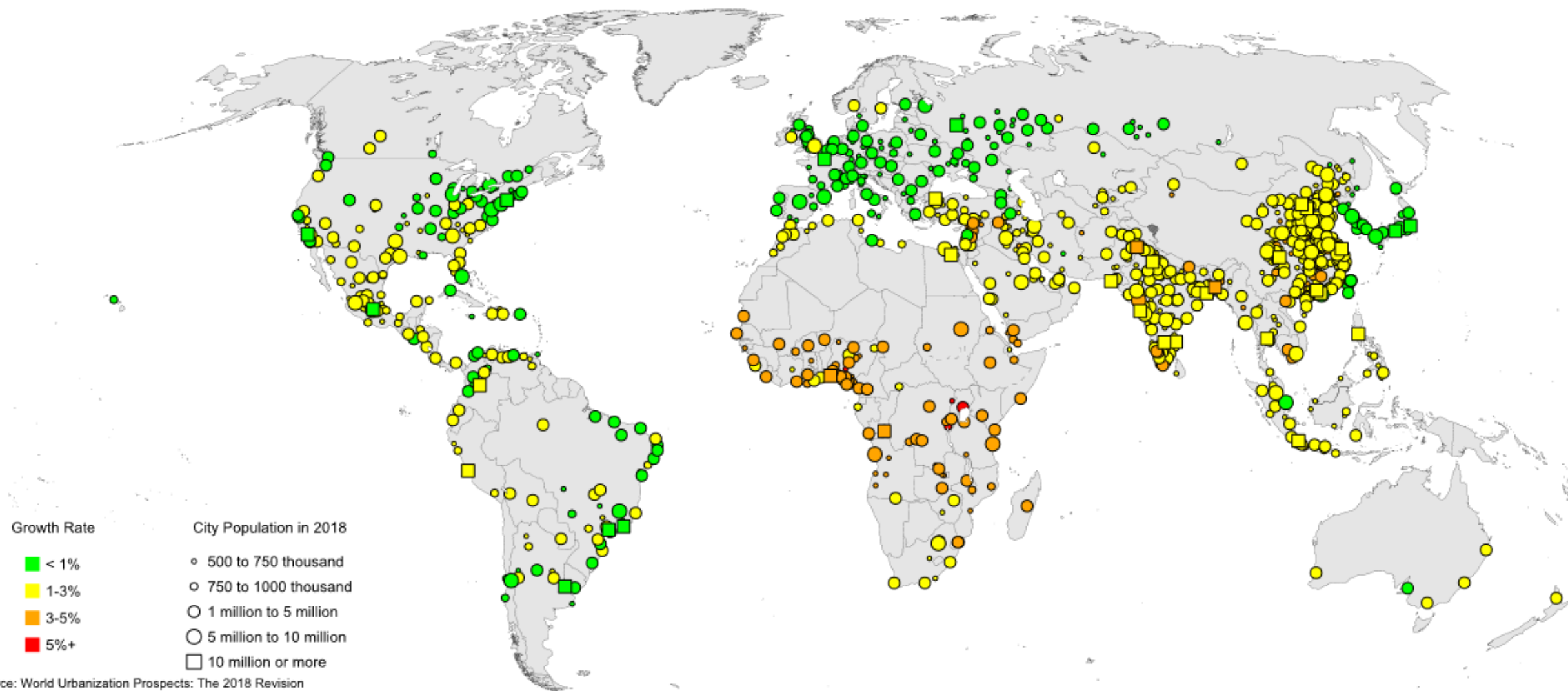
- From 751 million in 1950 to 4.2 billion in 2018, adding another 2.5B by 2050 (68% urbanized)
- = urban growth of 1.5m per week globally
- 80% of global GDP is now generated in urban areas

*“City leaders must move quickly to plan for growth and provide the basic services, infrastructure, and affordable housing their expanding populations need.”*



# Growth rates of urban agglomerations

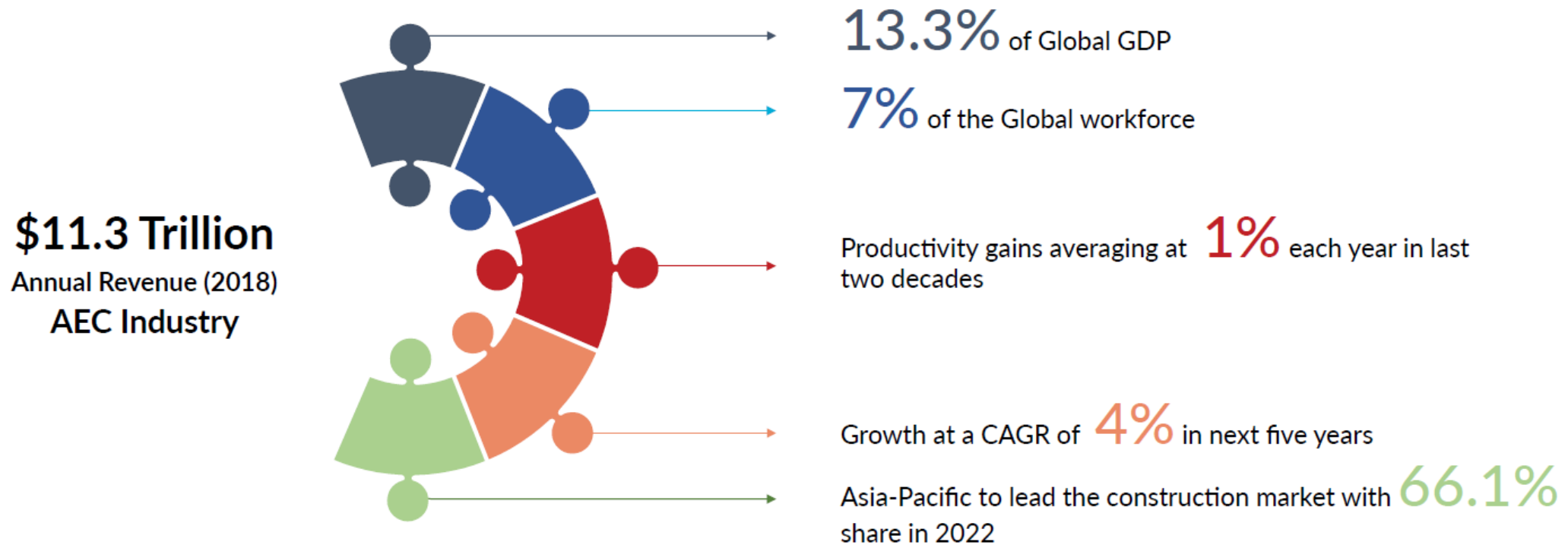
2018-2030



Data source: World Urbanization Prospects: The 2018 Revision



# Architecture, Engineering & Construction

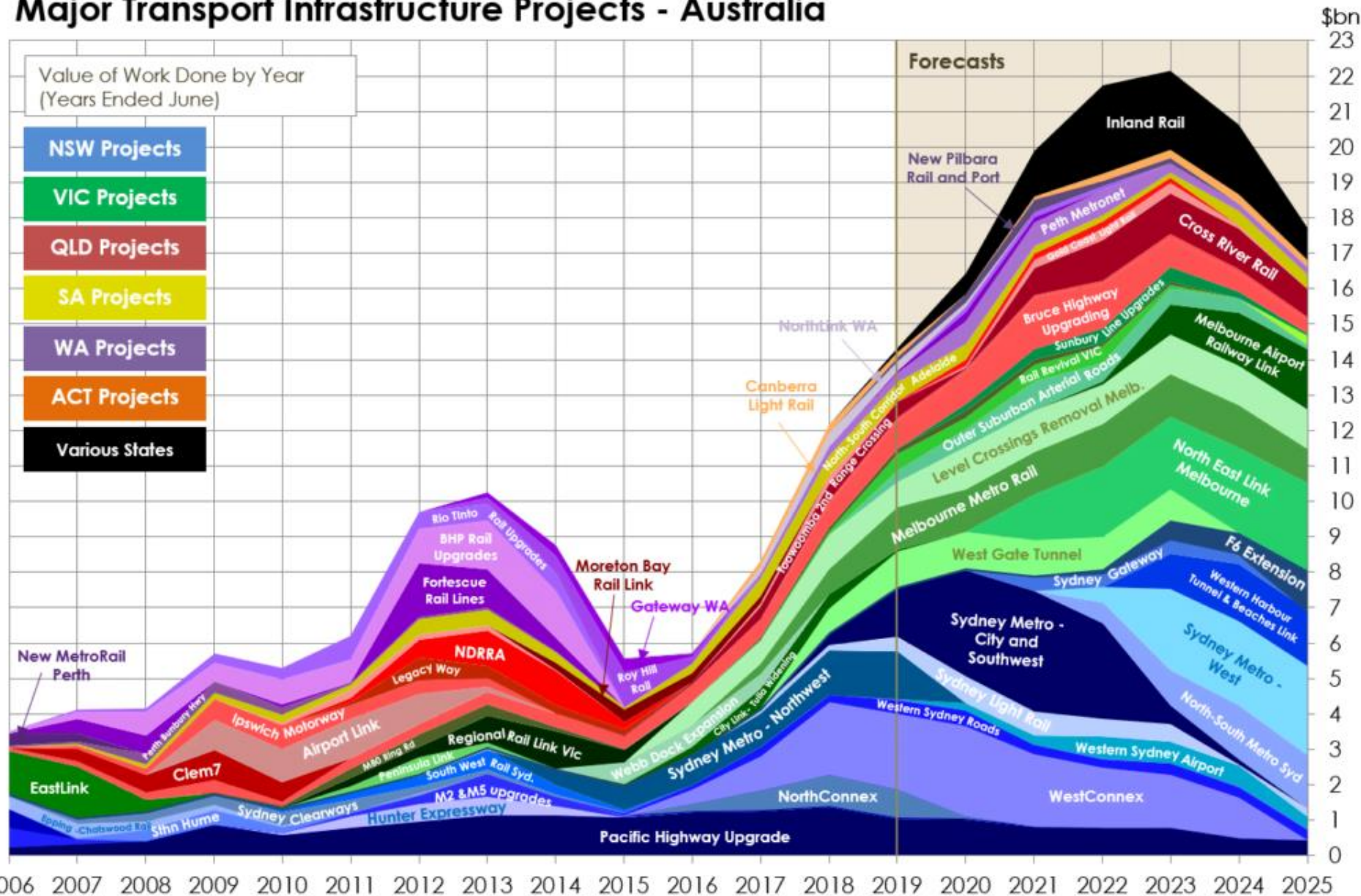


Source: Geospatial Media and Analysis

Source: Geospatial Industry Outlook & Readiness Index 2019 - Geospatial Media and Communications

# Infrastructure growth in Australia

## Major Transport Infrastructure Projects - Australia



Source:  
<https://macromonitor.com.au/australian-construction-outlook-overview/>



# Digital Twins

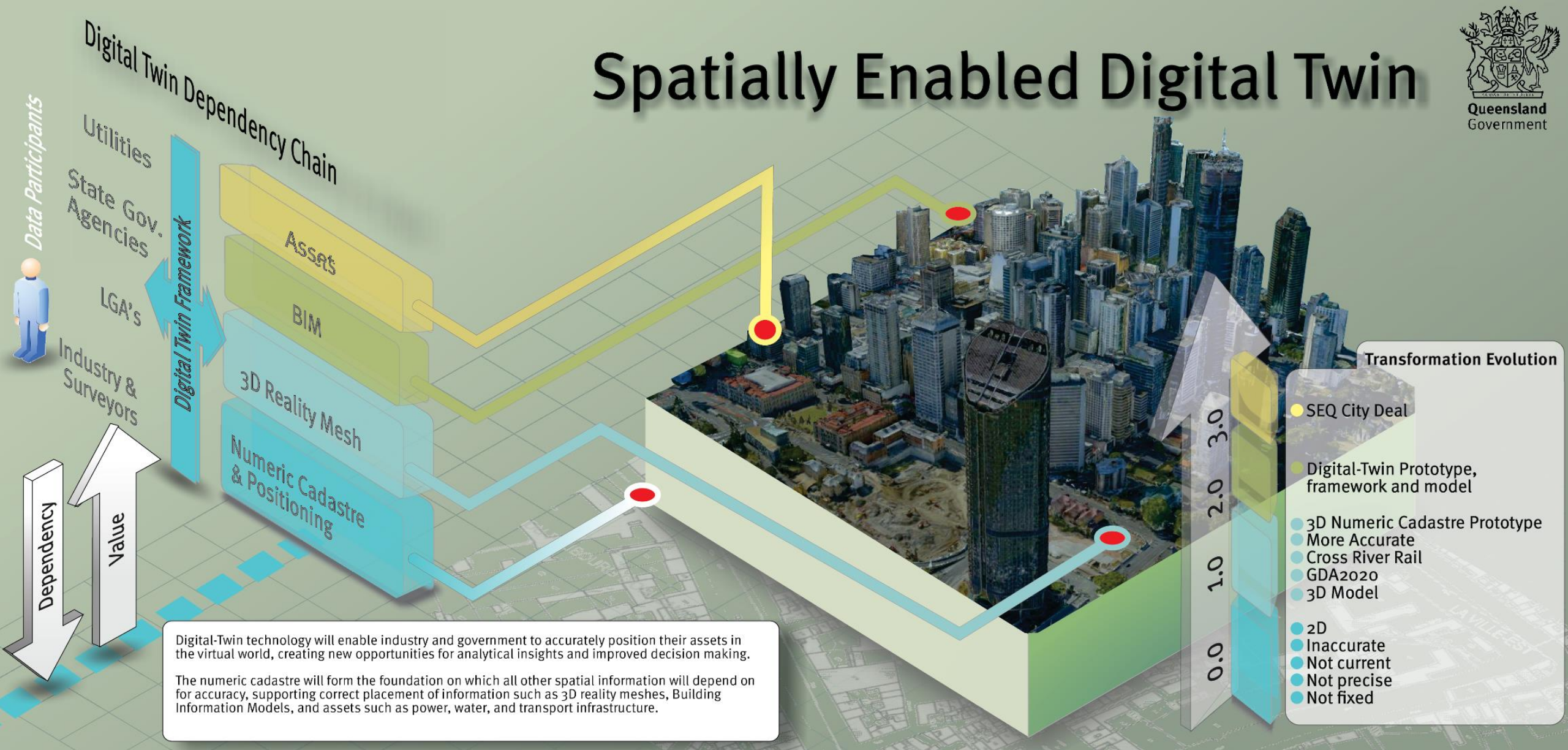


NSW Digital Twin model showing Strata Title ownership of a building

*Courtesy of NSW Department of Customer Service*



# Spatially Enabled Digital Twin



Courtesy of Queensland Department of Natural Resources,  
Mines & Energy

# Space derived data :



- **Position and location:** More accurate positioning and tracking data improve the accuracy of data sets. All sensed data is easier to integrate/fuse/overlay.
- **Earth Observation:** More sensors, different types, higher resolution, smarter analysis ready data, closer to real time- improves data availability, currency and quality. Also enables higher resolution analysis using non-space based sensors.
- **Communications:** broader coverage (IoT etc) enables wide area change detection.



# Thank You!

