

Empowering Governments and Societies to achieve *SDGs*



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COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT



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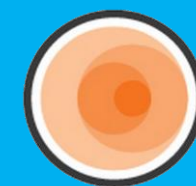
A DIGITAL TWIN

Towards Sustainability and Resilience

a close collaboration between Academia and Industry



THE GLOBAL GOALS
For Sustainable Development

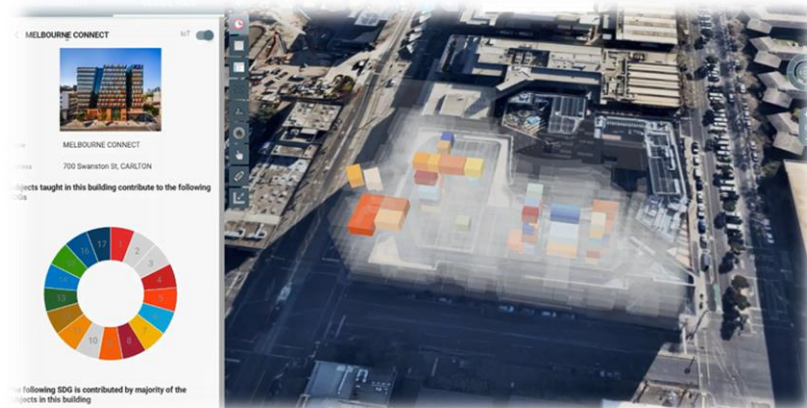


CSDILA



*Emerging **digital surveying, spatial information and services** enable us to gain **insights** from data resulting in cost, efficiency, and decision-making benefits.*

- Land and Geospatial Information
in support of Sustainability and Resilience and our
response to COVID
-New MSc program on Digital Infrastructure Engineering

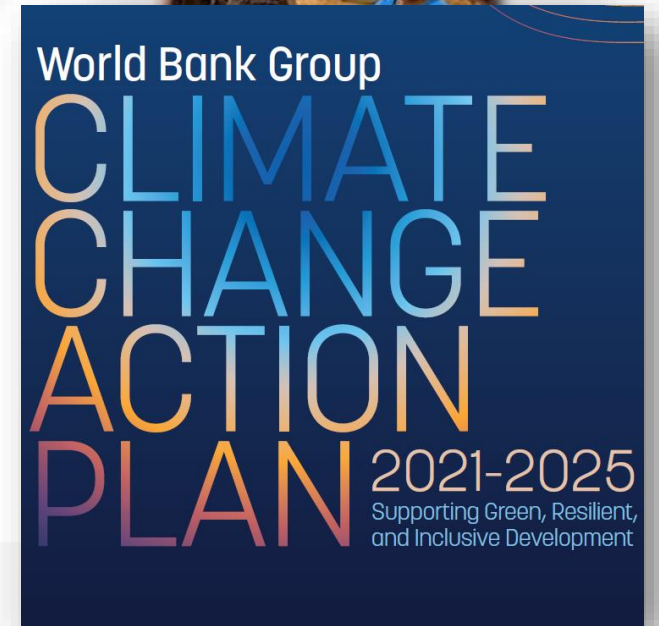
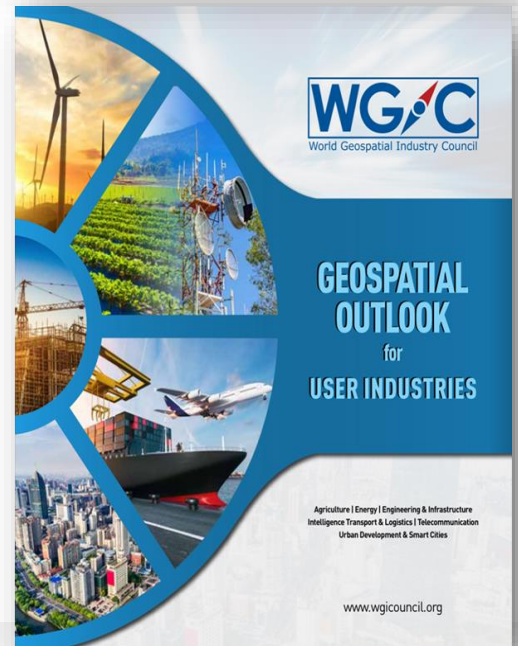
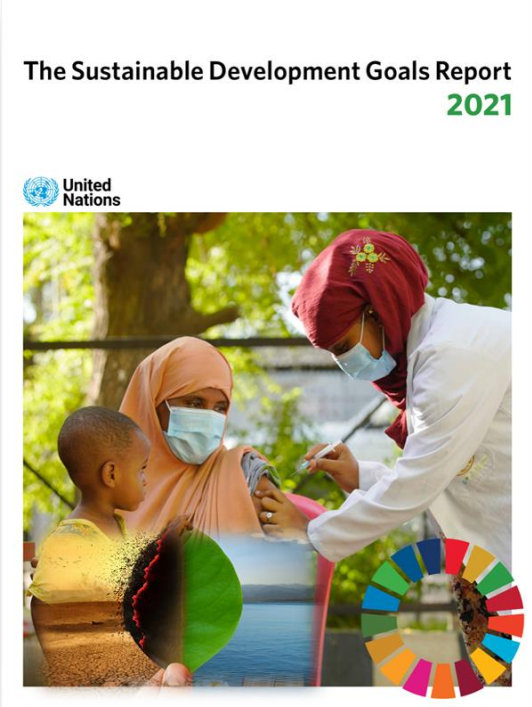


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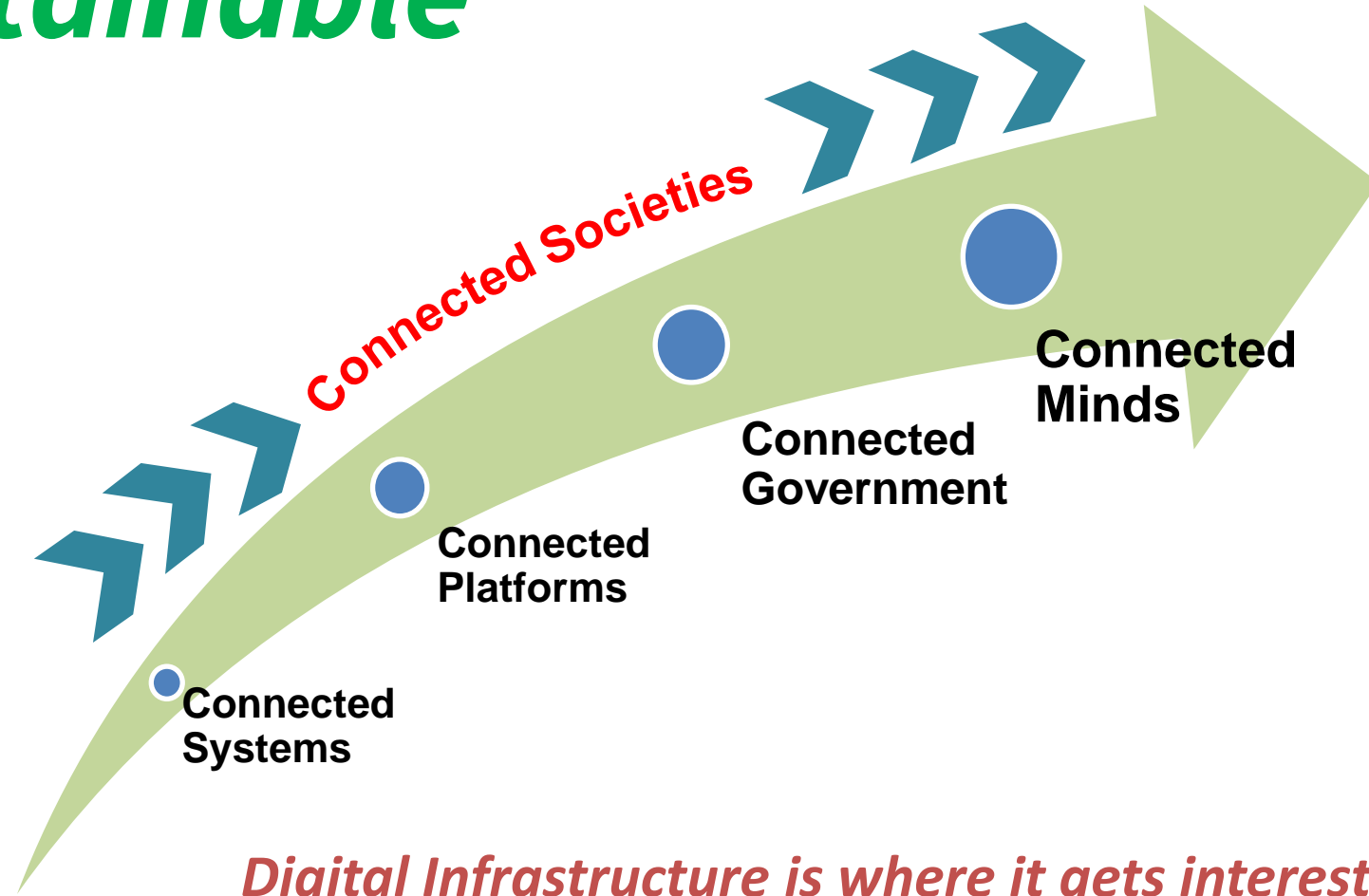
Key Drivers

- **Current and Emerging Global Markets** in land and spatial context of COVID, climate change;
- Population Growth & Increasing complexity;
- Increasing Disasters-*a Worldwide Problem*;
- **Digital Economy and Smart Societies**;
- Industry 4.0, and Technological Trends;
- **Connected, automated** and shared services;
- Land Administration Modernisation agenda;
- **3D land and property (3D Cadastre)** to support future planning (**Digital Twin- and BIM**);
- Needs and opportunities in the context of **Sustainable Future for All-SDGs**;
- IoT, AI, AR, making sense of smart data, smart utilities, 3D, 4D,..*nD data*...





Future *is Smart, Connected* and *Sustainable*

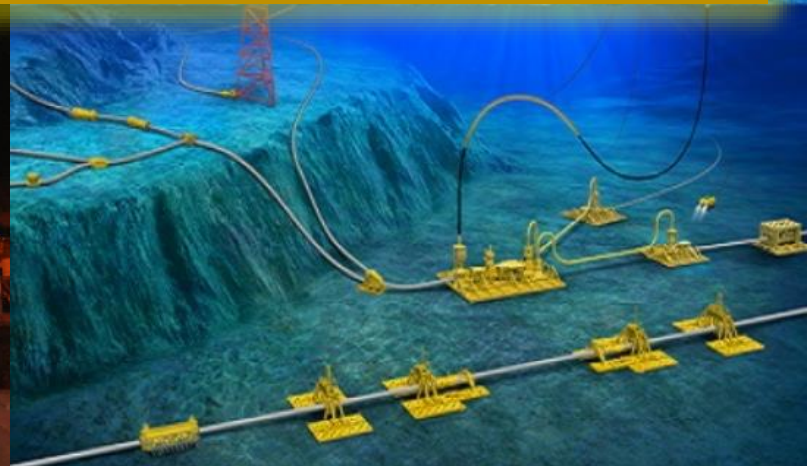


Moving from being “*Sustainable*” to *Productivity* & “*Regenerative*”

Digital Twins Geospatial + AI Modelling and Simulation
Predictive analytics Optimisation Quantum computing
Smart Cities Asset Management



Critical surface and subsurface infrastructure and physical assets such as buildings, roads, bridges, rail lines, tunnels, utilities, processing plants, refineries as well as resource industries **form the backbone of countries productivity**. Yet, according to the Australian Infrastructure Audit **most infrastructure used in 2030 will be in a substandard state of repair.**



The Problem

To achieve sustainability, we need to **remove barriers to integrating and analysing land data from multiple disciplines** and **enable access to data** that can directly inform decisions. This can reduce costs, increase productivity and help plan climate change mitigation and adaptation.

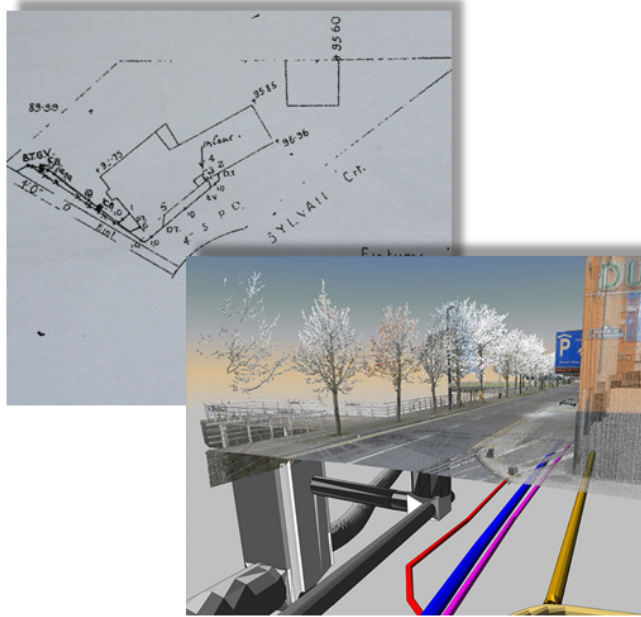
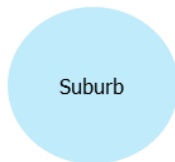


Image 4. A 'place based' strategy

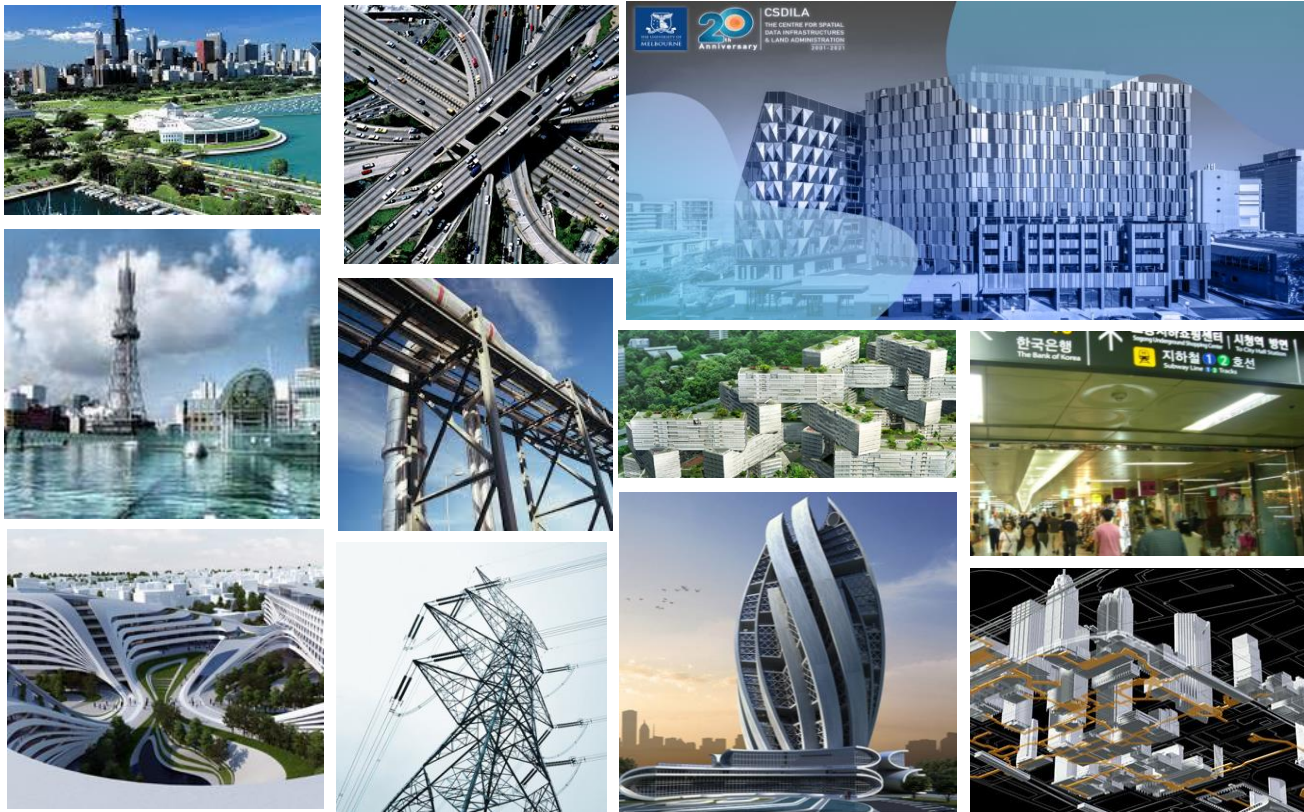


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Complex Urban Environments

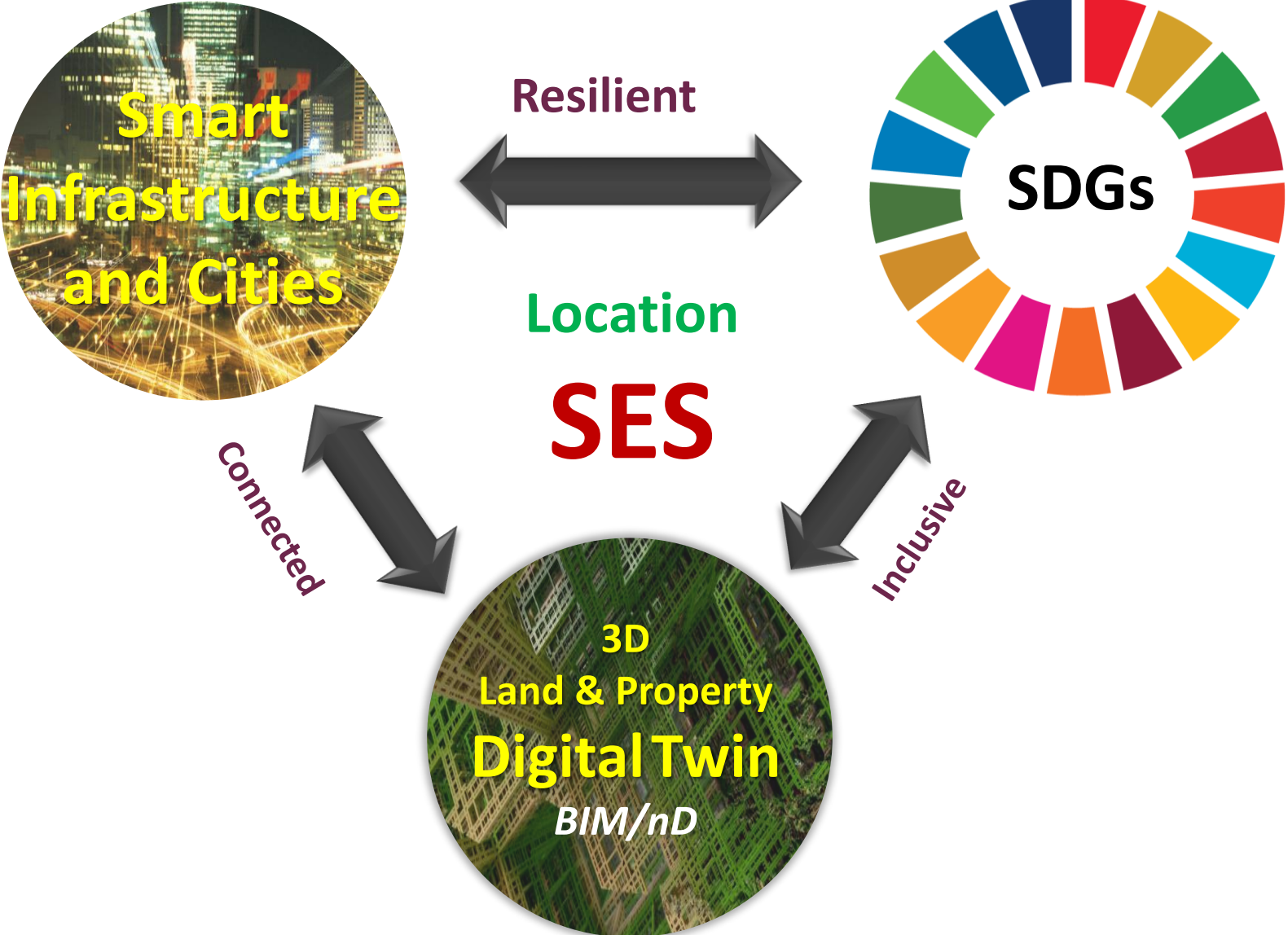
A primary reason for the limitations in addressing the interdisciplinary challenge of sustainability is the **lack of an ecosystem of open, harmonised and interoperable information models and datasets across land, built environment and natural environments.**



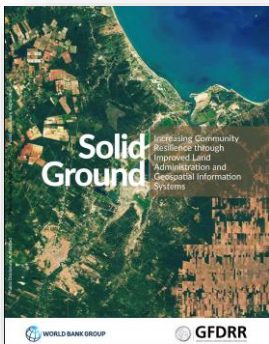
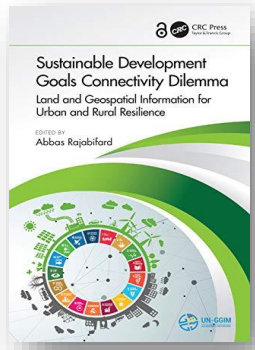
Addressing the Problem



Interconnected FUTURE For ALL



A Process-Based Approach to Achieve SDGs



Identifying Challenges
Collect Spatial Data

Take Action
Implementation

Understanding Socio-Economic and Environmental Diversities
Visualise the Data

Interrelationships
Mapping

Develop
Action Plan

Monitoring Progress
Spatial Analysis

SES



**Sendai
Framework
Targets**

REDUCE

- Disaster Mortality
- People Affected by Disaster
- Economic Loss
- Infrastructure Disruption


INCREASE

- National Strategies
- International Co-operation
- Disaster Risk Information


**Research
Priority
Areas**



Understanding and Mitigating Extreme Events and Critical Incidents



Enabling Technology, Informatics and Analytics



Improving Whole-Life Infrastructure System Performance and Resilience



Strengthening Organisational, Institutional and Community resilience



Enhancing Policy and Decision Making

SDGs

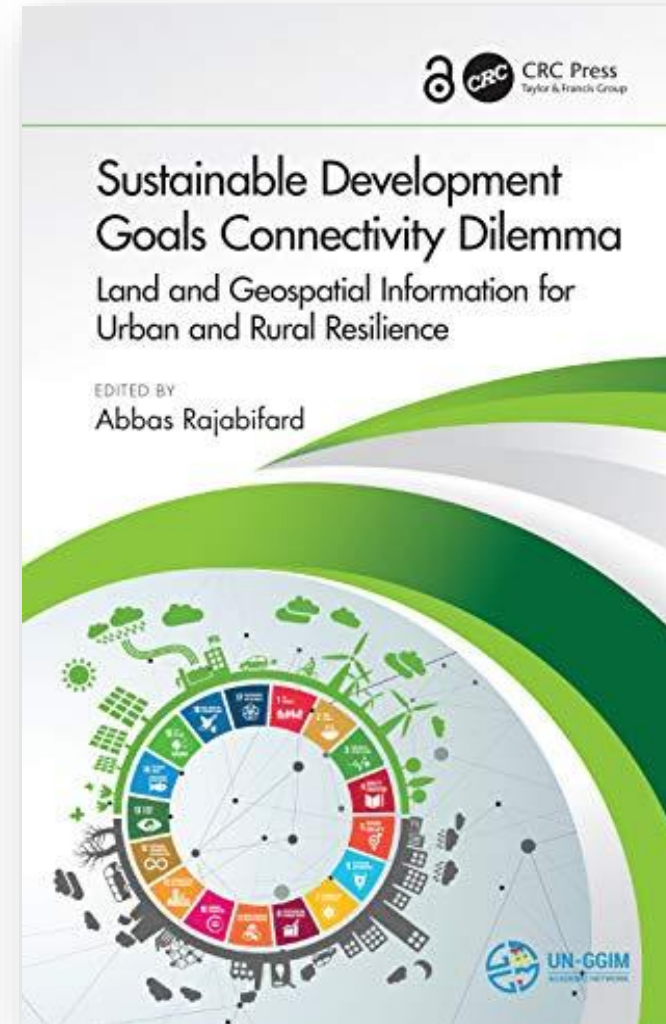
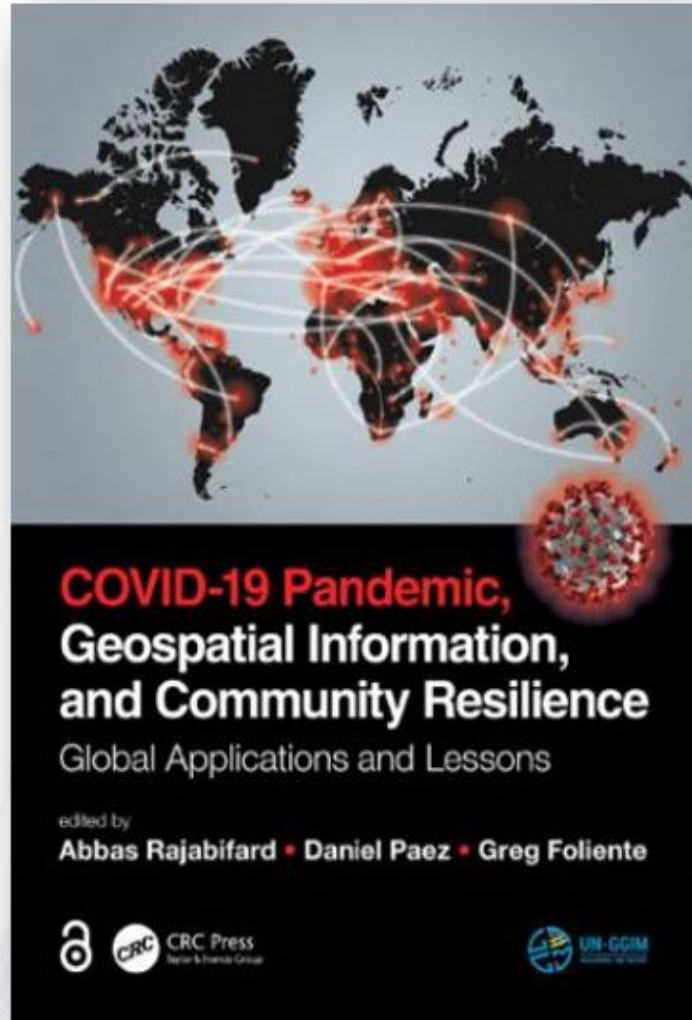
- 1 NO POVERTY
- 2 ZERO HUNGER
- 3 GOOD HEALTH AND WELL-BEING
- 4 QUALITY EDUCATION
- 5 GENDER EQUALITY
- 6 CLEAN WATER AND SANITATION
- 7 AFFORDABLE AND CLEAN ENERGY
- 8 DECENT WORK AND ECONOMIC GROWTH
- 9 INDUSTRY INNOVATION AND INFRASTRUCTURE
- 10 REDUCED INEQUALITIES
- 11 SUSTAINABLE CITIES AND COMMUNITIES
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
- 13 CLIMATE ACTION
- 14 LIFE BELOW WATER
- 15 LIFE ON LAND
- 16 PEACE, JUSTICE AND STRONG INSTITUTIONS
- 17 PARTNERSHIPS FOR THE GOALS

SDGs Inter-Relationships



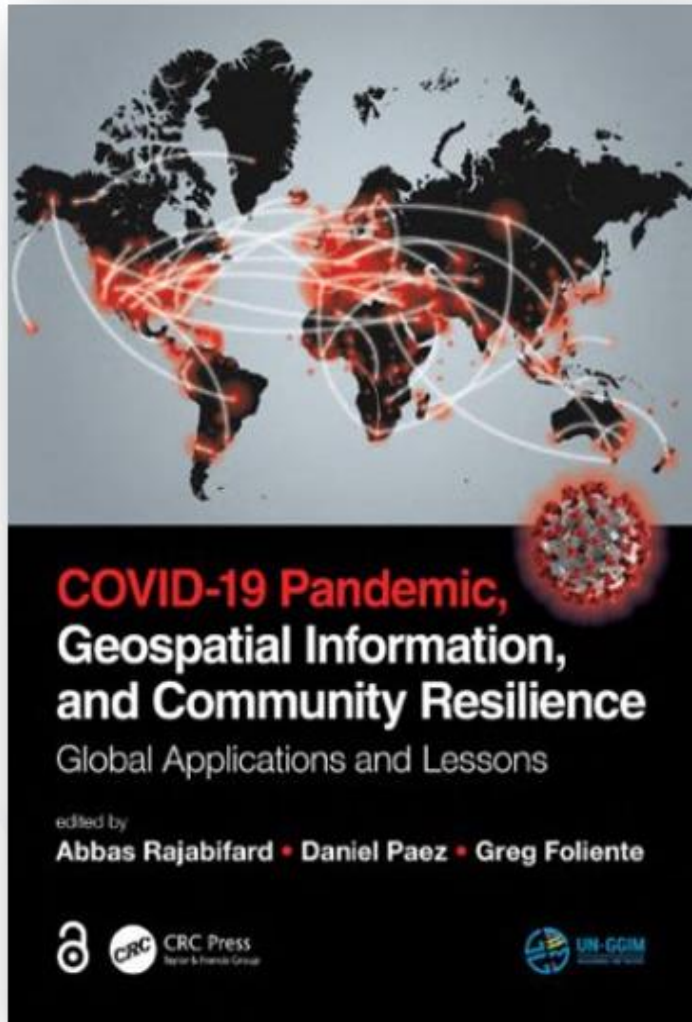


127 collaborators
(Gov, Industry, Academia)
+30 Country Case
Studies



44 Collaborators
(Gov, Industry, Academia)





The Role and Value of Geospatial Information and Technology in a Pandemic

- Critical Role of Location Information
- Impact of COVID-19 on the Sustainable Development Goals (SDGs)
- Digital Innovation During a Pandemic
- Collaboration and Engagement
- Opportunities Emerging from the Pandemic
- Moving Forward from the Pandemic

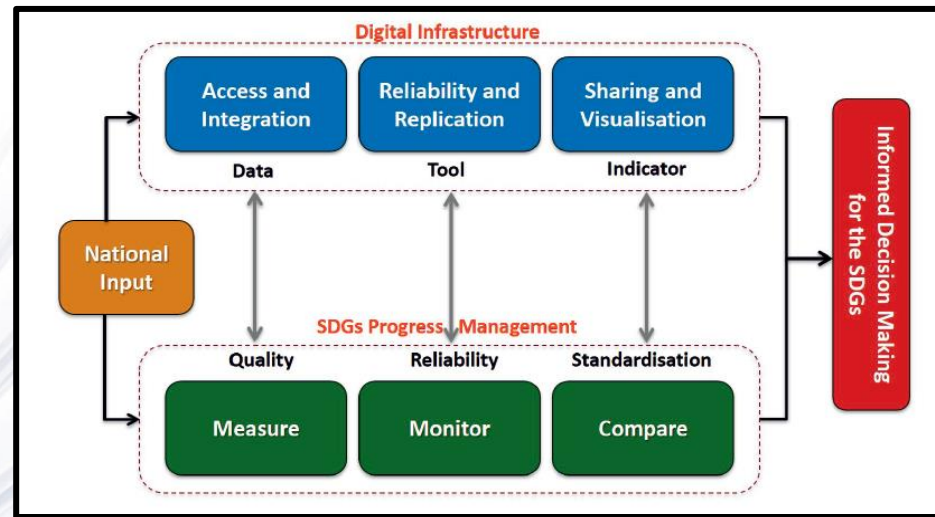
Global crises such as **Climate Change** and the **COVID-19** pandemic demand community and societal resilience that is built from broad stakeholder cooperation at the local, regional and national levels.



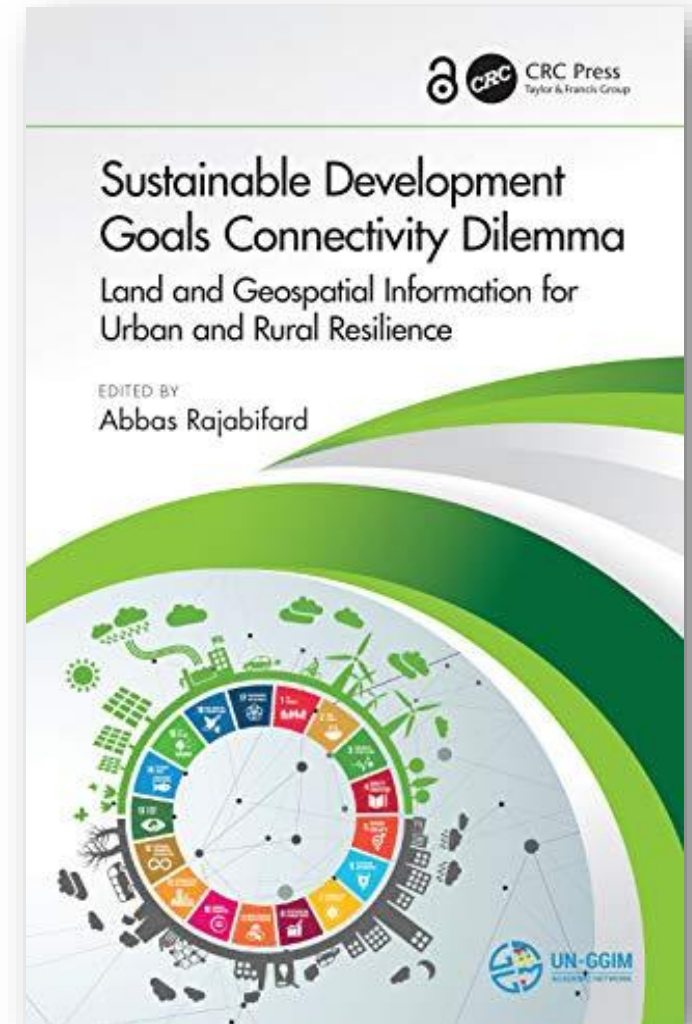


Discussed Areas

- ✓ Sustainable Development Goals Connectivity Dilemma
- ✓ Enhancing SDGs Connectivity and Disaster Resilience
- ✓ Supporting SDGs: Legal, Policies and Institutional Components and Capacity Building
- ✓ Enabling Tools and Technical Components
- ✓ SDGs Perspectives: Current Practices and Case Studies



The conceptual framework for a digital infrastructure enabling the SDGs progress management





Master of Digital Infrastructure Engineering

Launch event: Monday 31 October
3-5pm, Melbourne Connect

Register now
to meet academics
and industry experts



Non UoM staff members
register here

What is digital infrastructure engineering?

- *Where Engineering meets Information Technology*
- *Acquire skills in the areas of sensing, managing, analysing and communicating information about environments, and specialise in land, transport, energy, water, industry, communication infrastructure, AI, business*

Acquire core skills in:

- Sensing, managing, analysing and communicating (georeferenced) data
- Monitoring our environments
- Using digital skills and digital technology (ethically) to improve processes of management in a range of industries
- Urban analytics and digital twin system development

Specialise in:

- Artificial intelligence / data analytics
- Information technologies
- Business
- Smart and sustainable cities
- Construction / digital engineering
- Transport, Energy, Water
- Land surveying

Digital infrastructure engineering in practice



Assess the impact of a **windfarm development** on nature and people, and how this is balanced by the benefits at particular locations and with particular designs.



Create a **digital construction** workflow to improve building practices and use of resources.



Help emergency teams as well as evacuees in **disaster management**: monitor events like bushfires and floods using drones and maps.

Digital infrastructure engineering in practice



Manage **public transport** using data streams of vehicle locations and passenger counts, social media, and infrastructure data.



© Mihir Rambhia, UoM, based on open data

Use remote sensing, sensor networks, and crowd-sourced data for **urban green** management in **smart cities**.




Help **autonomous vehicles** know where to go with high-definition maps.

THE FUTURE IS BRIGHTER

Thank You
We welcome new
partnerships and
collaborations.



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