



UN GEONOW 2025
第二届联合国地信周



Geospatial Leadership

Supported by

Knowledge and Innovation

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地理信息知识创新领导力培训

Geospatial Information, Knowledge and Innovation Leadership Training





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Welcome

Leadership Training

on

Geospatial Knowledge and Innovation

Delivering Geospatial

Intelligence for the World



地理信息知识创新领导力培训

Geospatial Information, Knowledge and Innovation Leadership Training





What is Leadership?



Leadership is the ability **to influence, inspire, and guide** individuals, teams, or an organization toward achieving a common goal while fostering collaboration, trust, and innovation.

Key Elements of Leadership:

- **Vision:** Setting a clear direction and purpose.
- **Influence:** Inspiring others through communication and action.
- **Empowerment:** Encouraging team autonomy and growth.
- **Accountability:** Taking responsibility for outcomes.



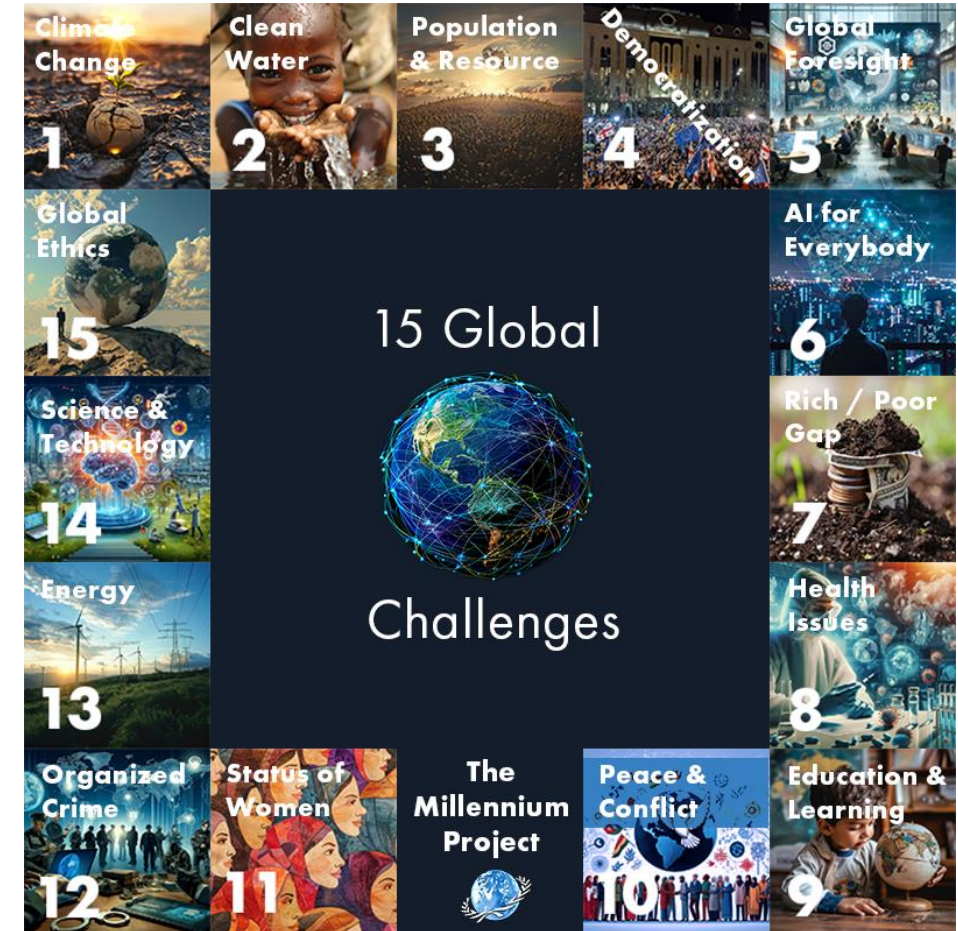
Global Challenges



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- ✓ Population growth and rising complexity
- ✓ **Climate change** and environmental sustainability
- ✓ **Digital economy** and smart, inclusive societies
- ✓ Global trade, emerging markets, and resilient supply chains
- ✓ **Future cities**: adaptive, regenerative, and sustainable
- ✓ Digital infrastructure with **open ecosystems**, IoT, and sensors
- ✓ Ageing assets and the need for integrated digital upgrades
- ✓ Connected, automated, and shared services
- ✓ Growth in open data, 3D models, AR/VR, digital twins, and urban analytics
- ✓ AI and Large Language Models are changing everything!



<https://millennium-project.org/challenges-overview/>

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This Session highlights:

- **The urgency of the challenge:** Fragmented governance and unverified data are undermining sectors like infrastructure, insurance, and emergency management.
- **The transformative opportunity via geospatial innovation:** Quality geospatial data can **unlock innovation**, climate resilience, and equitable development.
- **The enablers of trust and impact:** Semantic stewardship, policy reform, and investment in **innovation ecosystems** are essential to converting data into trusted action.
- **The call to action:** Government must lead by regulating quality, mandating openness, and enabling a competitive, ethical, and resilient geospatial ecosystem.

This is a call to **move from fragmented efforts to coordinated systems** — with **policy, talent, and trust** as the foundation for **geospatially enabled futures**.

The Leadership Imperative

Geospatial Leadership is about turning tech, data, tools and platforms into trusted, valued knowledge and **aligning it to real-world, cross-sector decisions.**



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What's changed?

- **The world:** climate risk, urbanization, resource constraints.
- **The tech:** mature platforms, linked data, real-time insight.
- **The need:** sustainability, equity, system-wide optimization.

What's needed now?

- **Leaders** with an effective engagement skill, and build on global success in, technology application, open data models and governance.
- **Leaders** who ensure transformation is:
Ethical
Insight-driven
Impact-focused.

- **Leading Innovation** and **design thinking** empowered by **Geospatial Information**.
- Identify the **key drivers for change** in the **Geospatial Sector**, such as technological advancements, policy changes, and societal needs, so leaders can anticipate and respond to these drivers.
- Managing change and **data value chain**.
- **Enacting Transformation**.



What do we need to do?

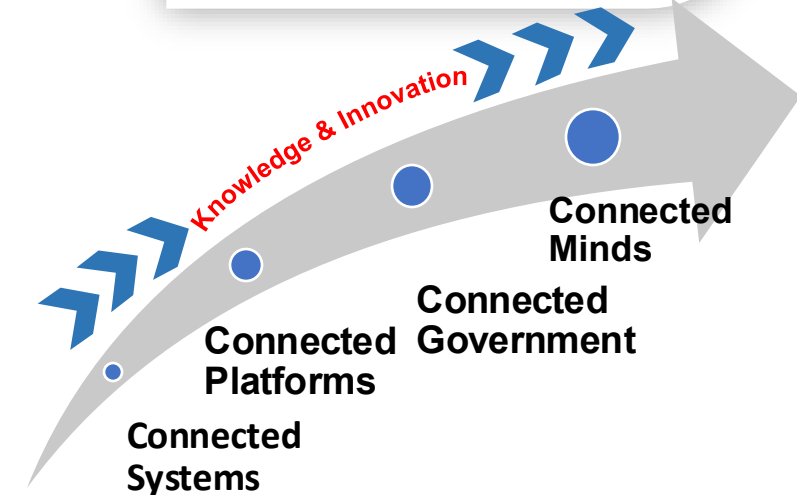
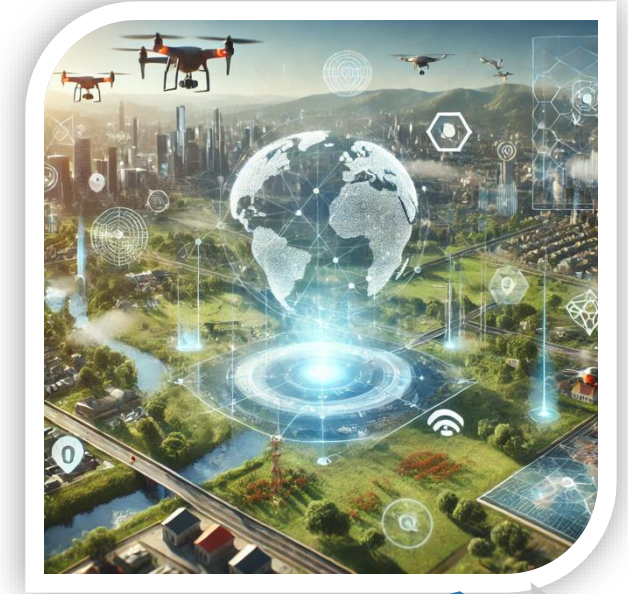
As leaders, How can we ensure geospatial data is not only available, but also accessible and actionable across diverse communities?

As leaders, How do we develop the strategies needed to build the human and institutional capacity to mainstream geospatial intelligence in climate policy and planning?

How do **we all** ensure **balance between innovation and ethical governance** to ensure geospatial technologies support just, inclusive, and sustainable outcomes?

...requires **overcoming barriers:**

- **Engagement and Collaboration**
- **Data Integration and Interoperability:**
 - Lack of harmonized data standards across sectors.
 - Difficulty in integrating data from multiple sources due to siloed systems.
- **Ethical Concerns:**
 - Bias in GeoAI algorithms leading to unfair or discriminatory outcomes.
 - Failure to prioritize diversity, equity, and inclusion.
- **Knowledge Gaps:**
 - Limited capacity to adopt global geospatial standards.
 - Insufficient investment in geospatial education and human capital development.
- **Policy and Governance Challenges:**
 - Inadequate regulatory frameworks to guide Geospatial data use and innovation.
 - Fragmentation in governance across the Geospatial sectors, hindering collaboration.
- **Lack of Professional Skills:**
 - Insufficient focus on multidisciplinary knowledge.
 - Limited innovative thinking in Leadership roles.
- **Technological Limitations:**
 - Unequal adoption of advanced technologies like AI and Big Data
 - Lack of infrastructure to process and utilize both large and small datasets effectively.





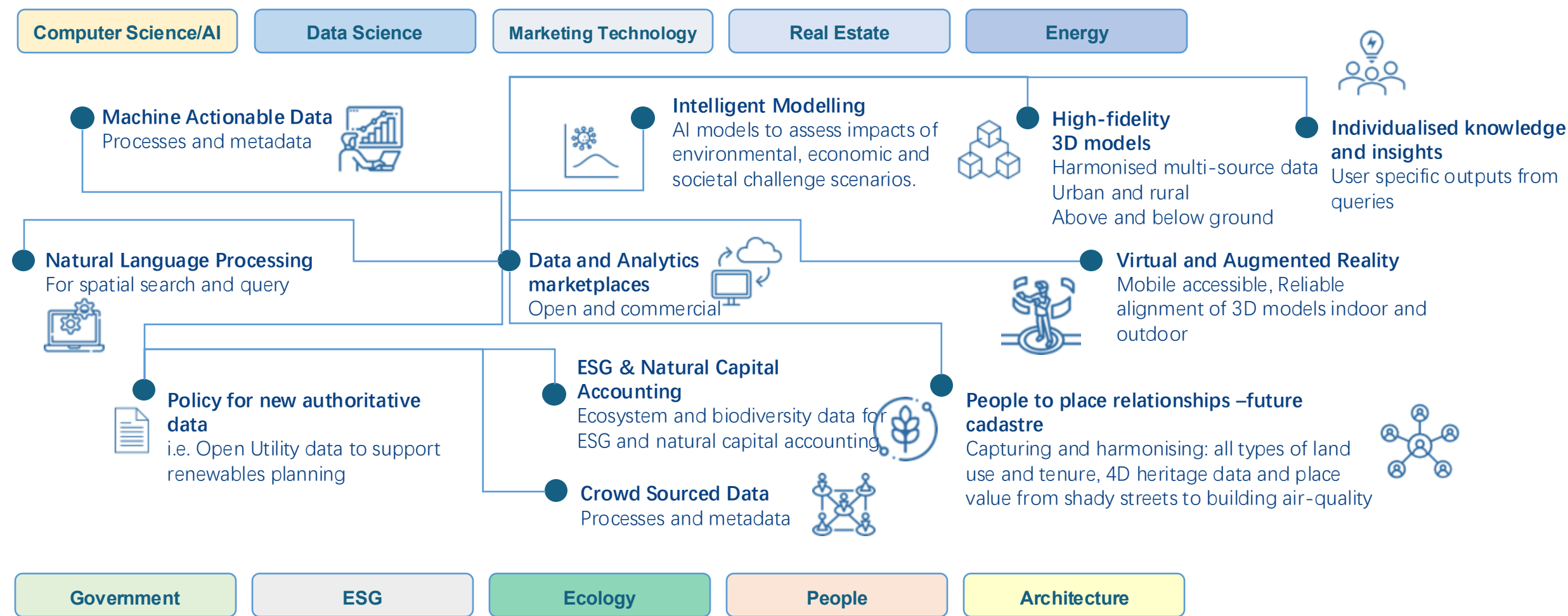
Handled properly, geospatial data can:

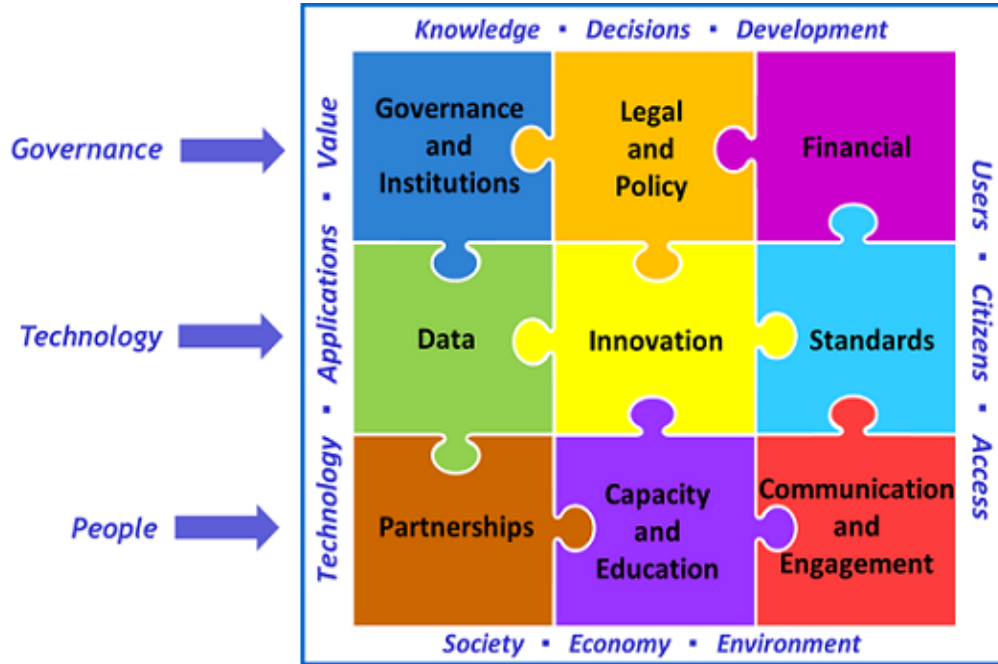
- ✓ Unlock coverage for uninsurable homes via improved flood risk data.
- ✓ Enable site selection and design for climate-smart, circular construction.
- ✓ Build smarter, adaptive cities and infrastructure.
- ✓ Catalyze industries in AI, sensing, data fusion, and analytics.

Geospatial data is not just critical – ***it is Transformative.***



If we consider the innovations required to advance the capture, visualization, discovery, and use of geospatial data, for Disaster Ready and Geospatially Enabled Communities, **the geospatial industry needs to grow our collaborations with complementary domains.**





Empowering the Implementation of the UN-IGIF:

- Bridging the digital and knowledge gap and connecting people with all kinds of potential resources and partnerships **to overcome the barrier and foster the implementation of the UN-IGIF** in their country.
- Identifying **pathways to strengthen national leadership capacity**, promote innovation, and ensure sustainable geospatial governance across Member States.
- Inspire Innovative Thinking
- Build an Application Ecosystem.



Geospatial Leadership Topics

Challenge for Leaders & Skills Gaps

Geospatial Leadership: What does the Future Need

Lack of Strategic Foresight and Adaptability

Redefining the Geospatial Ecosystem: Leadership in the Era of Emerging Technologies

Limited Proficiency in Emerging Geospatial Technologies

Governance, Policy, and Ethics in a Rapidly Evolving Digital Landscape

Limited Awareness of Ethical and Digital Governance Issues

Financial Models and Real Estate

Limited Understanding of Financial Models and Sustainable Investment

Challenge for Leaders & Skills Gaps

National and Global Leadership in Geospatial Sciences

Challenges in Enacting Organizational Change

Next-Generation Geospatial Intelligence & Emerging Opportunities

Gaps in Leadership for Innovation and Design Thinking

Land, Climate Change, and Sustainable Development Goals (SDGs)

Underestimation of Geospatial Role in Sustainability and SDGs

Geospatial Leaders for Future-Ready Cities

Lack of Leadership Strategies for Future-Ready, Resilient Cities





GEOSPATIAL LEADERSHIP TRAINING

An integrating leadership, innovation and geospatial intelligence

Geospatial Leadership

Focus on leading innovation, understanding change drivers and enacting transformation

Geospatial Trends & Innovation

Explores future trends live GeoAI, GeoIT, ML, Digital Twins, immersive technologies and collaboration

Geospatial Knowledge

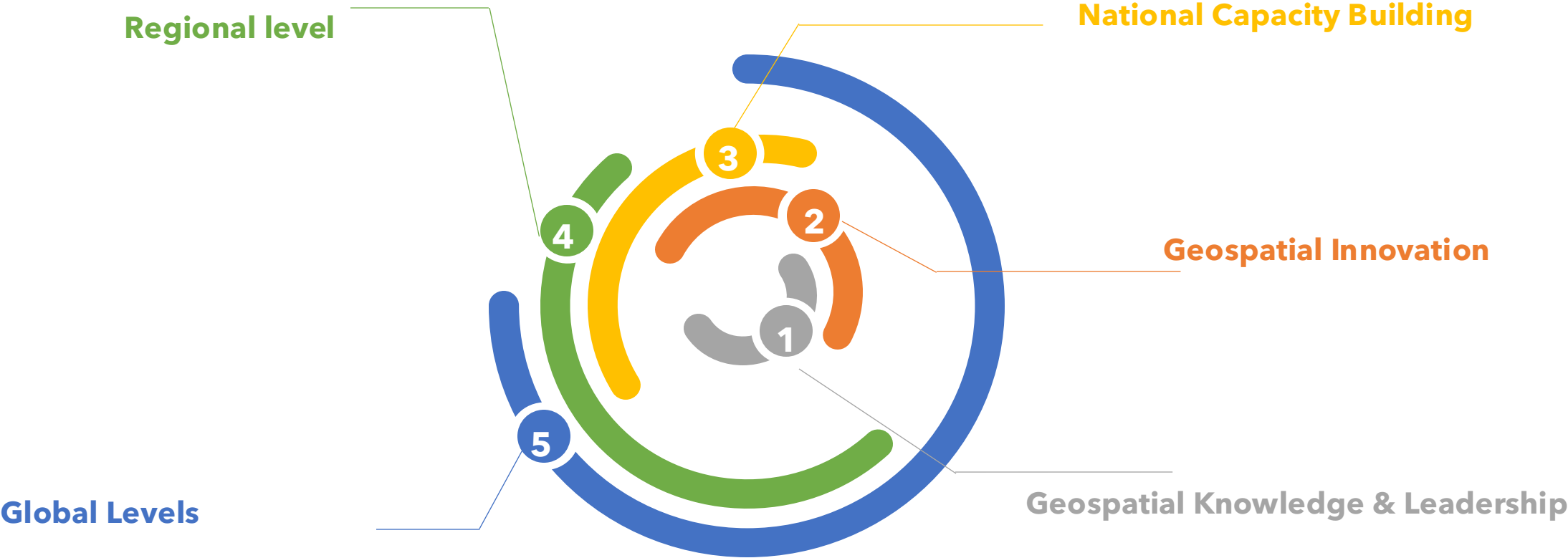
Exploration of location intelligence, climate resilience, open data and ethics

Key benefits

Advanced Geospatial Knowledge, strategic insight, and practical application

This session equips **Leaders** with the knowledge, skills, and insights needed to leverage Geospatial Technologies effectively, drive innovation within their organizations, and respond proactively to the evolving landscape of geospatial challenges and opportunities.





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01 LEAD GEOSPATIAL INITIATIVES

Develop Strategic Geospatial Leadership Skills.
Learn how to lead geospatial initiatives within organisations, integrating innovation, policy, and governance.

03 INFORM SUSTAINABLE DEVELOPMENT

Learn how geospatial data supports climate resilience, land access strategies and the UN's SDGs.

02 STRATEGIC INSIGHT INTO GEOSPATIAL TRENDS

Build knowledge on GeoAI, Digital Twins, on-demand geospatial ecosystems, and machine-actionable data.

04 ENHANCE YOUR DECISION MAKING

Learn about strategic solutions to leverage geospatial insights in complex decision-making processes.

05 DEVELOP ETHICAL AND SECURE SOLUTIONS

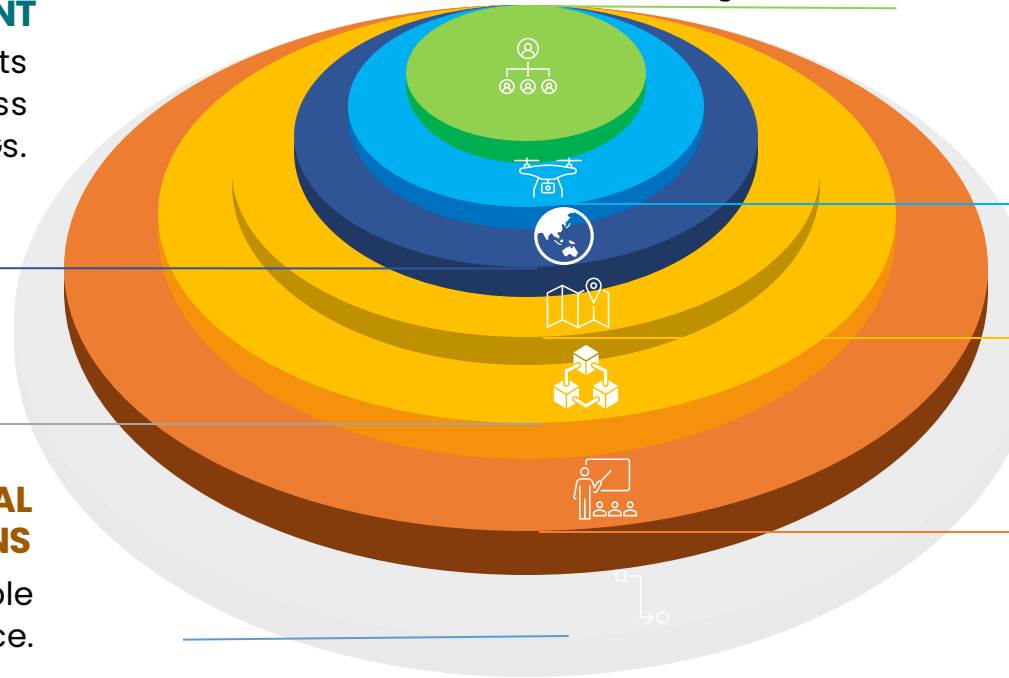
Understand ethics, and responsible geospatial data governance.

06 BRIDGE THE SKILLS GAP

Learn about technical and leadership skills to strengthen national geospatial programs and digital public infrastructure.

07 IMPACT VIA WORK BASED PROJECTS

Post training activity: Develop and execute impactful projects that translate course learnings into real-world applications.





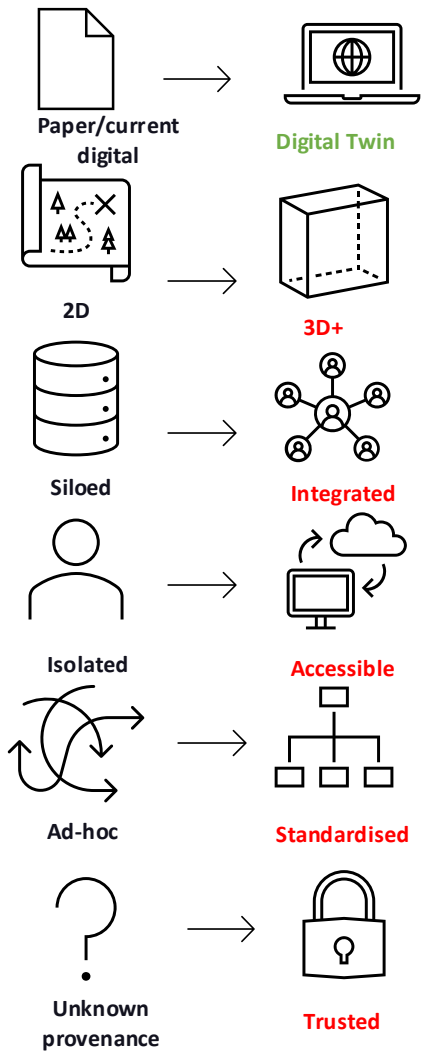
- Whole of Government Approach: **Geospatially Enabled Government and Society**
- **Builds on UN-IGIF** and its 3 components of: **Governance, Technology and People**
- UN-SDGs 2030
- UN-GGIM Global Geospatial Knowledge and Innovation Centre: UN-GGKIC
- National Geospatial Strategy
 - Addressing Areas of Improvement: Innovations/Capacity and Education
 - National Geospatial Policies and Standards
 - Integrating with **Geospatial National Academy**
- Knowledge-based Authority, Digital Economy and Industry 4.0, 5.0+
- **The Purpose: Values, Impacts and Strategic Leadership**
- Open Geospatial Data Ecosystem
- Maximizing **geospatial and land information** values through better **Knowledge and Innovation**.



Complex Urban Environments



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



An aerial night view of a modern city skyline. In the foreground, a large, illuminated spherical building with a grid-like facade sits on a circular base. To its left, a large, curved, green-roofed structure is visible. The background is filled with numerous tall, modern skyscrapers, some of which are under construction, as indicated by the presence of cranes. The city lights are reflected in a body of water on the left side of the image. The overall scene conveys a sense of rapid urban development and modern architecture.

Urbanization trend will continue..

CITIES



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Bridging the Digital Divide & Next Generation Geospatial Intelligence

Finding **Solutions** Through Leadership

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Source: Editors Ricky Burdett & Deyan Sudjic Phaidon 2008

3%

Earth surface occupied by cities

55%

of the world's population lives in cities (2025)



Cities are Complex and Dynamic



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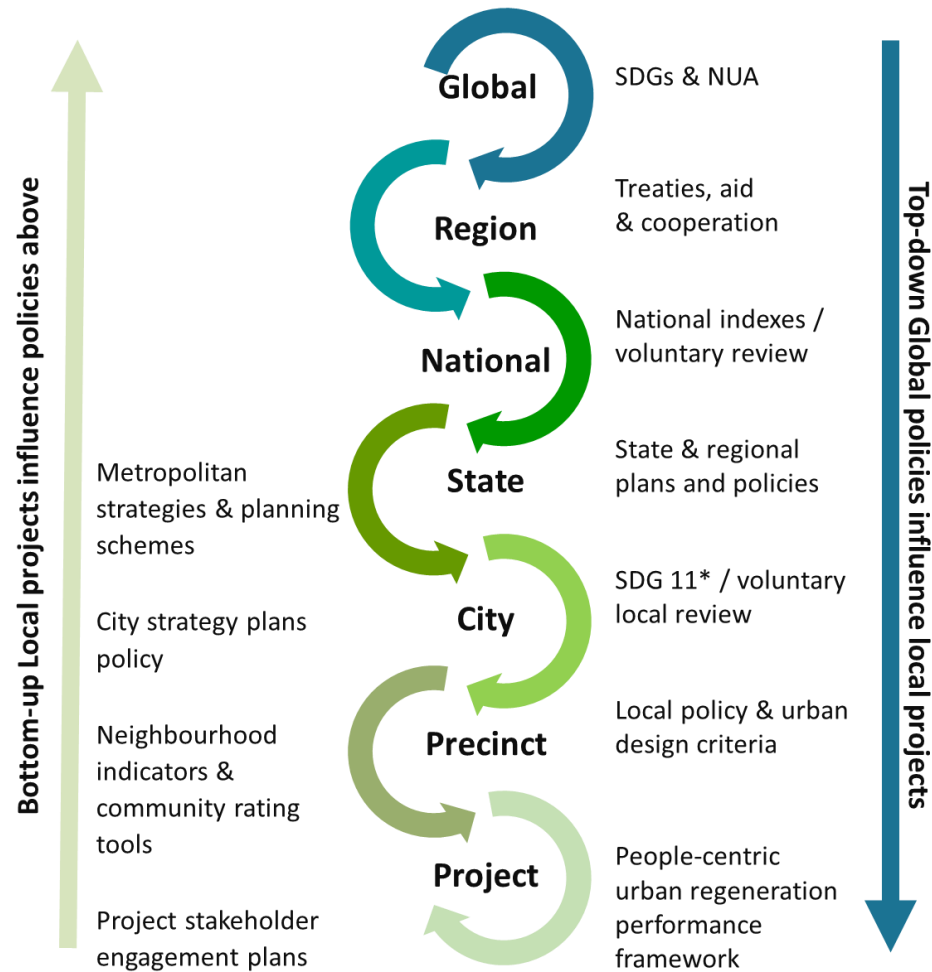


- Cities are our **safety valves**, the **engine rooms** of our economies.
- Advances in ICT are driving **significant social changes**.
- Enhancing the way people interact, move around and connect in cities **requires leadership, and new skills**.
- Technology can help address the impacts of climate change, and foster urban resilience, sustainability, and delivery of **data infrastructures**.
- ICT, data analytics and digitalization can advance **sustainable urban development**.

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- Complexities and urban challenges rely upon **top-down and bottom-up analysis**.
- **Collaborating to develop ideas and solutions** assist on the development and implementation of sustainable development policies and projects.
- **Top-down global standards** are typically developed and applied systematically.
- **Bottom-up local standards** remain largely abstract with limited methodological reference.



Goal 11: 'Make cities and human settlements inclusive safe, resilient and sustainable' (UN 2016)

Sustainable urbanism supports;

- communities
- appropriate housing
- access to freshwater & sanitation
- education, jobs, transportation, and energy
- healthy built environments that promote wellbeing

*Investing on our Human
Capital & Geospatial
Strategy*



Digital Economy



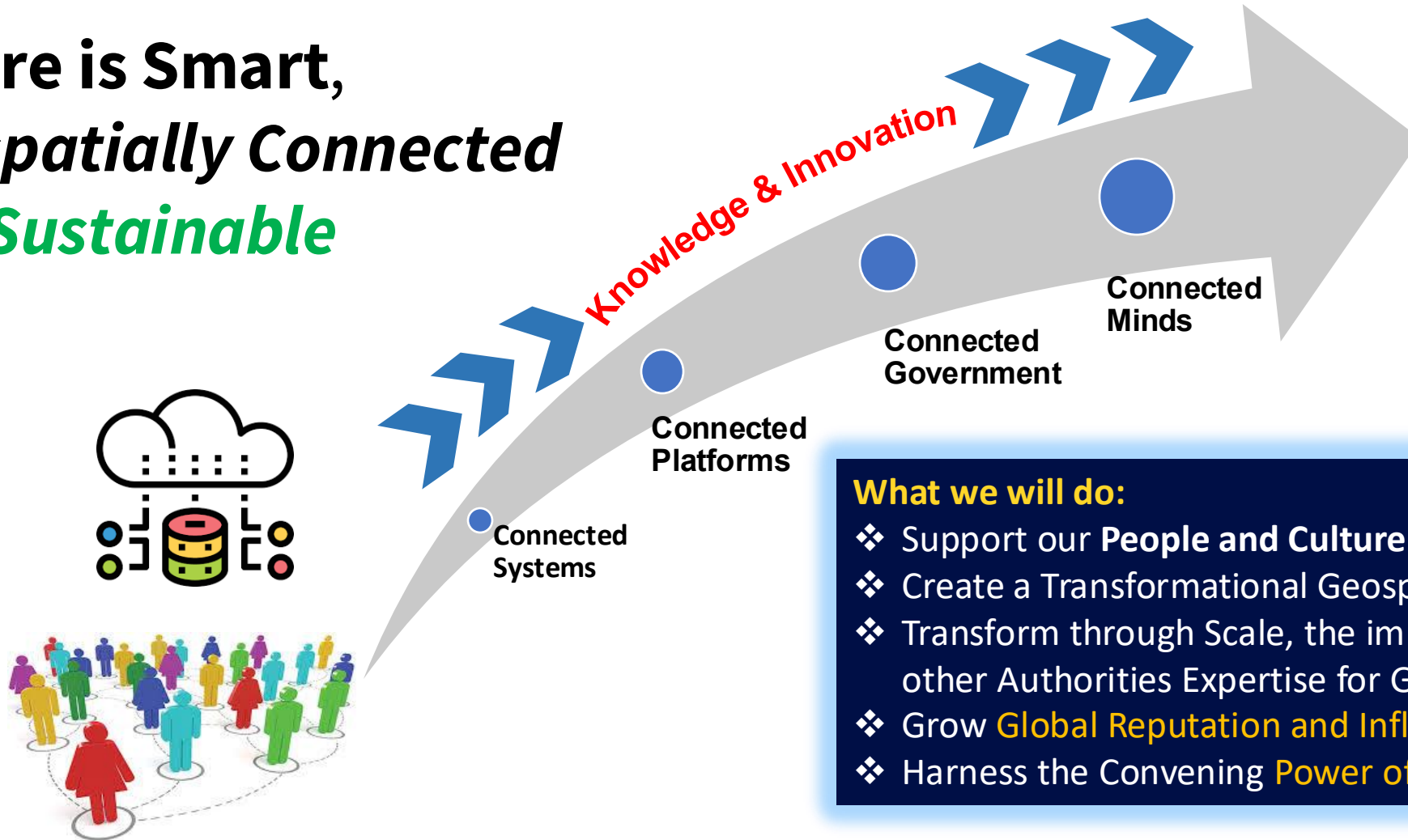
Innovation

Return on our Investments:
Making Geospatial Data/Information works for All!

Future is Smart, Geospatially Connected and *Sustainable*



THE GLOBAL GOALS
For Sustainable Development



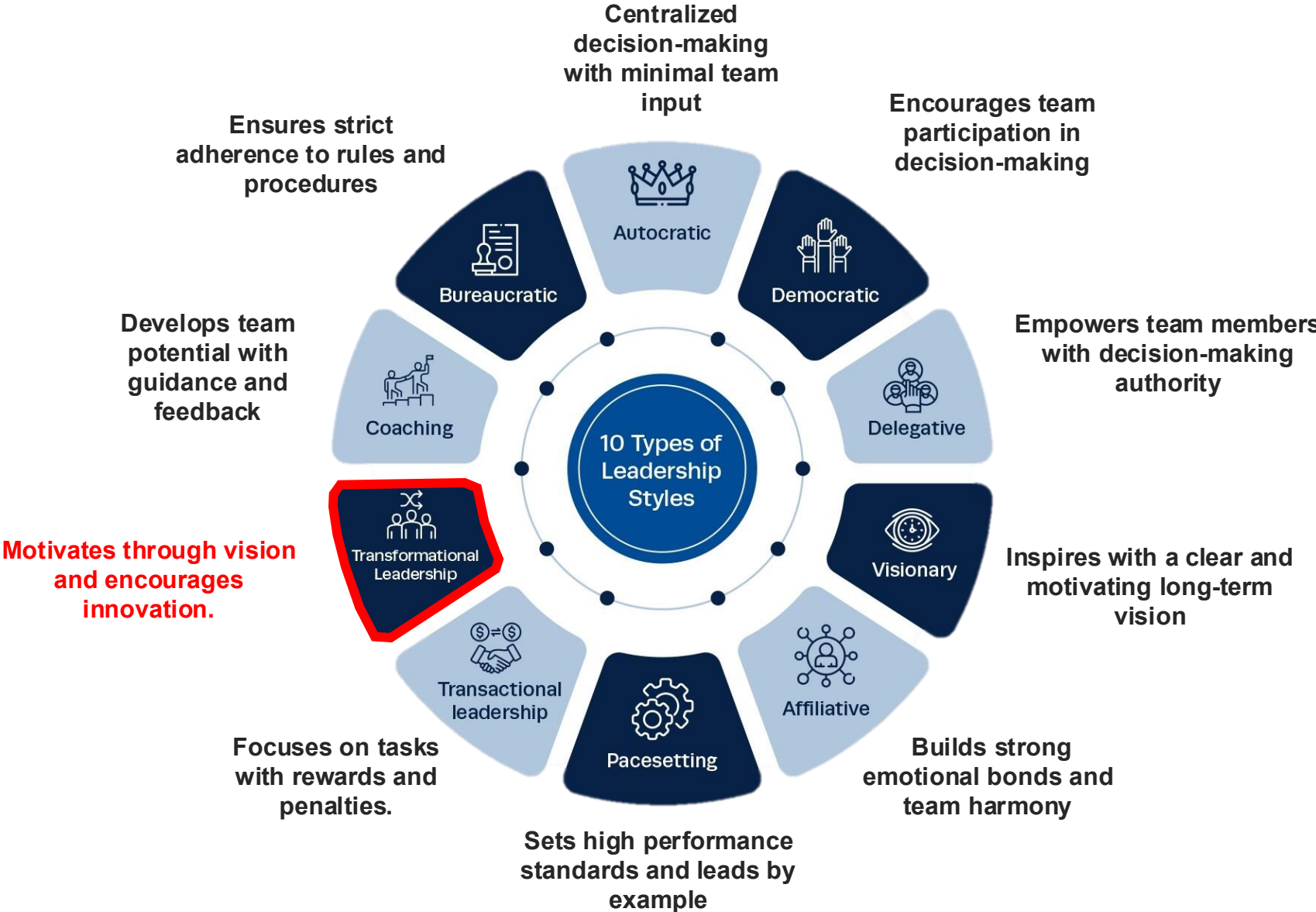
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A **Leadership Style** refers to the method a leader uses to guide, inspire, and oversee their team.

It is influenced by several elements, such as the leader's **character**, **principles**, **abilities**, and **past experiences**.

There is no universally "correct" **Leadership Style**, as an approach effective for one leader may not be suitable for another.



- **Data Integration and Interoperability:**

- Lack of harmonized data standards across sectors.
- Difficulty in integrating data from multiple sources due to siloed systems.

- **Ethical Concerns:**

- Bias in GeoAI algorithms leading to unfair or discriminatory outcomes.
- Failure to prioritize diversity, equity, and inclusion.
- Challenges in obtaining and maintaining social license for large-scale geospatial projects.

- **Knowledge Gaps:**

- Limited capacity to adopt global geospatial standards.
- Insufficient investment in geospatial education and human capital development.

- **Policy and Governance Challenges:**
 - Inadequate regulatory frameworks to guide **Geospatial** data use and innovation.
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- **Lack of Professional Skills:**
 - Insufficient focus on multidisciplinary knowledge.
 - Limited innovative thinking in **Leadership** roles.



- **Leadership Traits:** Agility, foresight, collaboration.
- **Modern Approach:** Innovation, empathy, adaptability replace traditional models.
- **Key Roles:** Navigate disruptions, inspire teams, drive change, address ethics.
- **Broader Scope:** Shape visions, build partnerships, enable transformation.





Leadership is critical to:

- Inspire collaboration across government, academia, and industry.
- Build organizational capacity for technology adoption.
- Foster an innovation-led culture for long-term growth.

Leadership in **Geospatial Technologies** is about managing change and data value chain.



➤ Open Data Ecosystems:

Enable collaboration across government, private, and academic stakeholders.

➤ Human Capital and Capacity Building:

Train human resources, engineers, and leaders in geospatial tools and decision-making.

➤ Integrated Approaches:

Combine geospatial data with artificial intelligence for predictive urban analytics.



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Intro to Knowledge and Innovation

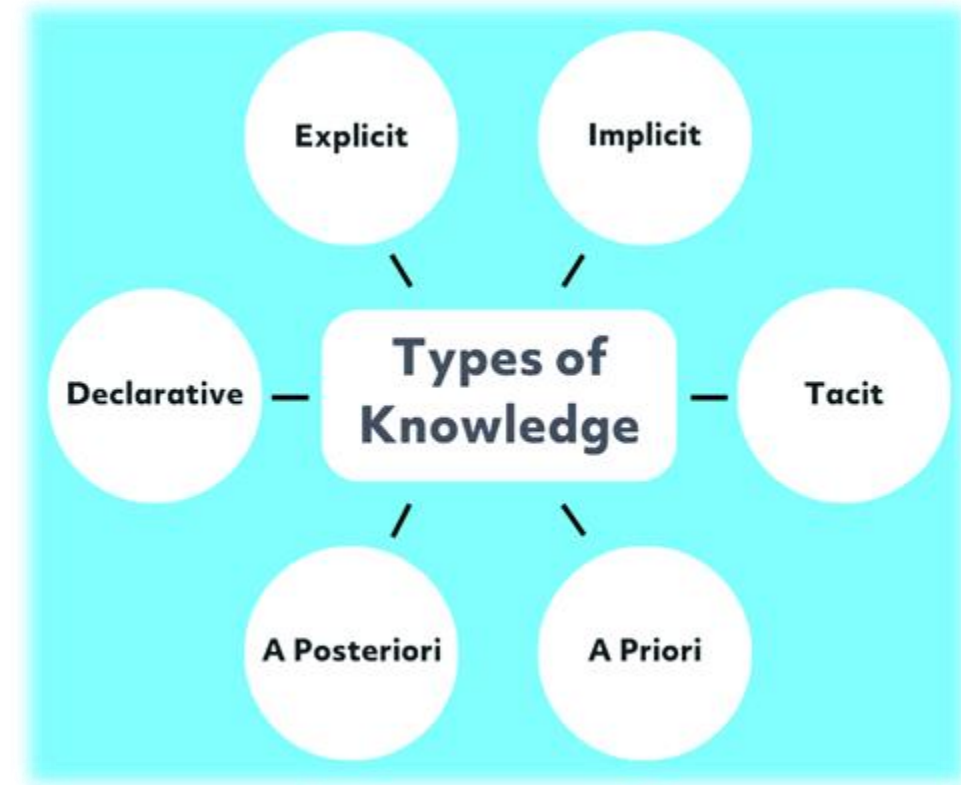
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Understanding, Awareness, or Familiarity gained through Education, Experience, or Discovery.

- ❑ **Types:** Explicit (documented), implicit (experiential), tacit (personal insight).
- ❑ **Importance:** Foundation for innovation and decision-making.



Three Types of Knowledge

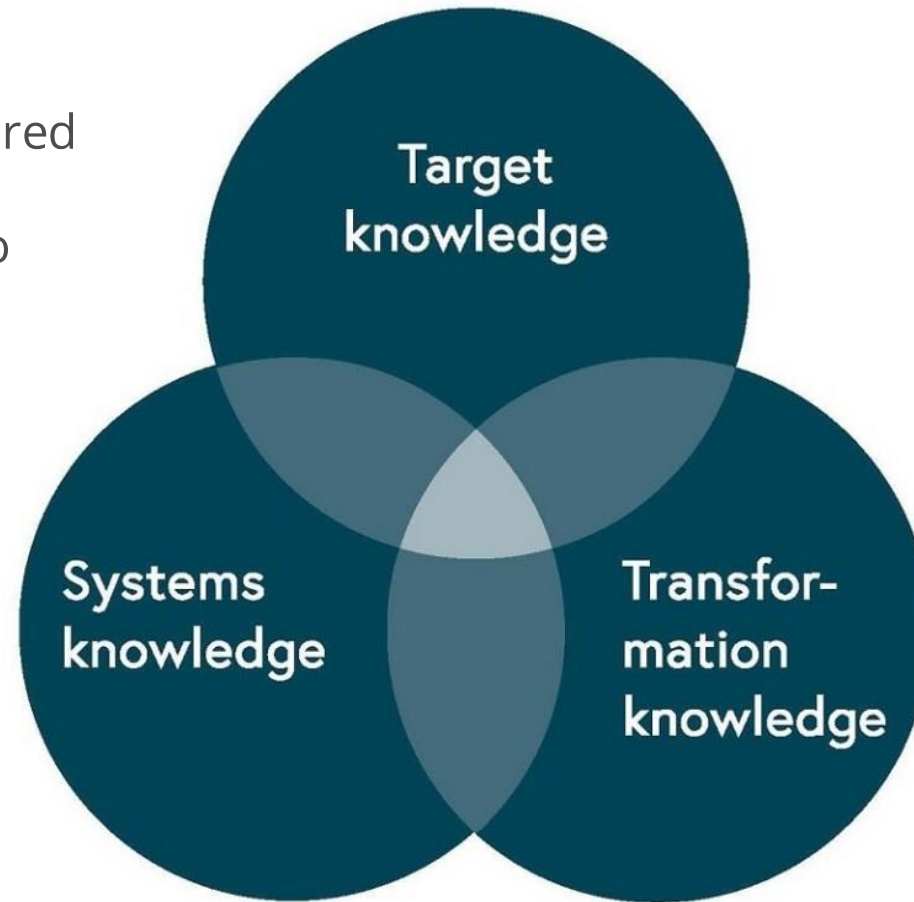


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Knowledge about the desired future and the values that indicate which direction to take.

Knowledge about the current system or problem situation. It is mainly analytical and descriptive.



Is about how to move from the current to the desired situation. It includes concrete strategies and steps to take

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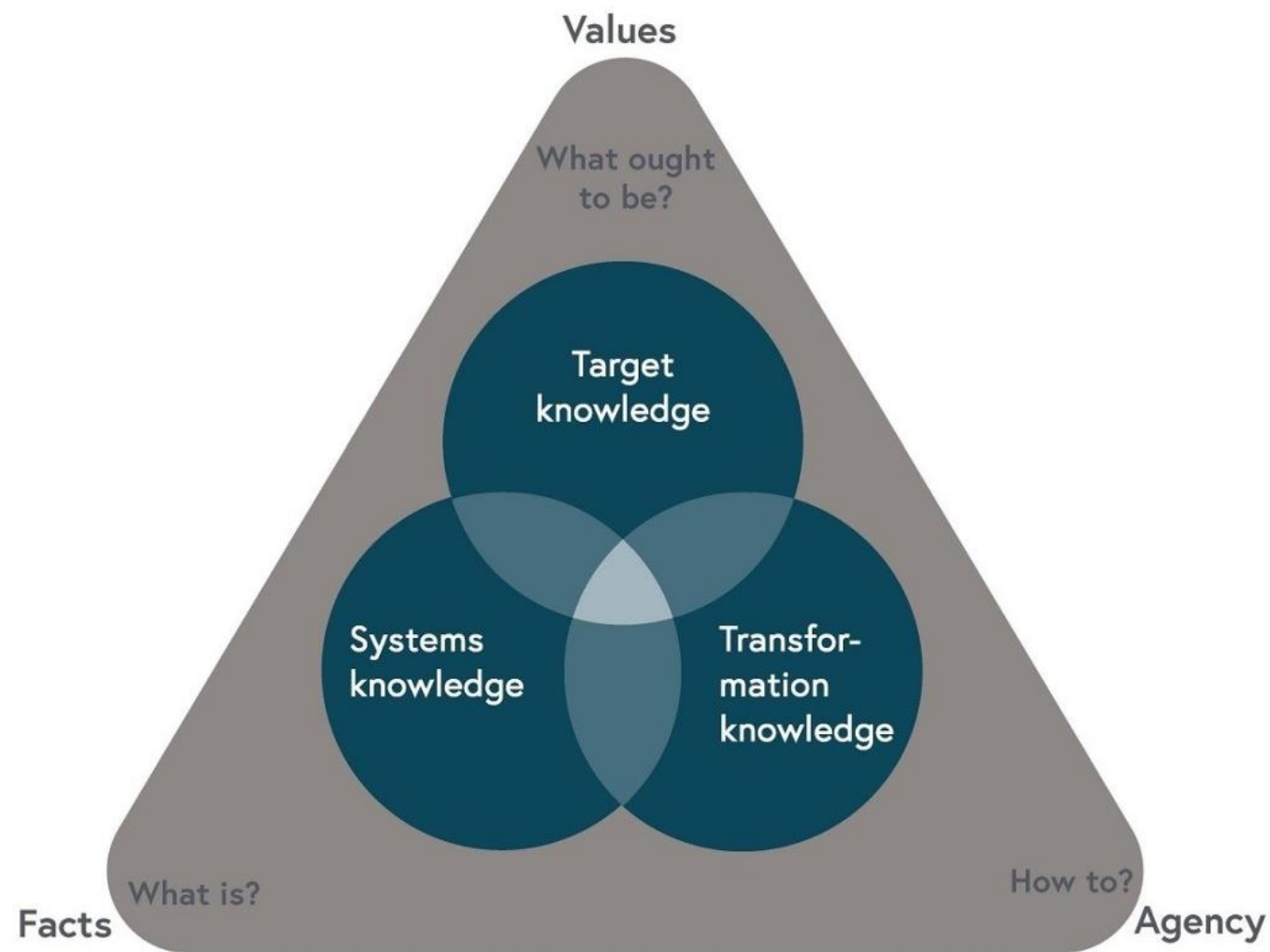
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Relationship with Facts, Values and Agency



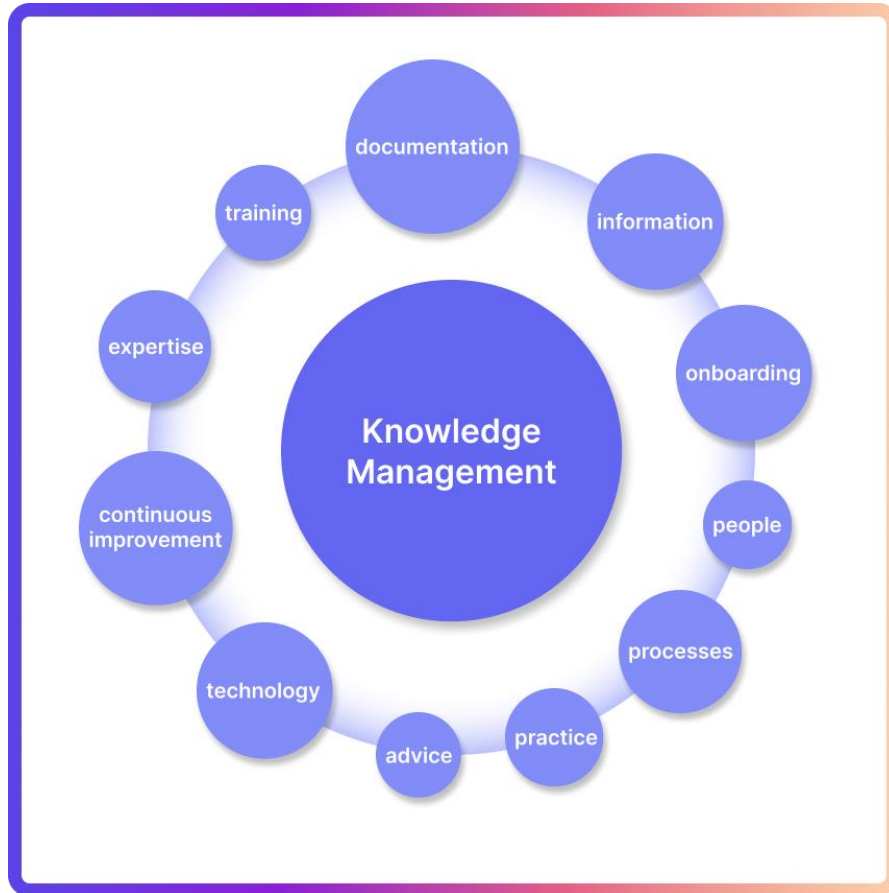
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Source: <https://www.oslash.com/blog/importance-of-knowledge-management-in-organizations-benefits-examples>

Knowledge Management is the process of creating, identifying, organizing, storing, using, and sharing collective information within an organization.

The Benefits of Knowledge Management



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Create Value. Get the right information to the right people at the right time.

Foster Innovation. Use shared knowledge to inspire brainstorming, collaboration and big ideas.

Reach Goals. Enable teams to set targets and hit them.



Create value



Foster innovation



Achieve goals

Source: <https://www.atlassian.com/itsm/knowledge-management>

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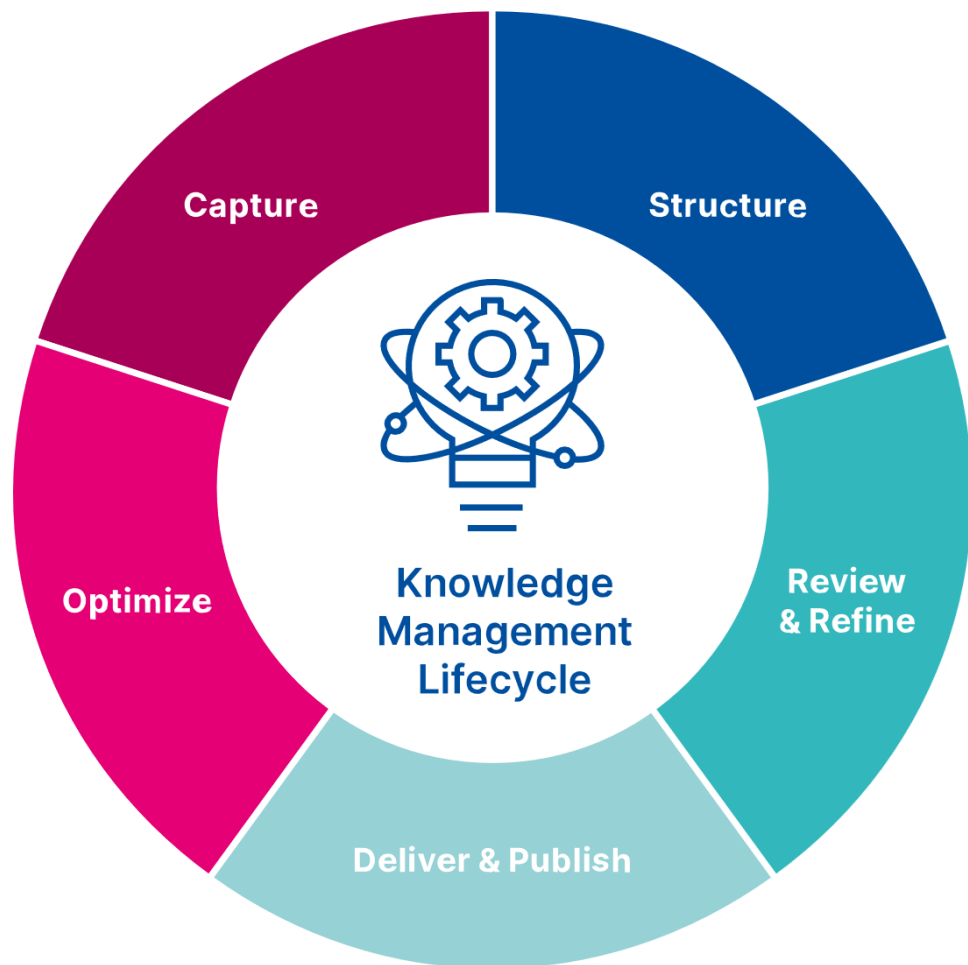
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5 Steps for Life Cycle Knowledge Management



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- 1 Capturing:** recording knowledge and processes
- 2 Structuring:** the data is then structured and processed
- 3 Reviewing:** the data is checked, revised or supplemented
- 4 Publication:** available through various communication channels after quality assurance
- 5 Optimization:** ongoing optimizations to be made based on the feedback

Source <https://www.usu.com/en-us/solutions/usu-knowledge-management/what-is-knowledge-management/#definition>

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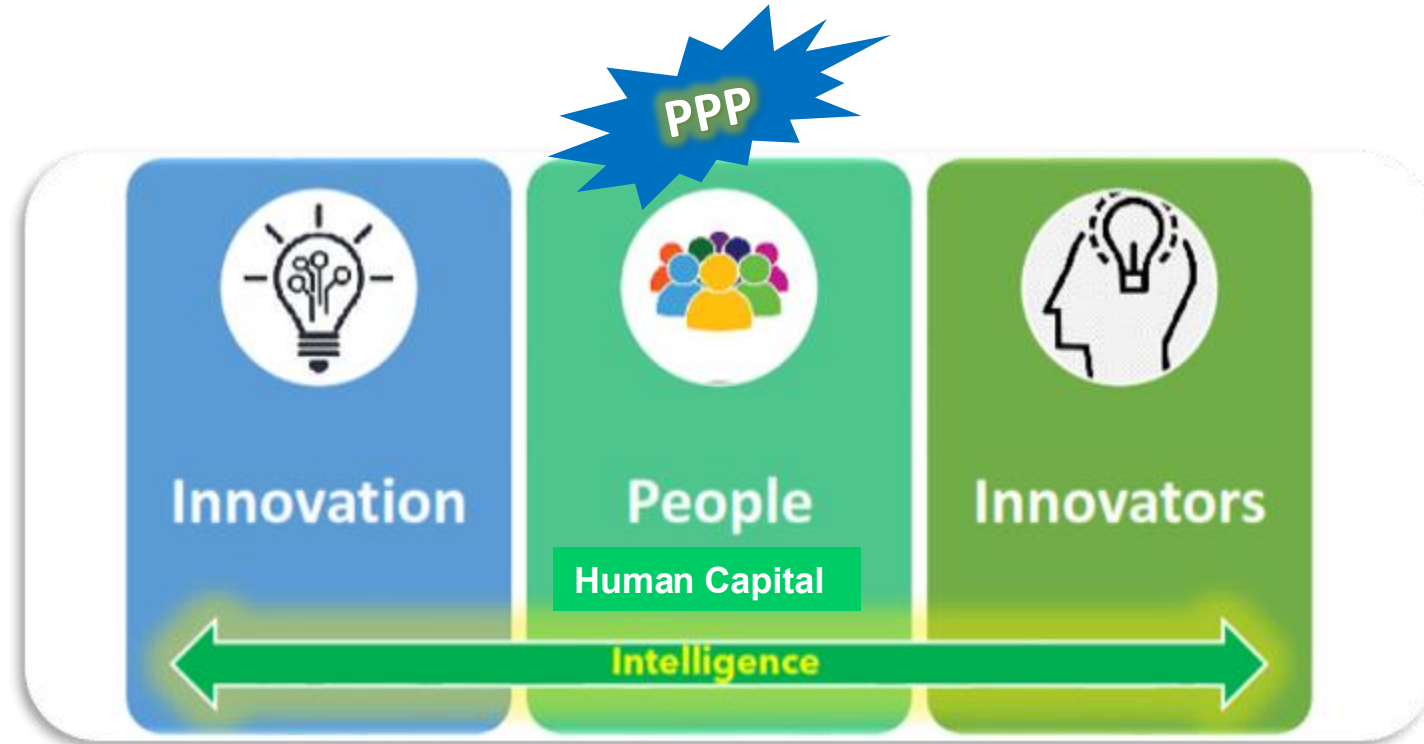
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Creation, Development, and
Implementation of new Ideas to
improve Performance empowered
by **Geospatial Information**.

Innovation Cycle:

- Ideation,
- Development,
- Implementation,
- Diffusion

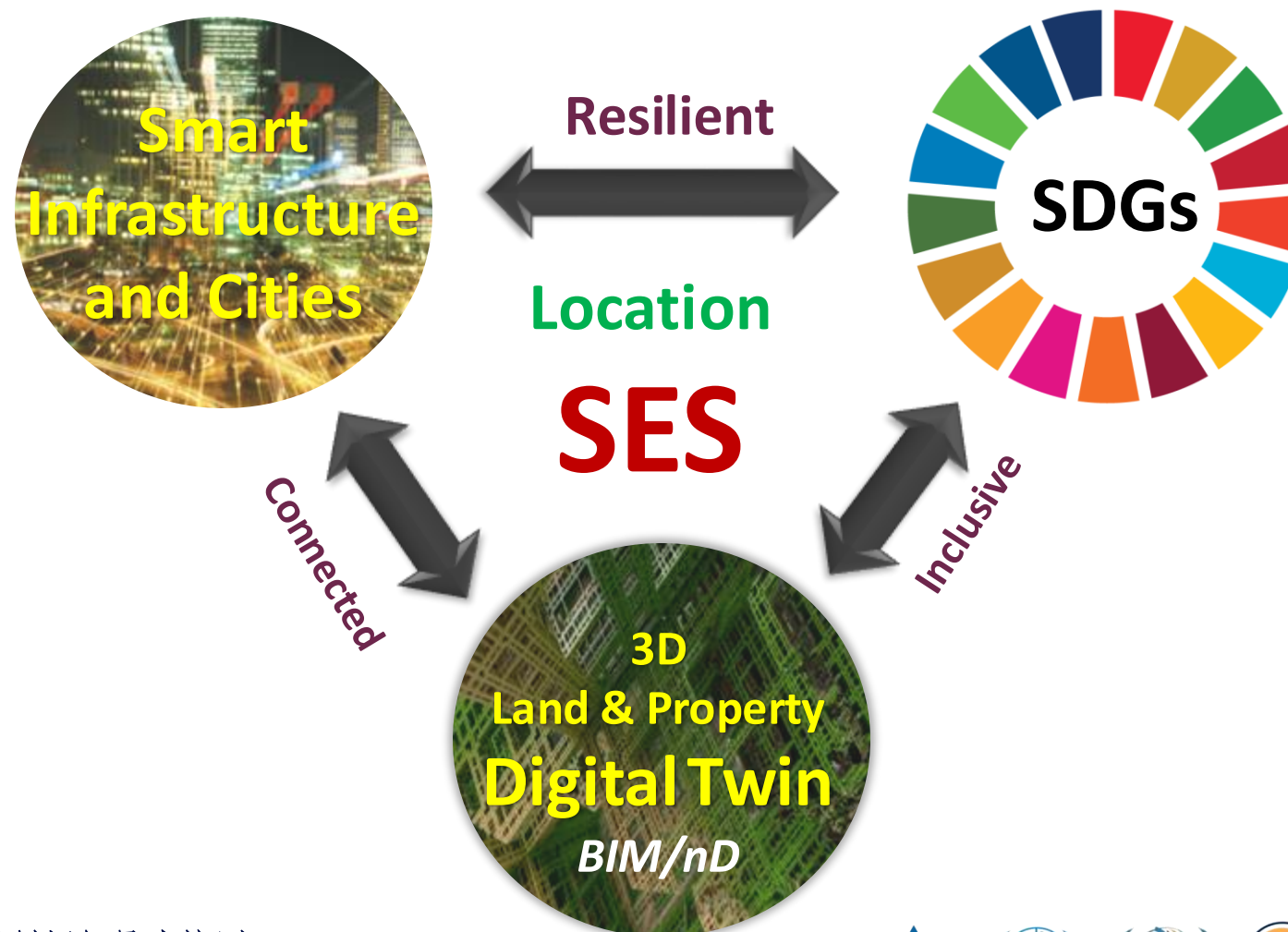


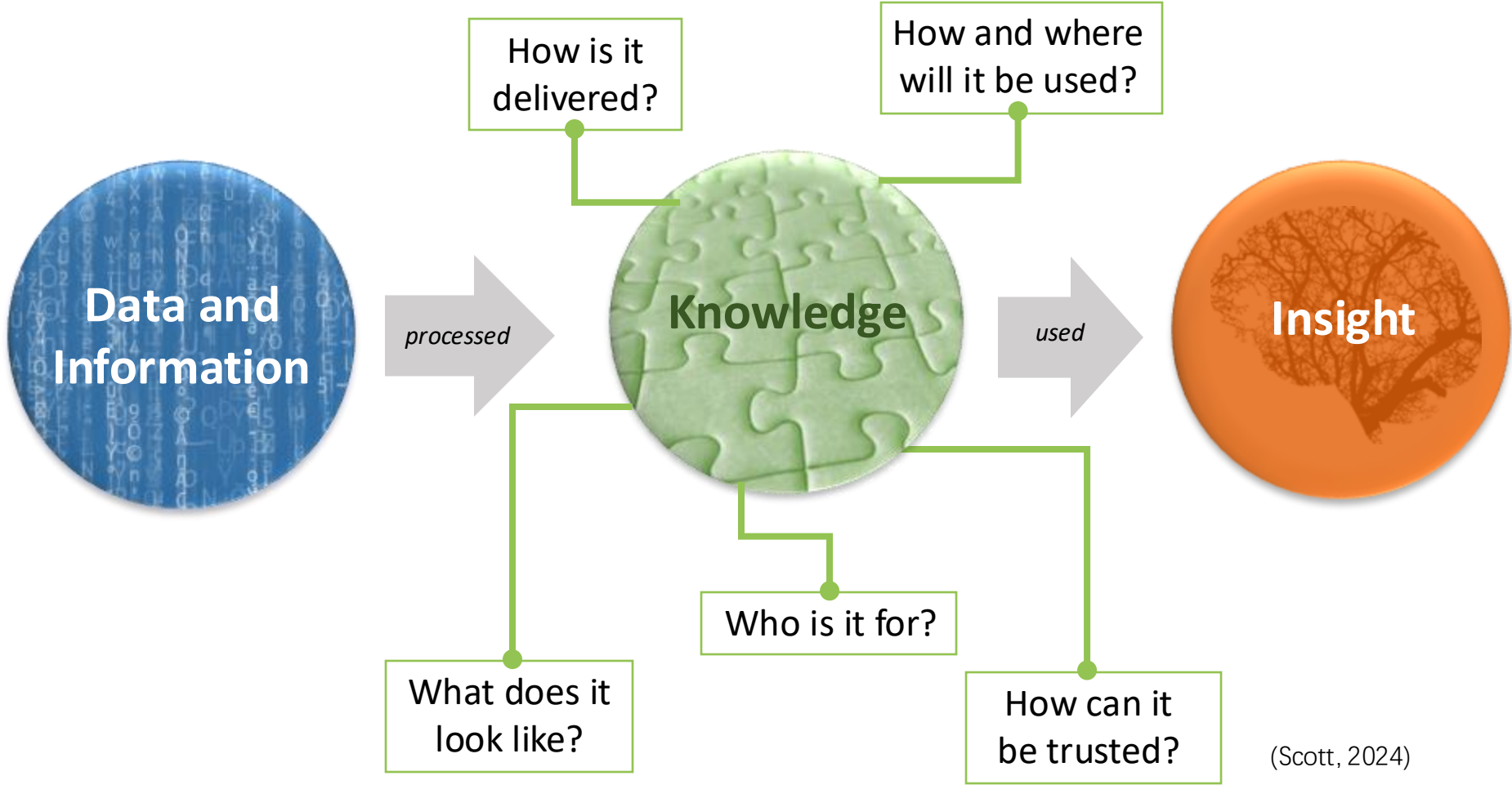
Types of Innovation



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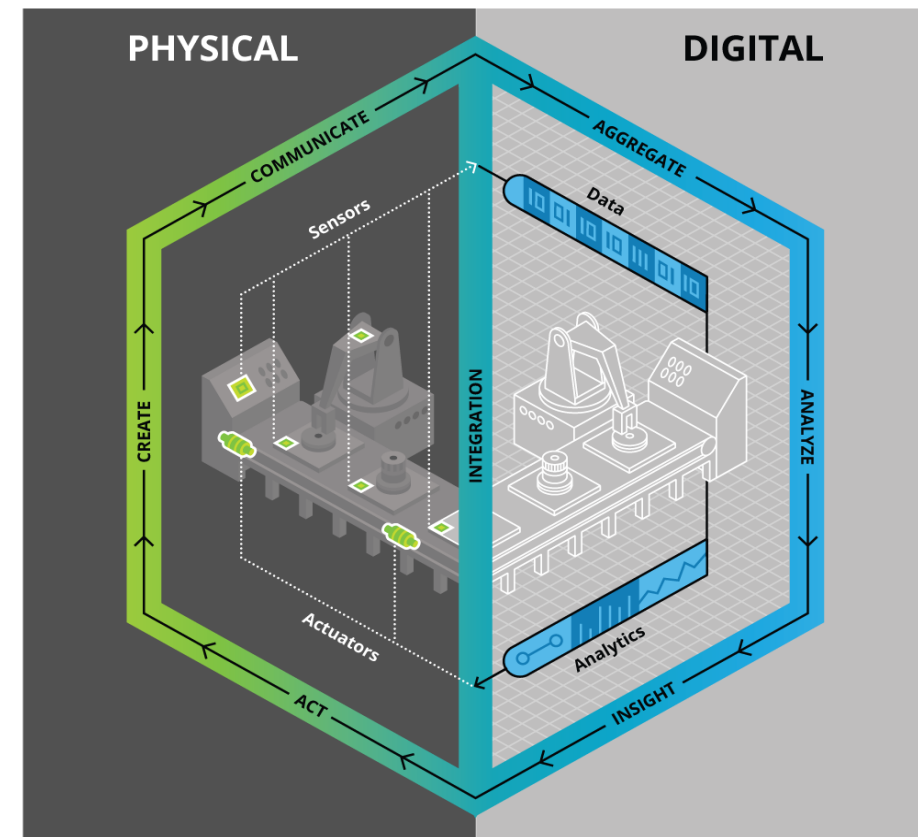




*A digital twin is a digital representation of a **real-world entity or system**.
The implementation of a digital twin is :*

- Connecting **data**, **model**, and **visualization** to mirror a unique physical object, process, organisation, person.
- Data from multiple digital twins can be aggregated for a composite view across several real-world entities, such as a building, power plant or a city, and their related processes.

Source: <https://www.gartner.com/en/information-technology/glossary/digital-twin>



Source: Deloitte University Press.

Deloitte University Press | dupress.deloitte.com

Principles for Spatially Enabled Digital Twins



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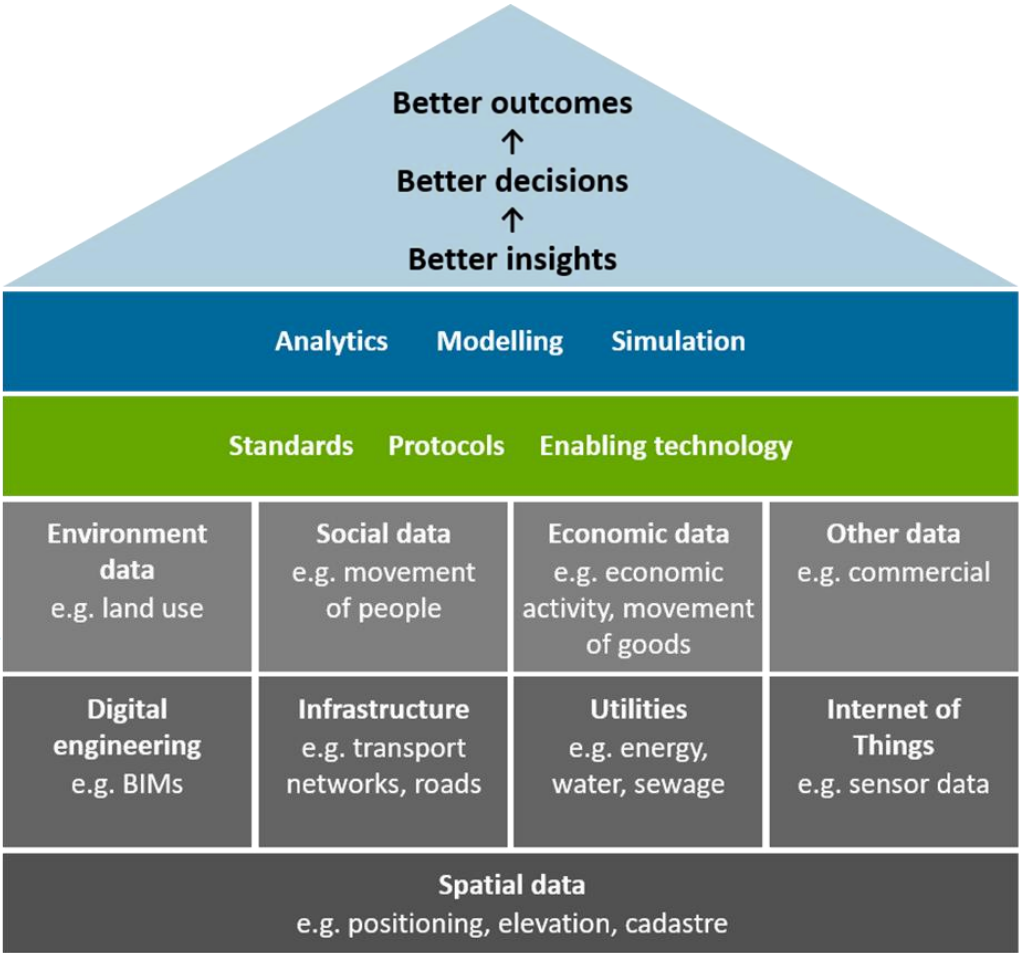
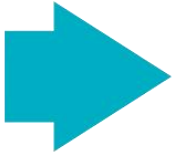
ANZLIC
the Spatial Information Council

Principles for Spatially Enabled
Digital Twins of the Built and
Natural Environment in Australia

December 2019

Highly advanced digital representations
of **the real world**.

Combining with underpinning spatial data
increases the value of Digital Twins as it
can provide **location-based insights**.



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Analytics

Simulation

Visualization

Knowledge

Intelligence

Insights



Spatial Digital Twin Platform



Data



Model



Visualization

Broad Application Domains



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Disaster
Management



Environment
Monitoring



Transport &
Energy



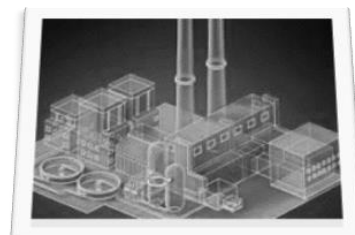
Smart City &
Urban Planning



HealthCare



Land
Administration



Infrastructure &
Construction



Manufacturing &
Industry 4.0



And more ..

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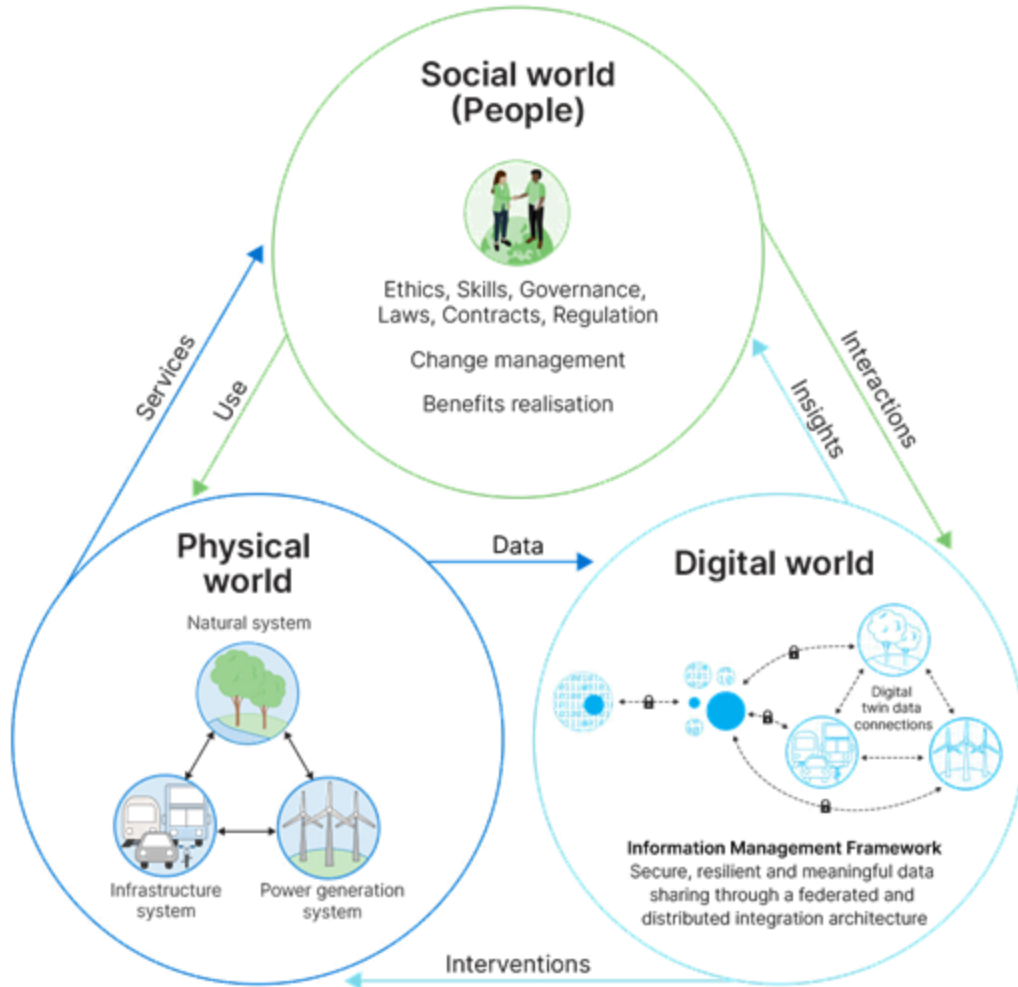




Source: <https://www.spiceworks.com/tech/big-data/articles/what-is-data-governance-definition-importance-and-best-practices/>

Data Governance

There are several governance activities going on behind the scenes to make sure people **use the right data** and **have rights to the data they use**.



Policies

- We have policies developed by governments – which include **laws**, **rules**, **guidelines** and **principals** to direct what individuals and companies can and can't do.
- These can help make sure data is of an appropriate quality (standards) and accessed by the right people.

Source: <https://digitaltwinhub.co.uk/about/the-gemini-papers/>

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Thank You

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