



Panel Session 4

Making City-Regions Resilience Practical and Affordable

3rd December 2019

Prof Peter Head CBE FREng FRSA Founder & Chair Resilience Brokers. Moderator

Dr Barbara Ryan ICES Expert Former Secretariat Director GEO Geneva

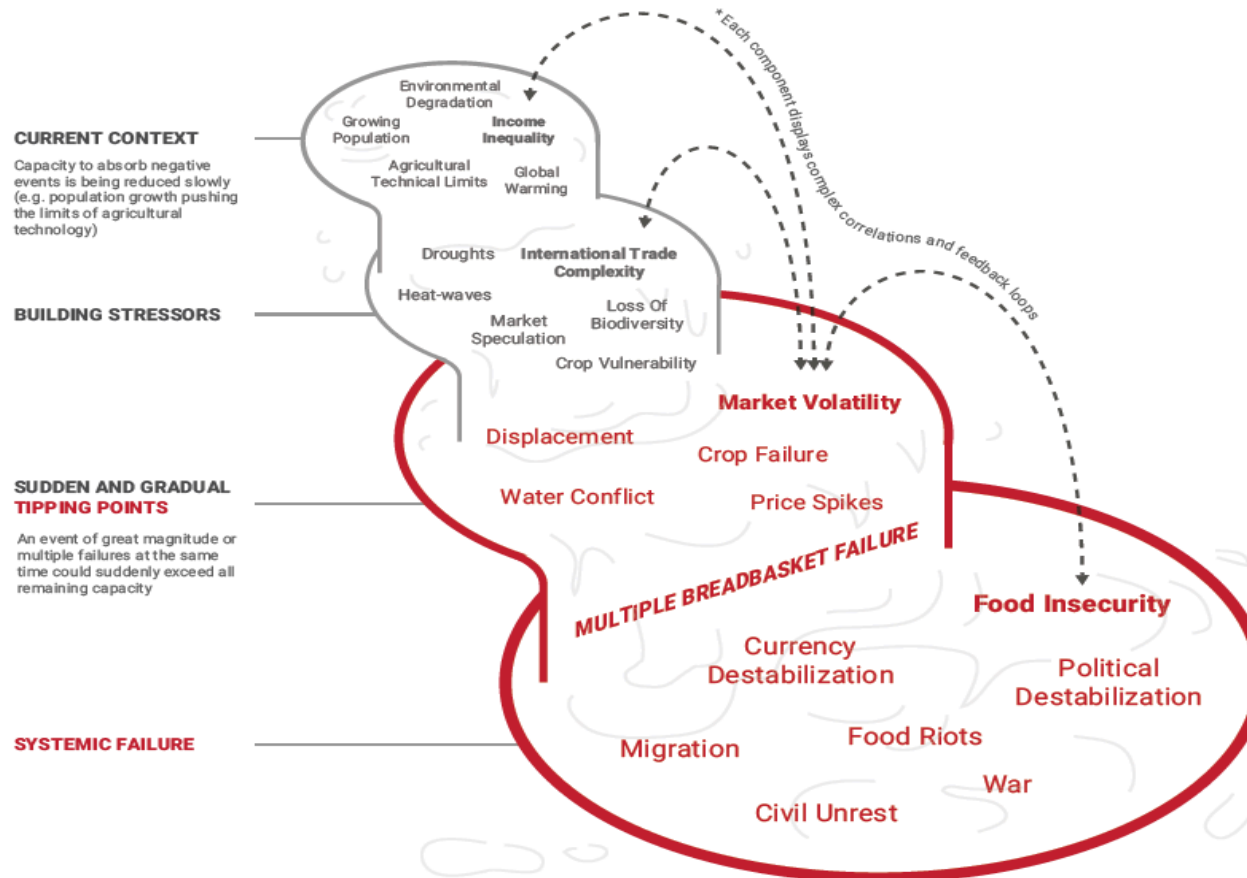
Mr Edwin Douglas ICES Financial Adviser, VP Finance Equinix Inc



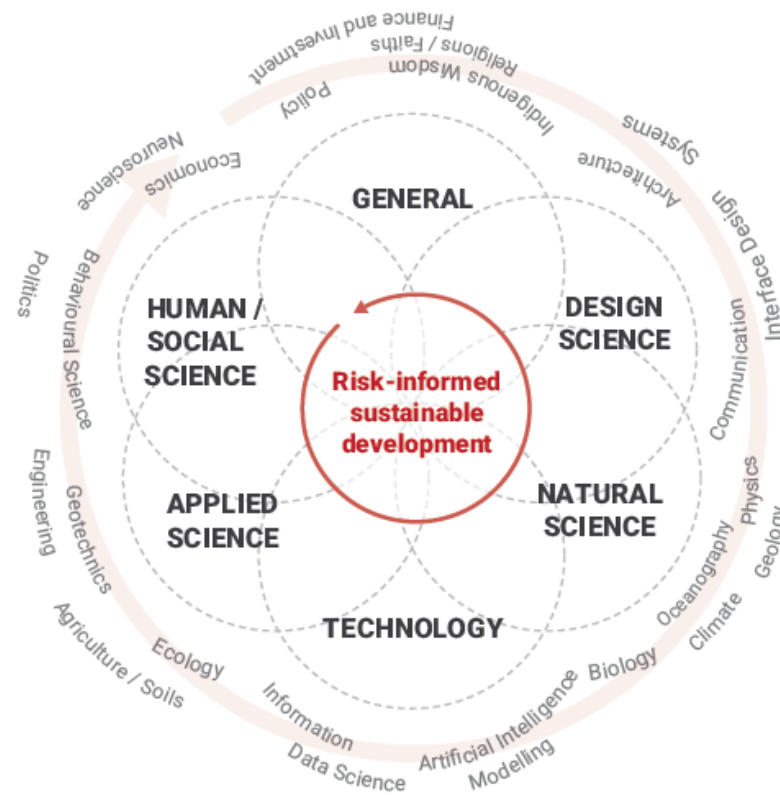
“If I had to select one sentence to describe the state of the world, I would say we are in a world in which global challenges are more and more integrated, and the responses are more and more fragmented, and if this is not reversed, it’s a recipe for disaster.”

Antonio Guterres





ACTION

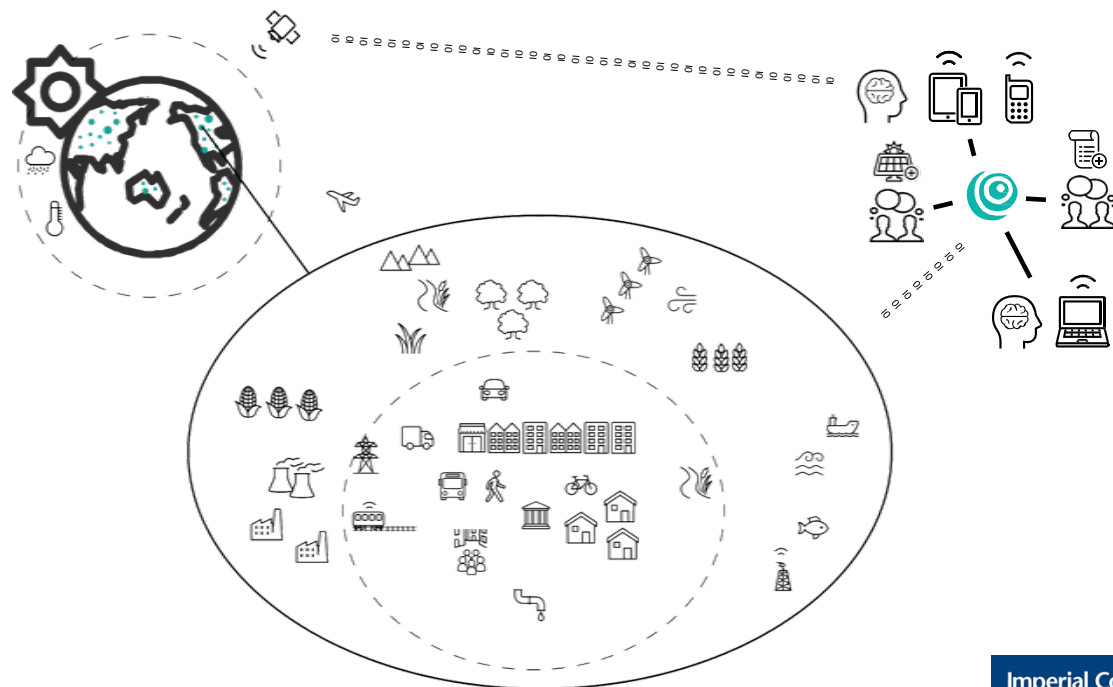
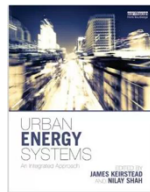




A new science for city regions

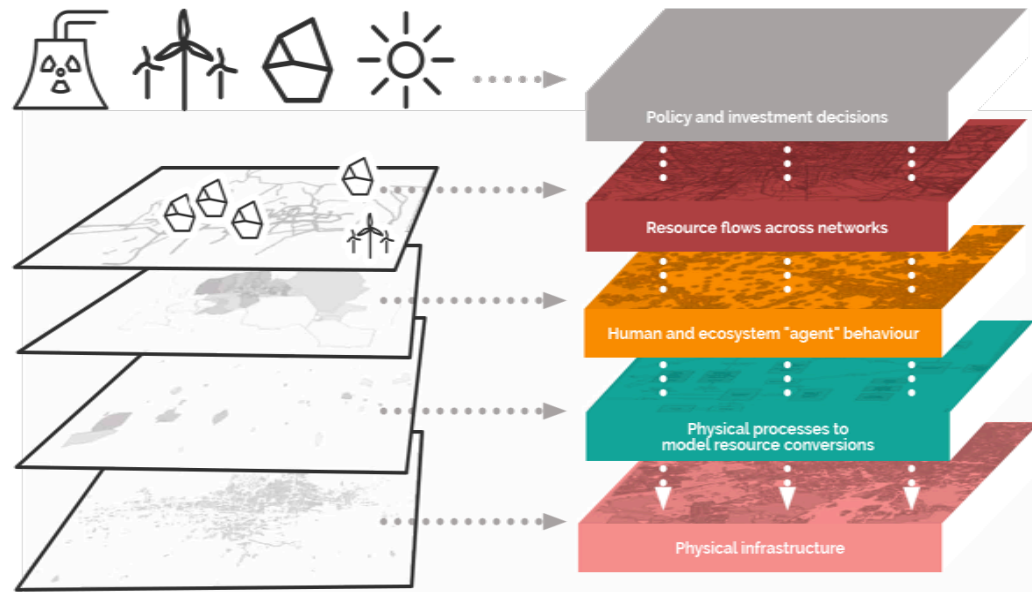
Early foundations in SynCity and SmartCity models developed at Imperial College London

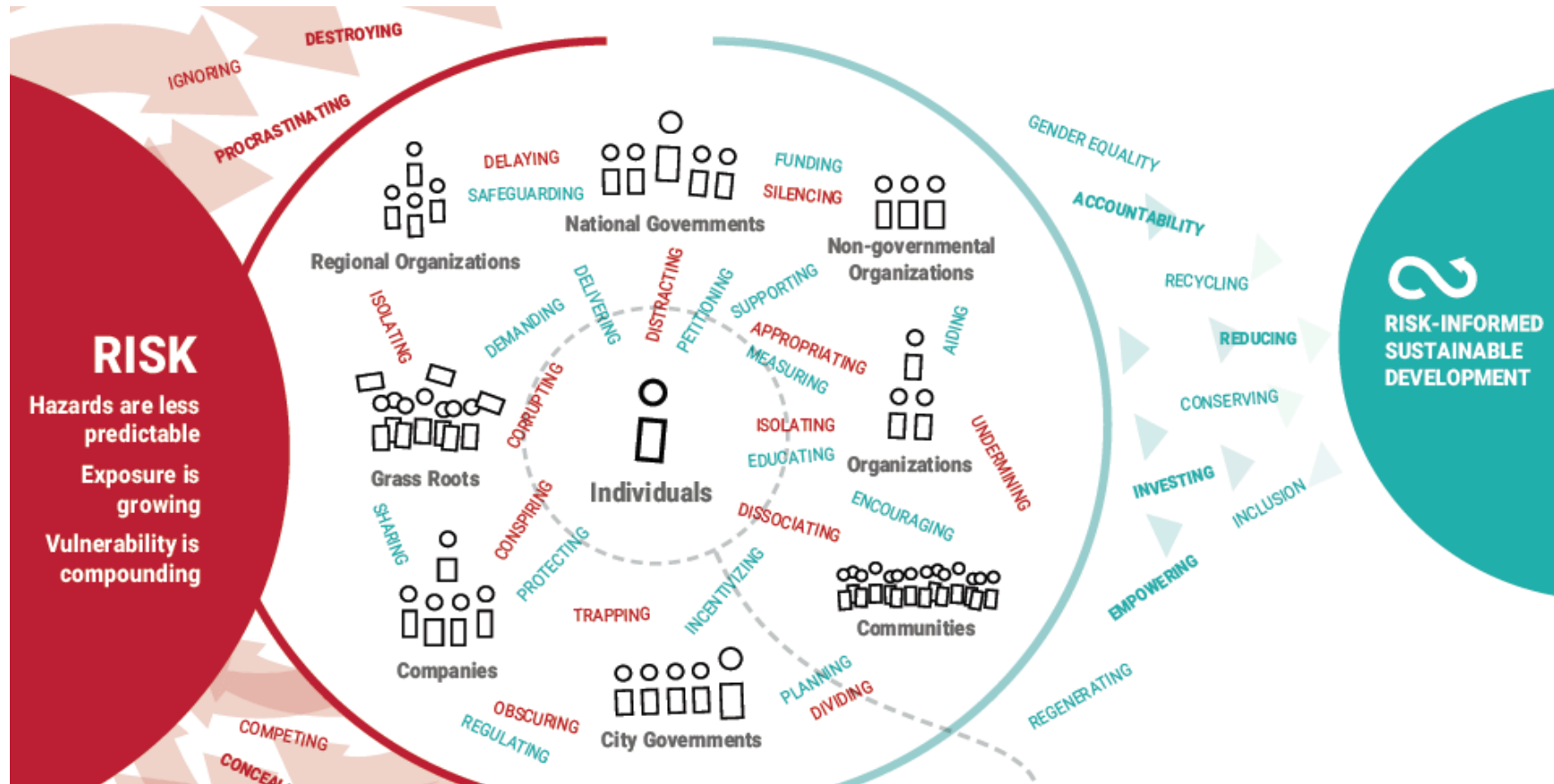
Kierstead, J., Shah, N., Fisk, D. 2013. Urban Energy Systems: an integrated approach. Routledge



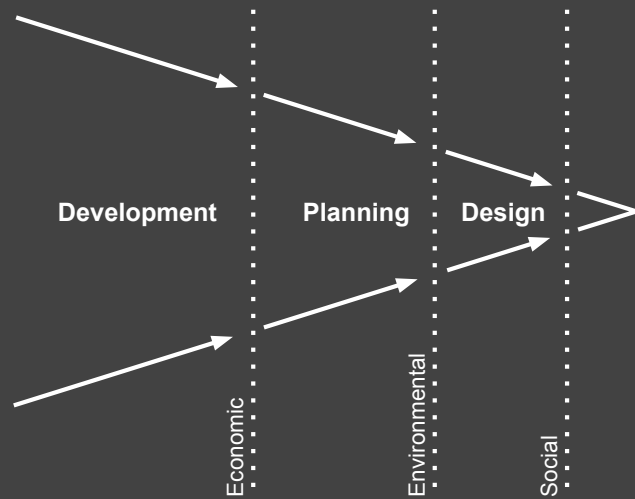
Social Science - An **Agent Based Model** (ABM) simulates the population of the entire city region, their choices, consumption patterns and behaviours.

Natural Science - A growing library of input-output **Digital Twins** (process optimization blocks) that describe all of the energy and materials flows of a city-region system. These processes are geolocated to build up an integrated systems network based on actual city function.

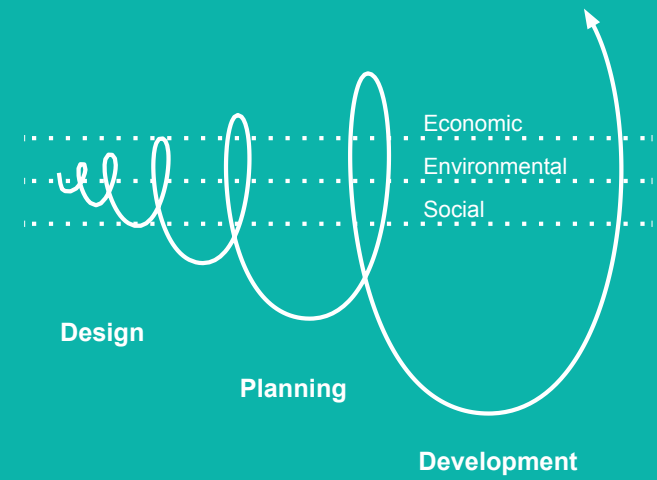


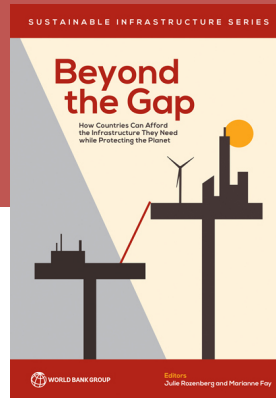


Current approach



CHEER systems health approach





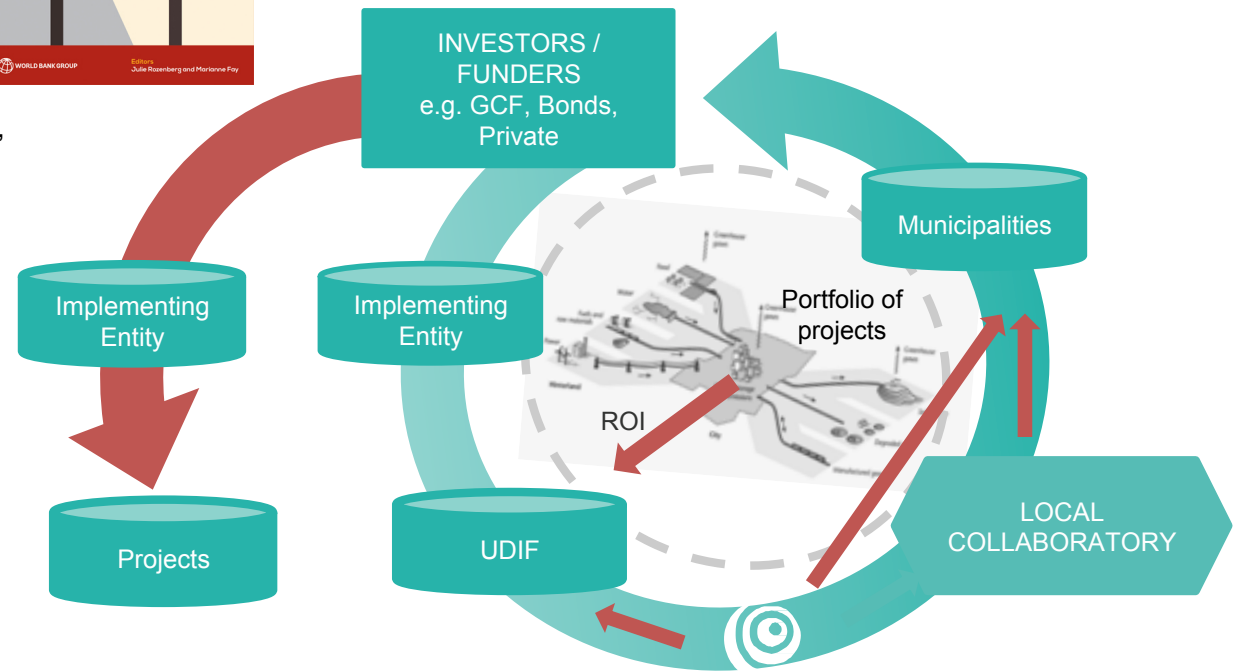
Practical and Affordable Resilience Transition

Smart selection of projects and improved design, planning and maintenance can reduce finance demand of \$5 trillion/yr by 40%

Sustainable infrastructure cost through integrated planning is \$3 trillion/yr (2014 prices): this is 4.8% of GDP

Current private sector spend on infrastructure is \$1.5 trillion/yr.
\$1 trillion/yr could come from Green/Climate / Social Impact Bonds into blended UDIF.

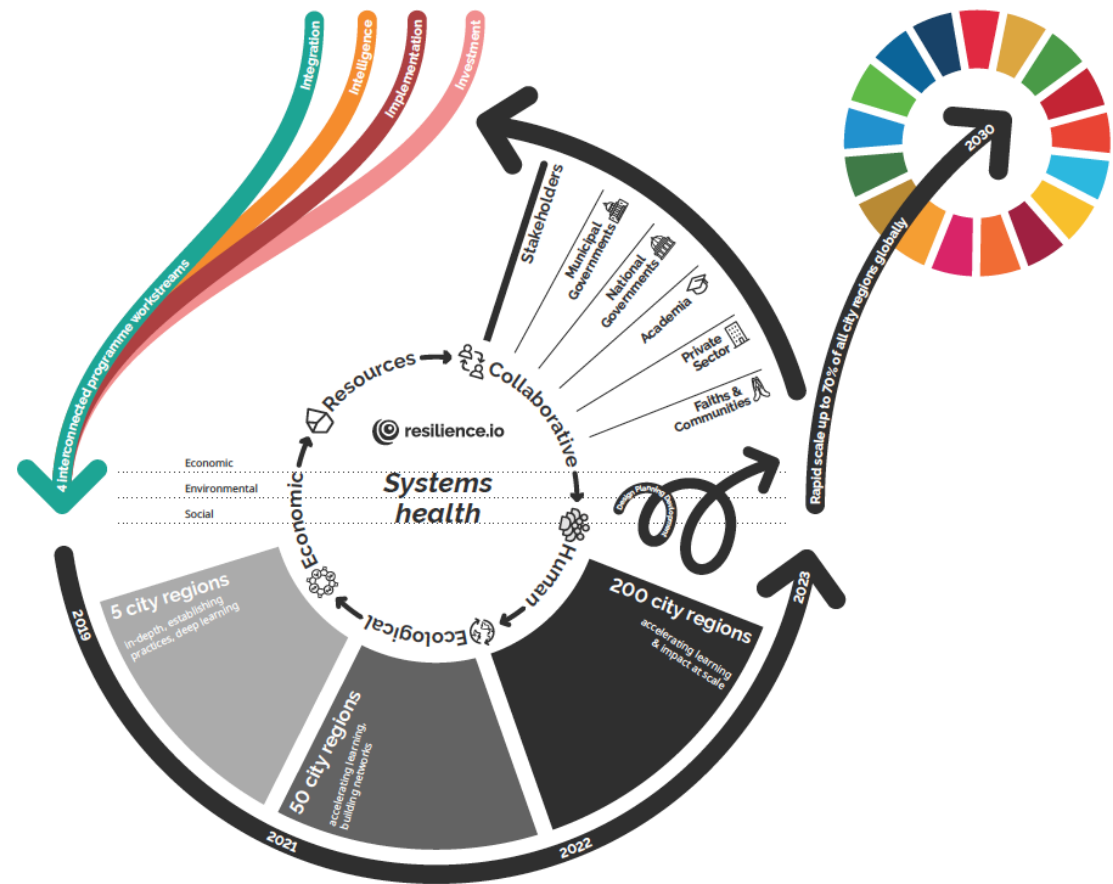
43% energy
29% transport
21% water, flood and waste
7% communications/data



Resilience Brokers Delivery Plan

Activity channeled through four interlocking workstreams and supporting activities

- **Integration:** City region, earth systems and technology
- **Intelligence:** Knowledge and interdisciplinary research
- **Implementation:** Collaboration, capacity and scaling
- **Investment:** Project aggregation, capital mobilisation and insurance
- **Supporting activities:** Innovation Business; Youth and Leadership





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