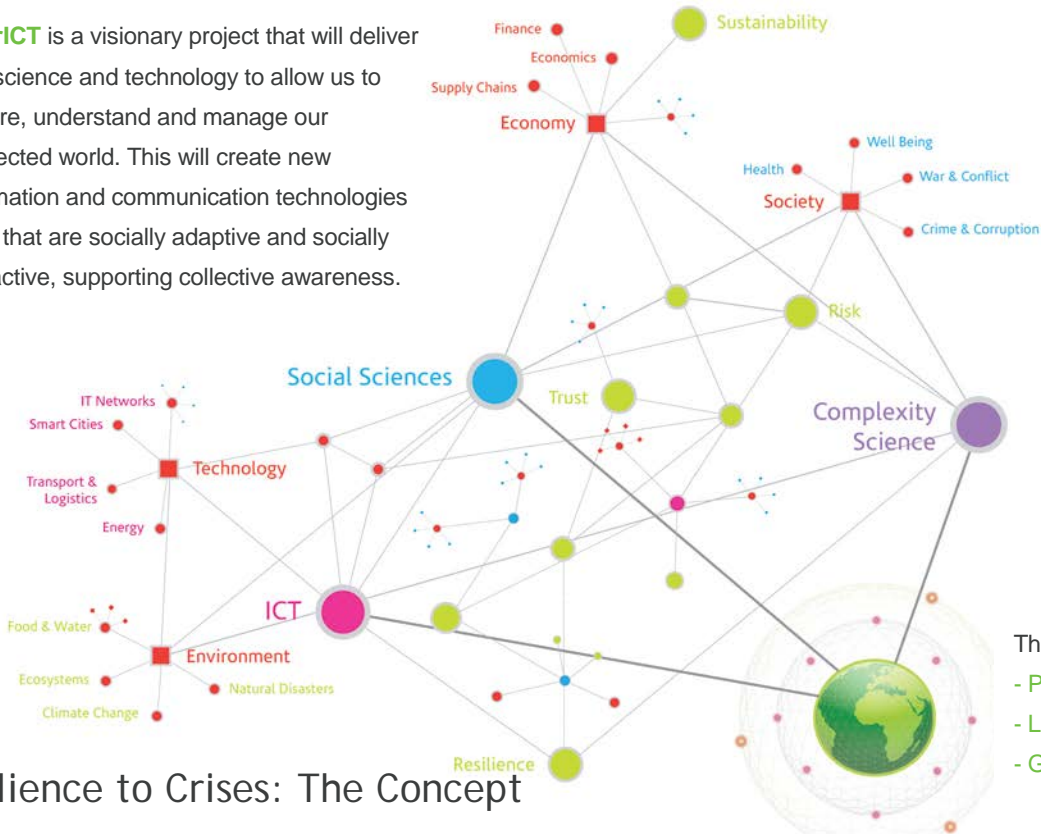# FuturICT
## Global computing for our complex world

**FuturICT** is a visionary project that will deliver new science and technology to allow us to explore, understand and manage our connected world. This will create new information and communication technologies (ICT) that are socially adaptive and socially interactive, supporting collective awareness.



The FuturICT Platform:
- Planetary Nervous System
- Living Earth Simulator
- Global Participatory Platform

## Resilience to Crises: The Concept

In networks, the rationality of construing risk as all-bad but controllable – if uncertainty is excluded – tends increasingly to invite more misfortune. The concept of Resilience to Crises (R2C), promoting study of risk and uncertainties, is vital given the environmental challenges ahead. Cyberspace is our first manufactured environment, where ideal assumptions become increasingly impractical, if not dangerous. R2C offers practical ways to endure and prosper given these realities. Crises are decisive moments, turning points - for better or worse. Resilience is the enduring power of a body, or bodies, for transformation, renewal and recovery through the flux of interactions and flow of events. R2C combines the definition of crises and resilience into an empowering concept. It is timely decisions, coherent actions and a willingness to learn that counts during the passage through and beyond decisive moments.

Crises continually test for resilience; this process is evolutionary in nature. Resilience grows and decays as the innovative capacity to select activities from a variety of capabilities changes, enriched or not by learning. The growing availability of data, processing power and diversity of modelling is making resilience easier to explore and exploit. Building capacity for R2C requires the integration of whatever multi-disciplinary fields can inform decisive action and complexity science to advance learning beyond tame risk. This can be summarised as R2C moving on from bouncing back to the status quo ante to bouncing forward and thriving, not just surviving. Change and continuity always cross-fertilise.

# Characterising the future usefulness of R2C

Six characteristics of R2C are selected and highlighted below. They not only mark the levels of challenge R2C aspires to but also indicates why these are reasonable hypotheses worthy of empirical exploration.

- Making better sense of risk and uncertainties. The big data that flows from ubiquitous sensors does not necessarily produce big or valuable information. Data combined with advances in the mathematics and modelling offer great prospects for exploring and exploiting risk and uncertainties.

- Remedying irresilience. Conventional approaches to risk are prone to being rackets. Threats, vulnerabilities and impacts are all too easily skewed to purchasing expensive remedies, prone to cost overruns and in- service date slippage. Meantime cross cutting contingencies are neglected. Risks and uncertainties too often outflank protective measures. "Super-spreading" hubs prone to irresilience are neglected or undetected.

- Enabling distributed decision-taking. R2C is a concept for any and all citizens, not just elites. The capacity to take decisions needs to be distributed rather than overwhelming single points of failure.

- Buying time to learn through coherent decisive actions. R2C relies upon a large repertoire of highly trained skills. Actions may be carried out unthinkingly but selecting the right evolving combination as events unfold, is a complicated process. However, in concert with distributed decision-taking, it is coherent decisive actions that buy time to learn. Cognitive energy saved by drills needs reinvesting.

- Investing time in greater capacities for healthy innovation. Immediate actions consume scarce resources. Unless the time they buy is being invested to accelerate innovation, those resources will be squandered. This is why transformation is the lead attribute of resilience - not recovery. It also underscores how R2C is a mainstream rather than exceptional concept for good days and bad. The ethos R2C promotes is for healthy co-operation and competition through innovation.

- Measuring the value of R2C in pragmatic terms. The five preceding characteristics all need reliable measures for their value-added. R2C is about adding value not just protecting or taxing the bottom line for bogus security.
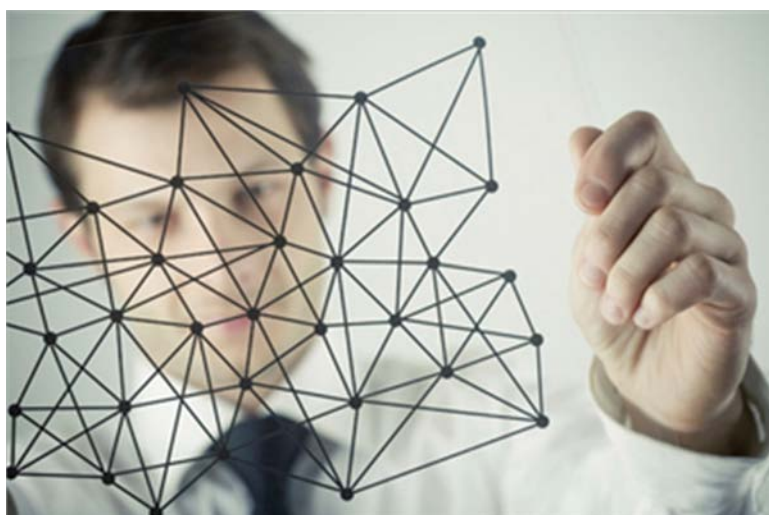
Overall, R2C is a concept that is designed to be fit for the evolutionary nature of networks. It works with diversity and selection rather than selecting from a depleting pool of diversity. The dynamic interaction between diversity and selection is an evolutionary process open to learning. Openness to learning can make fitness more than a fleeting interlude or just the product of chance. This makes transformation the lead attribute for the power of resilience. R2C offers a way to help deliver graceful convergence through creating real jobs and competitiveness. FuturICT is precisely the platform for making such ambition a reality.