

Resilience and Emergency Planning in Mega-cities

(Issues and Options)

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Overview of Presentation

- *Homo urbanis*: A vulnerable networked society
- *Resilience & Emergency readiness* - Why they are important
- *Issues of governance* - Vertical scales and linked geographies
- *Sense making and Issues of Importance*

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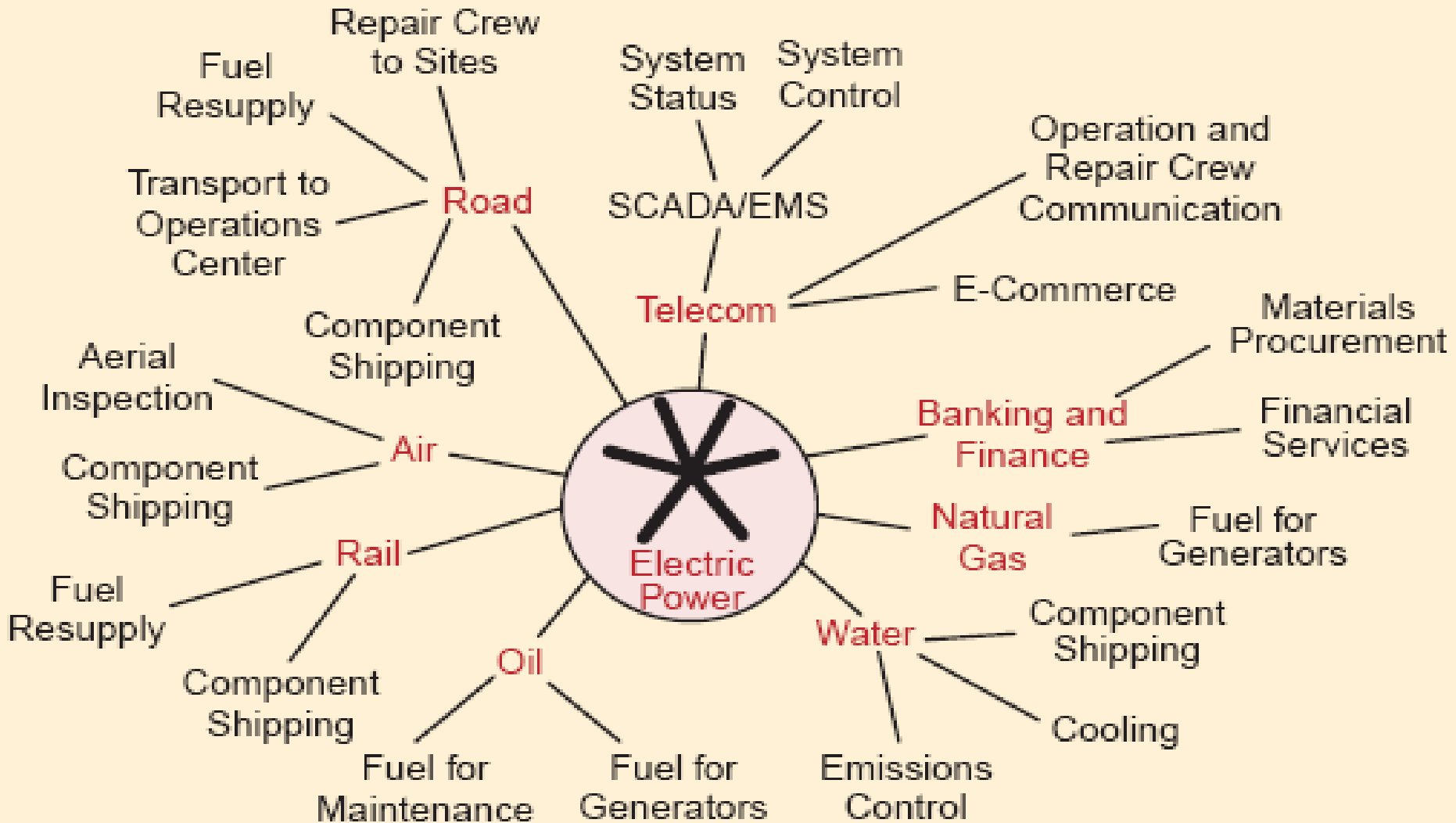
Urbanisation and Infrastructure

- Complex dynamic process (over multiple scales of space and time)
- Social phenomena and physical transformations of landscapes

Key Infrastructure disturbances might include:

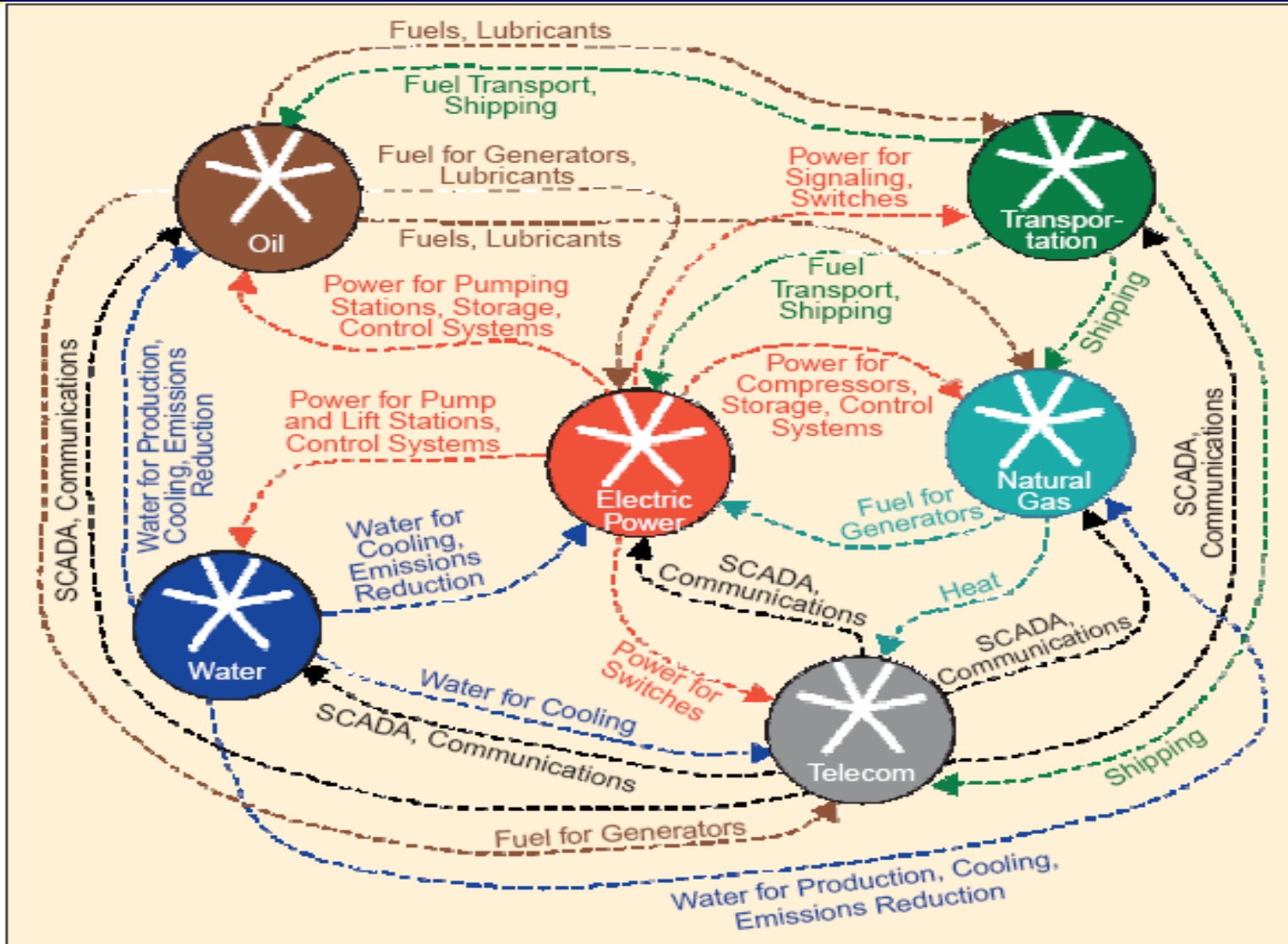
- Loss of interconnectivity & Telecommunications (data, networks)
- Damaged Housing Stock & Commercial Premises
- Power supply (Generation & transmission)
- Transport systems (Road, rail, air, water)

Infrastructure dependencies.



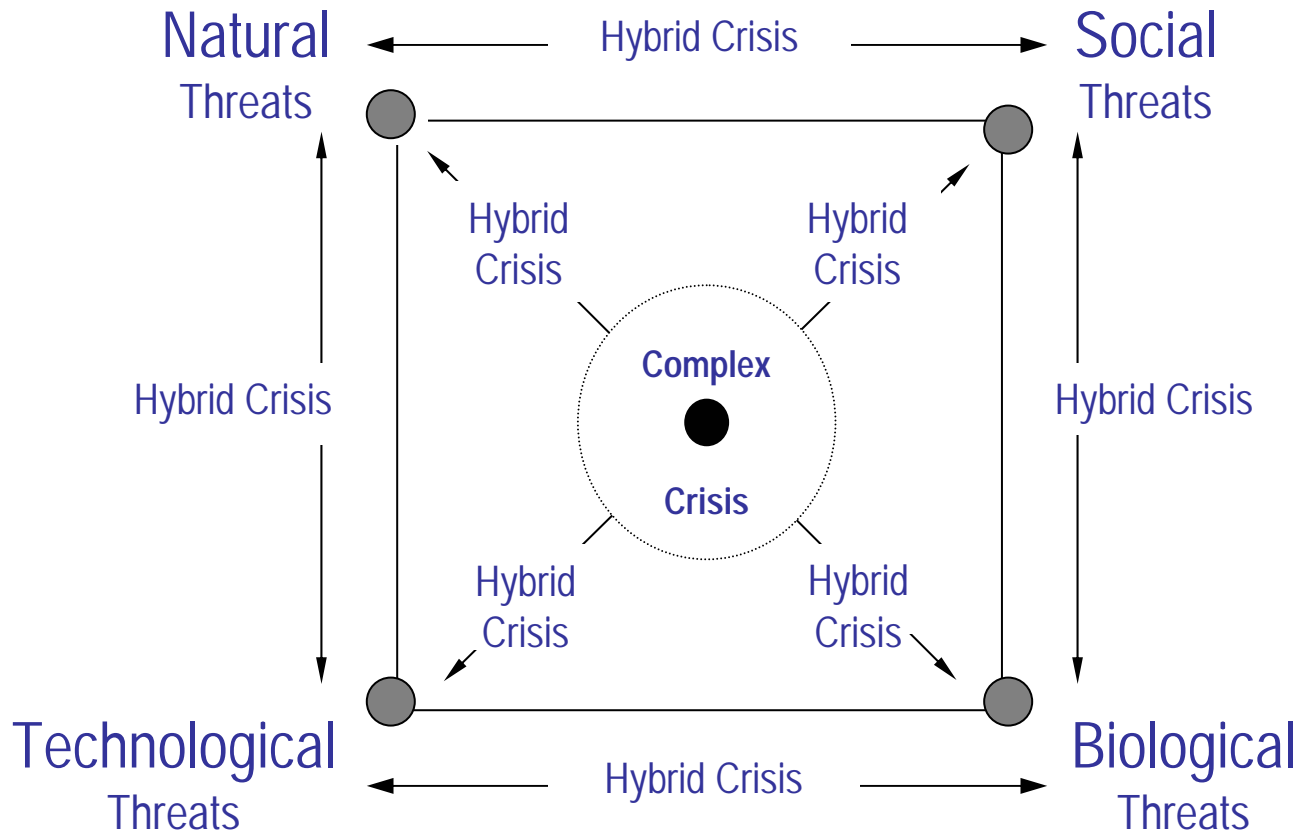
Rinaldi, S.M., Peerenboom, J. P. & Kelly, T.K. (2001) "Identifying, Understanding, and Analyzing Critical Infrastructure dependencies," in IEEE Control Systems Magazine, December

Infrastructure Inter-dependencies.



Rinaldi, S.M., Peerenboom, J. P. & Kelly, T.K. (2001) "Identifying, Understanding, and Analyzing Critical Infrastructure dependencies," in IEEE Control Systems Magazine, December

The *Interactivity* in Crises



(After Parker (1995:314))



Why is attention to these issues important?

- Crises have become *Normal*
- Often with a sudden emergence
- Causing major consequences

Why does it matter?

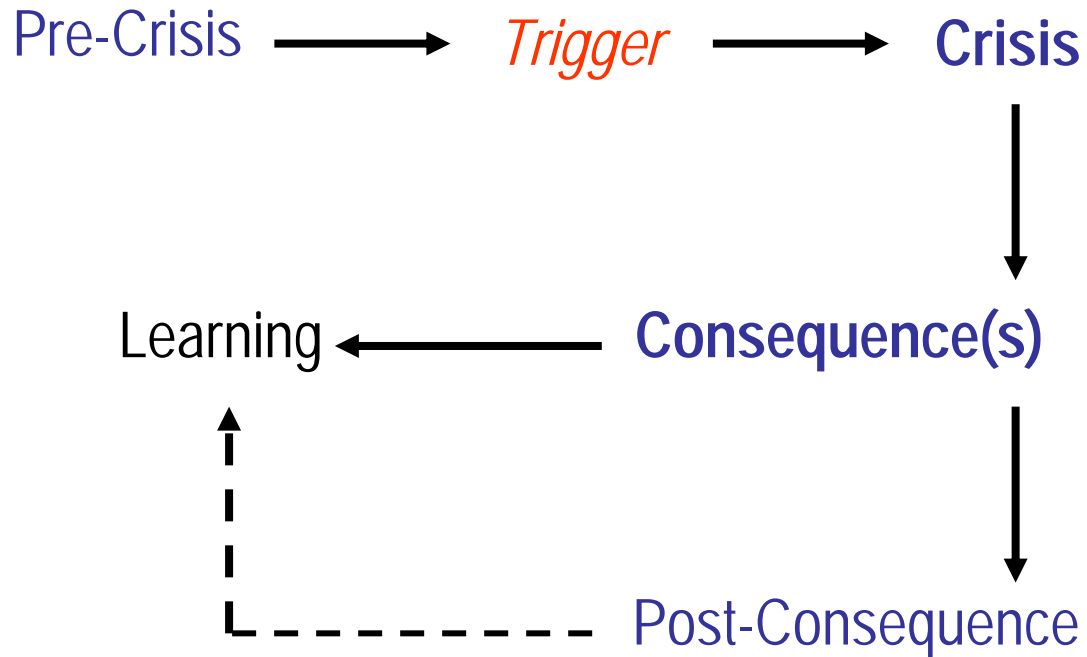
- Could the crises *or their triggers* have been attenuated?
- Could their consequences have been mitigated?
- Could they have been **anticipated** and resilience enhanced?

A Resilient Organisation?

- **Merrill Lynch**
 - Number of employees lost : 3
 - Amount of office space lost: 2,083,555
 - Physical location affected: 4 World Financial Center, Whole Building
 - 2002 revenue: \$28.5billion
 - Headquarters: 4 World Financial Center, New York, NY 10080

 - Returned back to work within 24hours
 - Transferring trading operations to London, Tokyo and Hong Kong
 - Used their web site to communicate relocation and emergency transportation information to employees

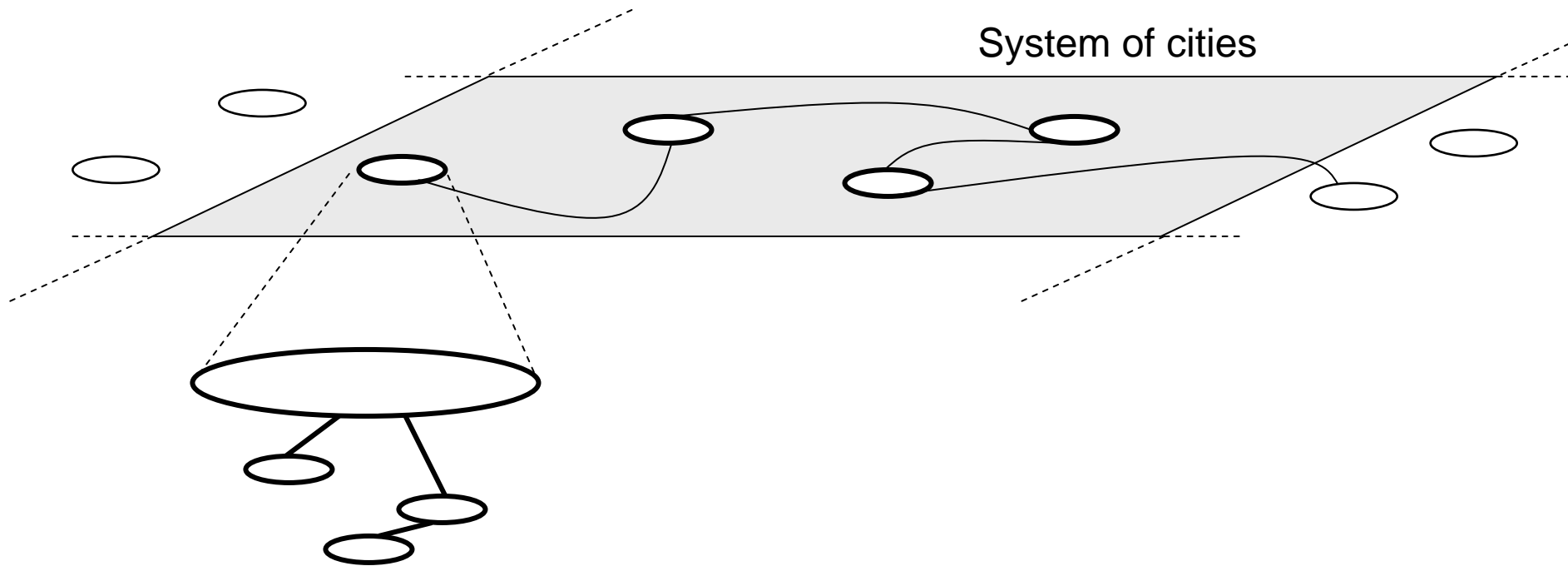
Failure *Fractals*



Cities as systems - cities as nodes in systems

Resilience:

The ability of a system to maintain its structure and patterns of behaviour in the face of disturbance^a



^a Stuart, F. & Downing, T. (2004) "Resilience and Vulnerability, in the *GECAFS Project - Poverty and Vulnerability Programme*. Stockholm, Sweden: Funding Agencies: Stockholm Environment Institute. (derived from: Holling, C.S. (1986) *The Resilience of Terrestrial Ecosystems: Local Surprise and Global Change*, in *Sustainable Development of the Biosphere*, edited by W. C. Clark and R. E. Munn. Cambridge, UK: Cambridge University Press. Based on an analysis literature by Michael Schoon (2005) Working Paper W05-4, Indiana University.

Emergency response *a city governance perspective. 1*

A number of analytical questions seem pertinent:

- Is the budgetary allocation for crisis & emergency response planning for the city commensurate with threats and consequences of major failure(s)?*
- How extensive is the role of the city administration in crisis planning response & recovery?*
- What degree of vertical collaboration exists - in relation to crisis planning, policy development & implementation - across City, Regional, National jurisdictions?*
- What degree of public confidence in the city administration exists (and/or other levels of govt.) in relation to preparedness and response capacity?*

Emergency response *a city governance perspective.2*

- *Are foresight techniques used to anticipate unexpected combinations of threats & emergent crises (Who should carry them out; how should stakeholder participation managed; who should fund the process; How would this knowledge be used)?*
- *Are vulnerability analyses of dependent and interdependent critical infrastructure(s) carried out (How & by whom)?*
- *Are early warning systems and risk communication mechanisms in place (thus allowing a coordinated threat recognition and response escalation capacity)?*
- *What collaborative first, secondary & supporting responder training is carried out (How often, and to what depth are threat scenarios examined)?*

Emergency response *a city governance perspective.3*

- *The degree & nature of stakeholder involvement (i.e. NGO's, Public and/or Private sector) in emergency response & crisis planning - How is crisis prevention marketed to the public & private sector?*
- *What post-crisis recovery, rebuilding and institutional learning strategies are in place?*
- *Who participates in post-incident debriefs - How are these 'lessons' applied?*

Empirical Findings

Crisis Prone organisations

- Cultural beliefs about invulnerability
- Non-existent or ineffective internal control mechanisms
- Senior management not trained in decision making in crisis contexts
- Contingency planning inadequate or non-existent

Accidents in highly complex systems

- 'Cook' slowly
- Occur suddenly

Crisis-ready Institutions have or are developing

- Two examples of mega-city governance that seek the degree of integration alluded to in the guidance questions above are:
- the **'Ready New York'** - Institutional and Community Engagement Program
- The **'London Resilience Partnership.'**

Both of which have a strong community outreach, integrative goals that include private and public partnerships

Why must our thinking change?

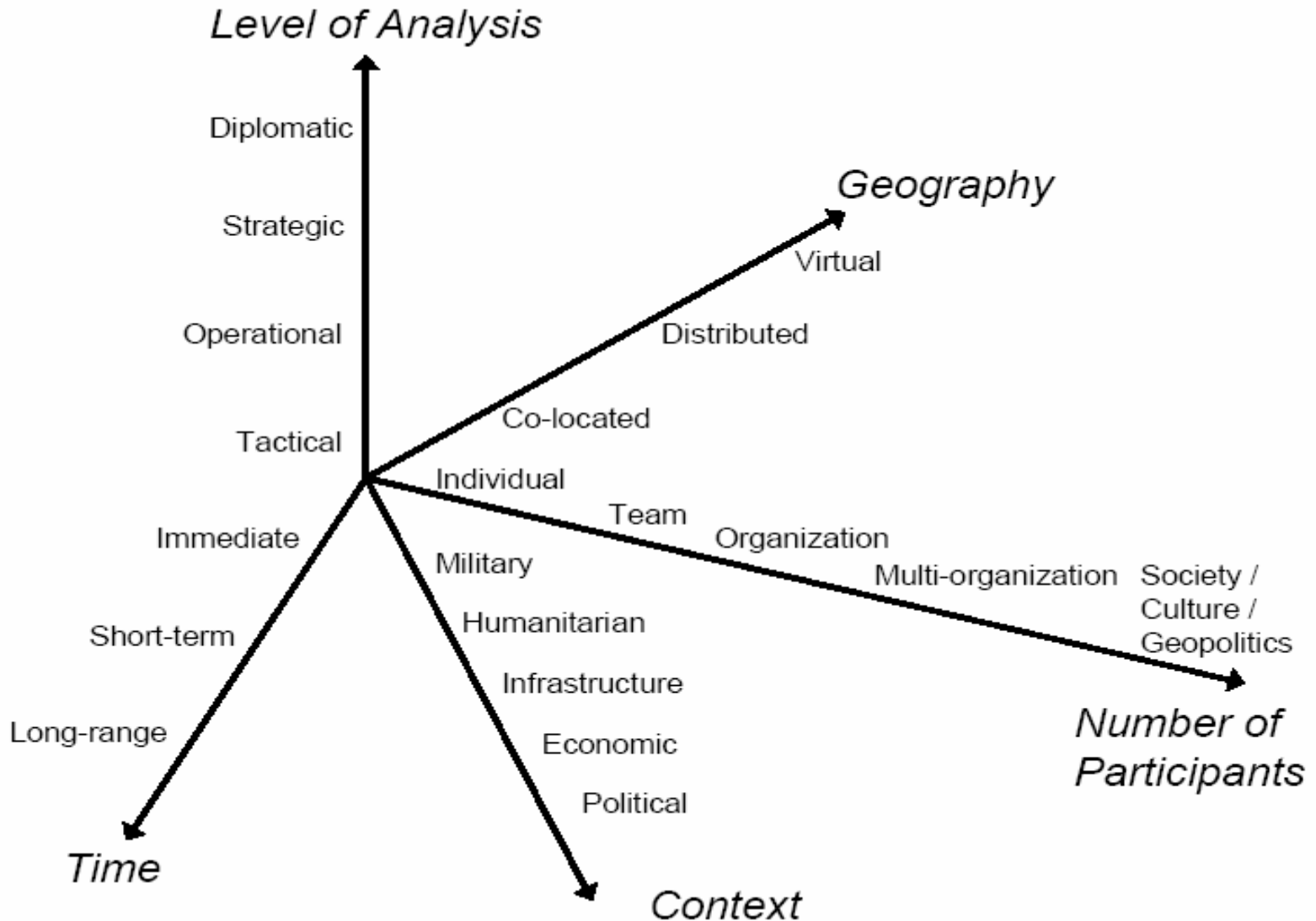
- With the threat of impacts from extreme natural hazards all Infrastructure and networks of infrastructure become *critical*:

Four kinds of failure - *before, during & after* Crises:

- *Imagination,*
- *Policy,*
- *Capabilities &*
- *Management.*

National Commission on Terrorist Attacks upon the United States (2004): "*The 9/11 Commission Report, Final Report,*" Authorized Edition, Norton: (p. 339)

Contexts of Applied Sense Making



Leedon, D.K. (2001) Final report: Sense Making Symposium, CCR Program, Office of the Assistant Secretary of Defense.

Issues of Importance

- How should the public & private sectors collaborate in implementing emergency response and systems continuity planning for mega-cities?
- How might the capacity for city governance be enhanced by aligning the skill sets and coordination of planning & response personnel (the requisite variety) needed for response, continuity and recovery?
- Can infrastructure be re-designed / designed to enhance resilience in face of disturbances and critical incidents (*either by intention or as normal accidents*)?