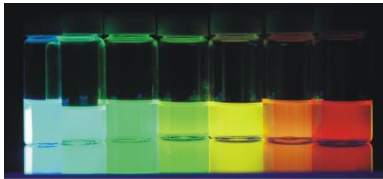




# Understanding Emerging Risks: System Complexity, Perceptions, Control and Learning

**Professor Nick Pidgeon PhD MBE FBA**  
**Understanding Risk Group, Cardiff University UK**

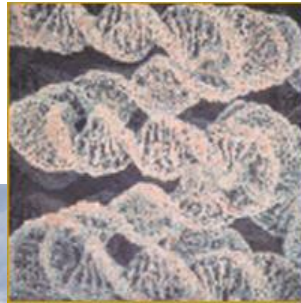
**PCAST - CST Joint Meeting 14<sup>th</sup> March 2024**



2.3 → 5.5

Size (nanometers)

© Copyright 2004, Benoit Dubertret



# Major Disasters Have Complex Pre-Conditions - Hence Need to Focus upon Socio-Technical as well Environmental and Engineering Resilience



Photo credit: NASA

- **Technical, environmental, and organisational preconditions combine**
- **Incubation of background factors - e.g. poor safety culture, risk normalization**
- **Warnings disregarded or not appreciated by those responsible**

**See: Vaughan, D. (1996) *The Challenger Launch Decision*. Chicago U Press**

**Also: Turner, B. & Pidgeon, N. (1997) *Man-Made Disasters* 2<sup>nd</sup> ed. Butterworth Heinemann.**

# Perceptions Matter Too - Cross Cutting Issues with New and Emerging Technologies

- NO ONE PUBLIC OUT THERE – ‘PUBLICS’
- Risk and Benefit Perceptions Matter (cf nanotechnologies)
- Trust (in technology, others, institutions) underlies Confidence
- Process, Distributional and Recognition Equity for Public Engagement
- Values, Narratives and Place-Based Context (‘risk’ concerns may stand in for other things)
- Risk Perceptions may change quickly - Social Amplification AND Attenuation of Risk Perceptions, with Real Consequences

## The ash tree crisis: a disaster in the making

Britain's 80 million ash trees are at deadly risk from ash dieback, a virulent fungal disease that has swept across Europe. But as the fight to save our native stock intensifies, could more have been done to avert the catastrophe?



📷 At risk: ash trees at Grange Fell near Watendlath in the Lake District. Photograph: Tim Graham/Getty Images

Source: Guardian Online

### Tree Health and Plant Biosecurity Expert Taskforce

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### Final Report

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20<sup>th</sup> May 2013



Department  
for Environment  
Food & Rural Affairs

[www.gov.uk/defra](http://www.gov.uk/defra)

#### Chalara and the Social Amplification of Risk

Professor Nick Pidgeon (Cardiff University) and  
Professor Julie Barnett (Brunel University)

May 2013

# The Collingridge Dilemma of Control



**Dungeness B advanced gas cooled reactor, 13 years late and 4x over original budget**

# The Collingridge Dilemma

- Early on in large complex technological projects risks, uncertainties and ‘ignorance’ abound – so when steering is most possible full societal consequences cannot be known
- When such consequences have become clear it may be too late to make corrections, as policies, supply chains and technologies have become ‘locked in’
- *“when change is easy the need for it cannot be foreseen, when the need for change is apparent changes have become expensive, difficult and time consuming”*(*The Social Control of Technology*, 1980, p11)
- Resolution – put a premium on reversible decision options, monitor for emergent issues and hazards (ongoing learning), flexible organisation norms (be prepared to change course or reverse), correction by doing over time.

## Do We Always Learn (and remember) the Lessons?



Summerland Leisure  
Centre, June 1973,  
Isle of Man

Grenfell Tower, June  
2017, London





# Globalization's Social Complexity

## DIGITALIZATION, EXTERNALIZATION, FINANCIALIZATION, STANDARDIZATION, SELF REGULATION

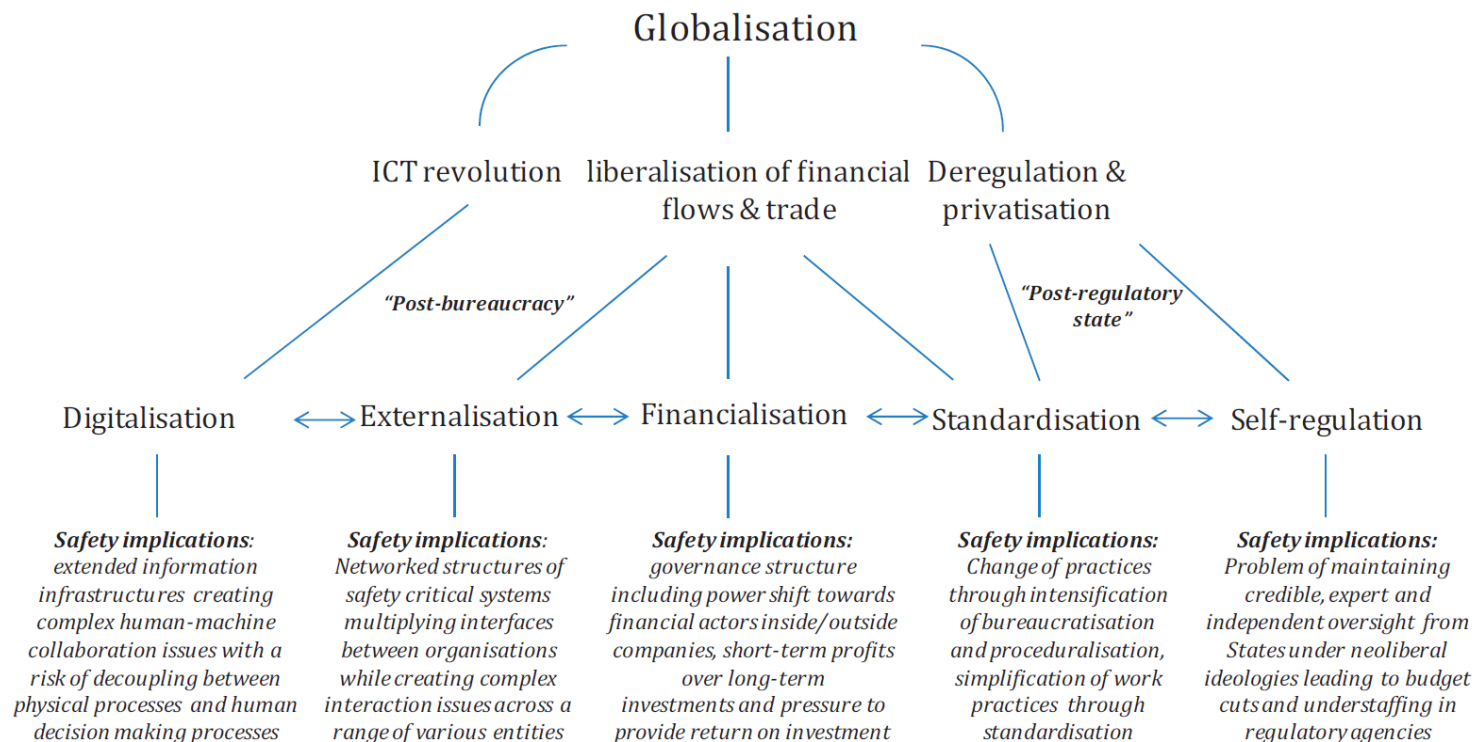


Figure 1. Integrative framework linking globalization to industrial safety.

Source: Le Coze (2017) *Policy and Practice in Health and Safety*, 15, 57-81

# THANK YOU

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Mitigation



Behavioural  
Research UK