

Preventing Catastrophic Failure and Building Resilience

Dr Carl A. Gibson

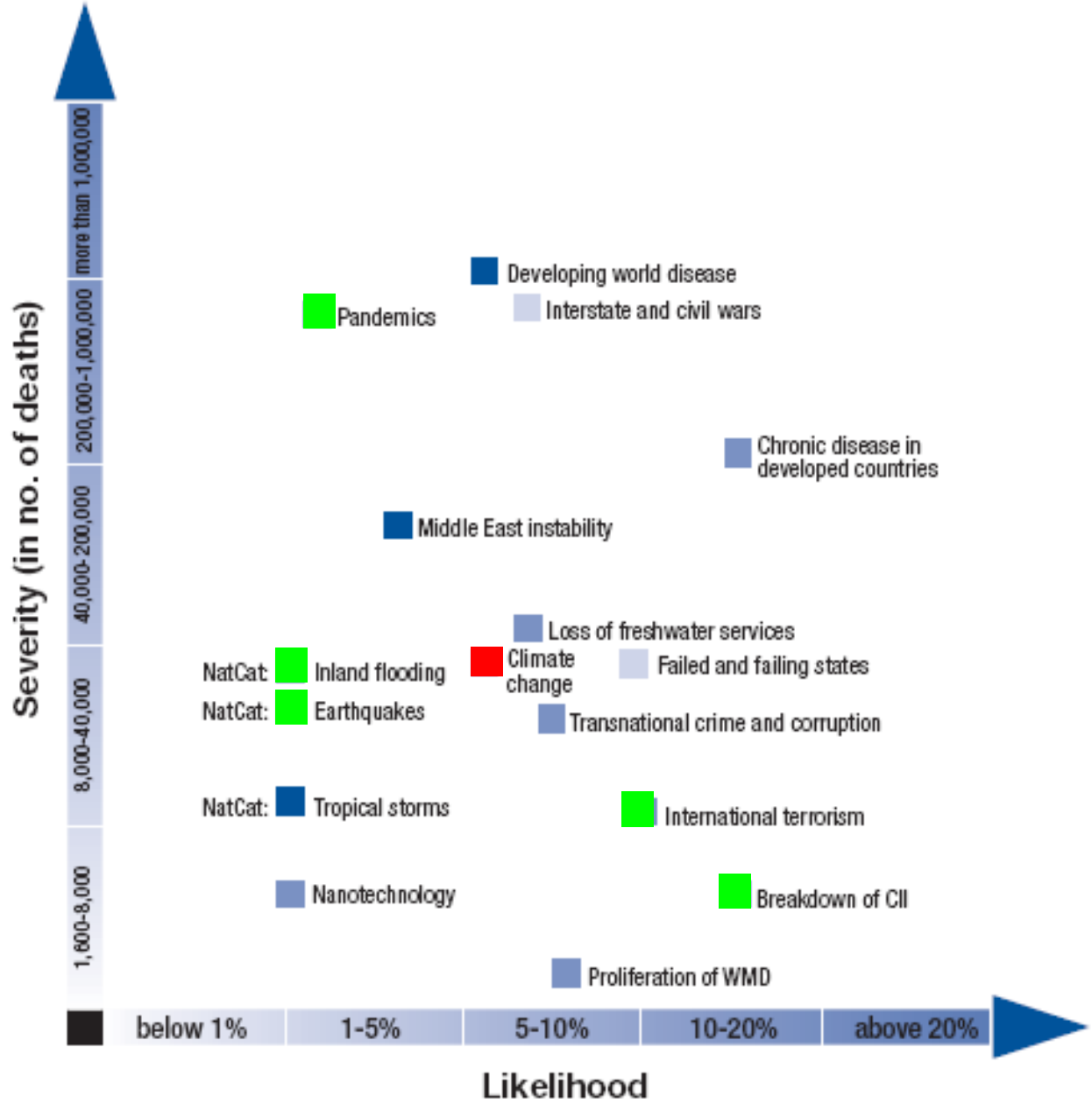
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A Continuum of Risk



A vertical bar on the left side of the slide, transitioning from orange at the top to yellow at the bottom.

What is resilience?

The ability to anticipate and adapt to volatility

It is about agility to work around failures and bounce
back from adversity

On a ***continuing*** basis

Current Approach

- Focus – minimize short term harm
- Heavily driven by a standardised process
- Strong basis on predicted events
- Heavily plan based
- Increasingly prescriptive & inflexible
- Continuously out of date
- Assumptions rarely challenged
- Development of process capability

Adaptable Approach

- Longer term strategic advantage
- Driven by emergent leadership
- Strong basis on uncertainty
- Heavily 'blink' decision based
- Guidance driven
- Continuously evolves
- Contestable assumptions
- Development of adaptive capability

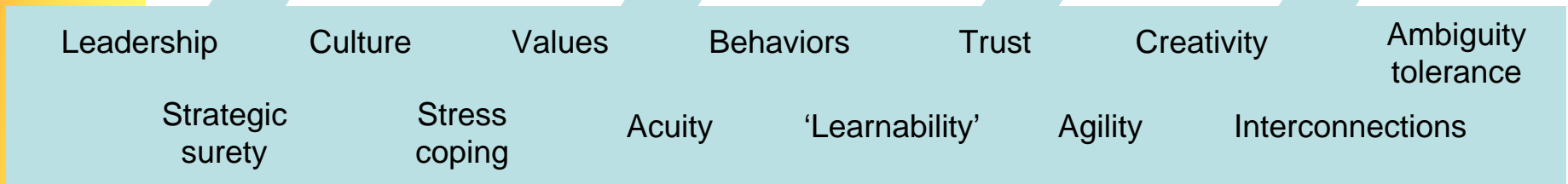
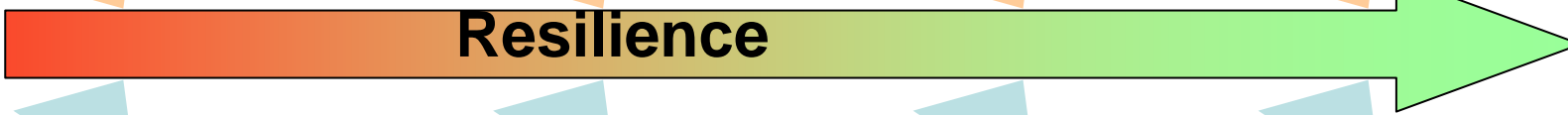
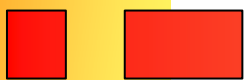
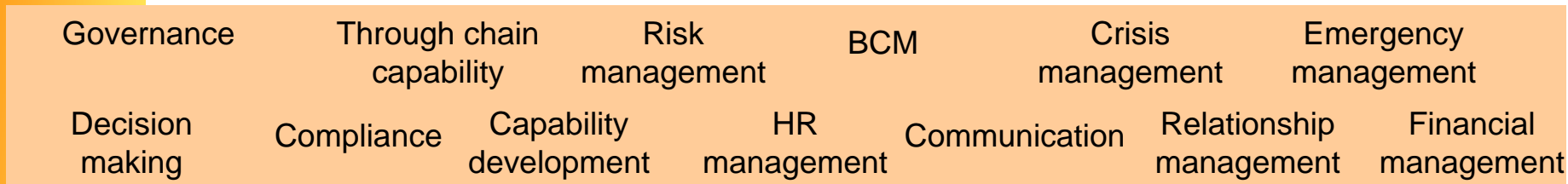
ROBUSTNESS

- Strength
- Power
- Durability - resistance to change
- Avoid failures
- React to predicted future events
- Precision based

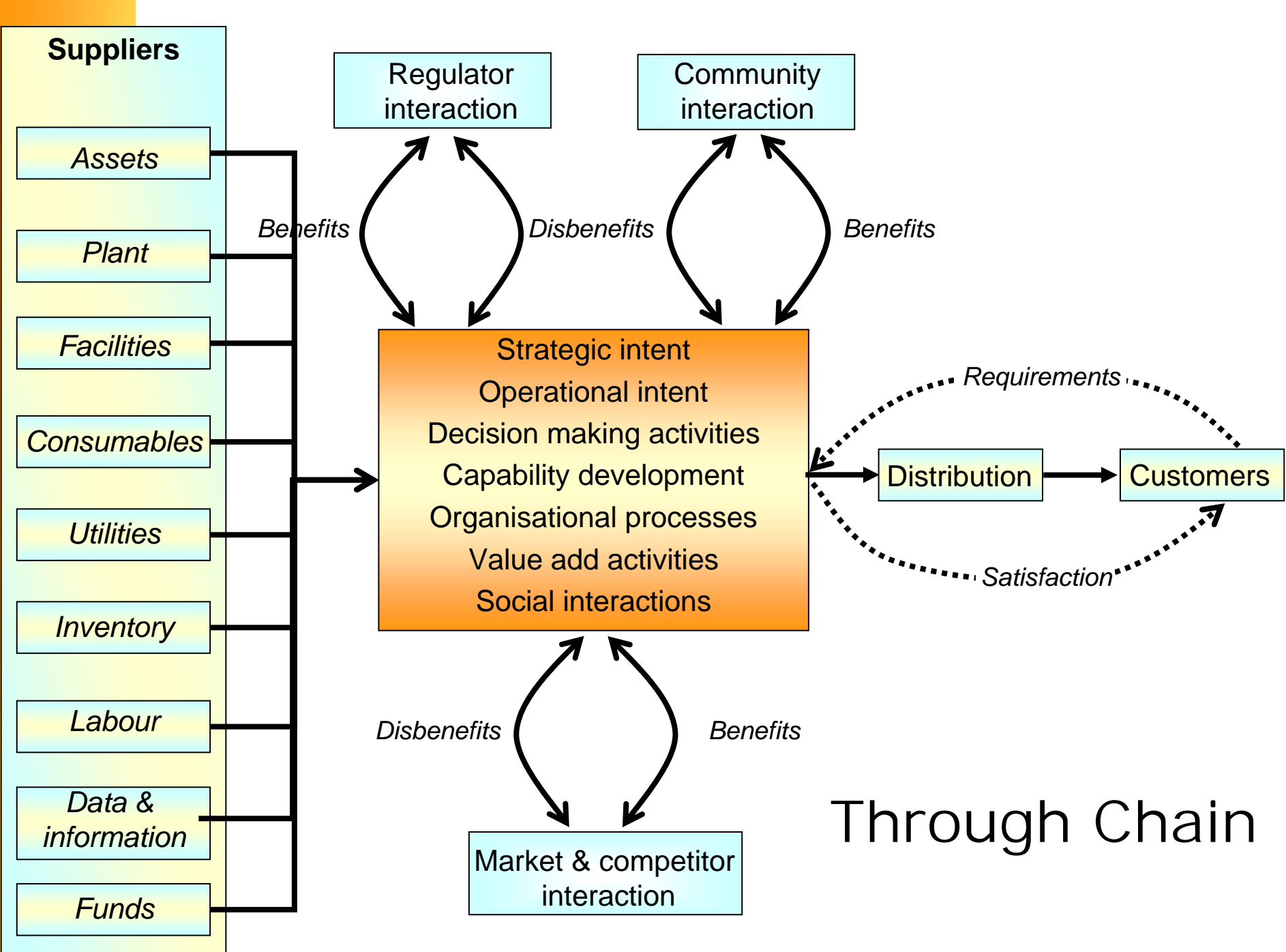
RESILIENCE

- Deformation
- Rebound
- Adaptability – adaptation to change
- Reroute around failures (tolerates)
- Respond to unanticipated shocks
- Generalization based

Activities



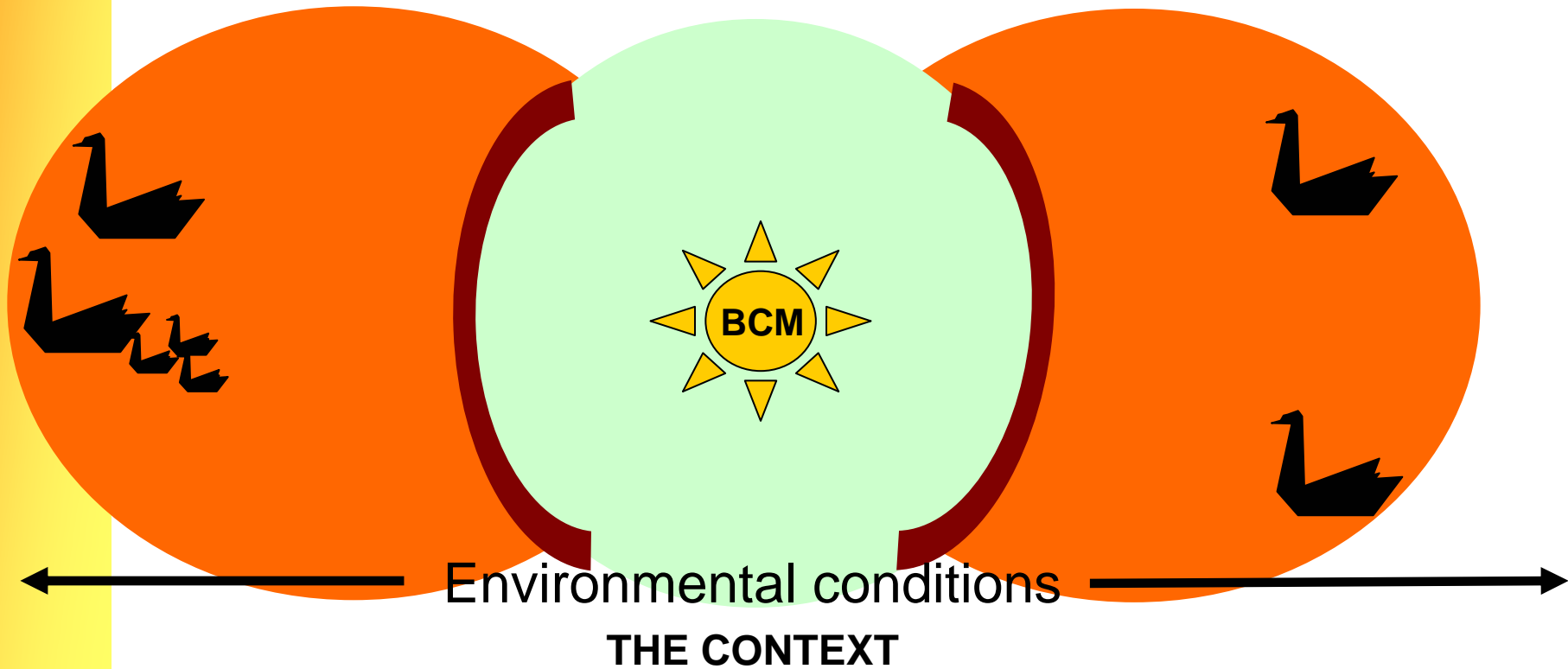
Characteristics



‘Science’ of low resilience

- Complex adaptive systems (CAS)
- Apply BCM to CAS – increases resilience?
- Creates Highly Optimized Tolerance (HOT)

Highly optimized tolerance



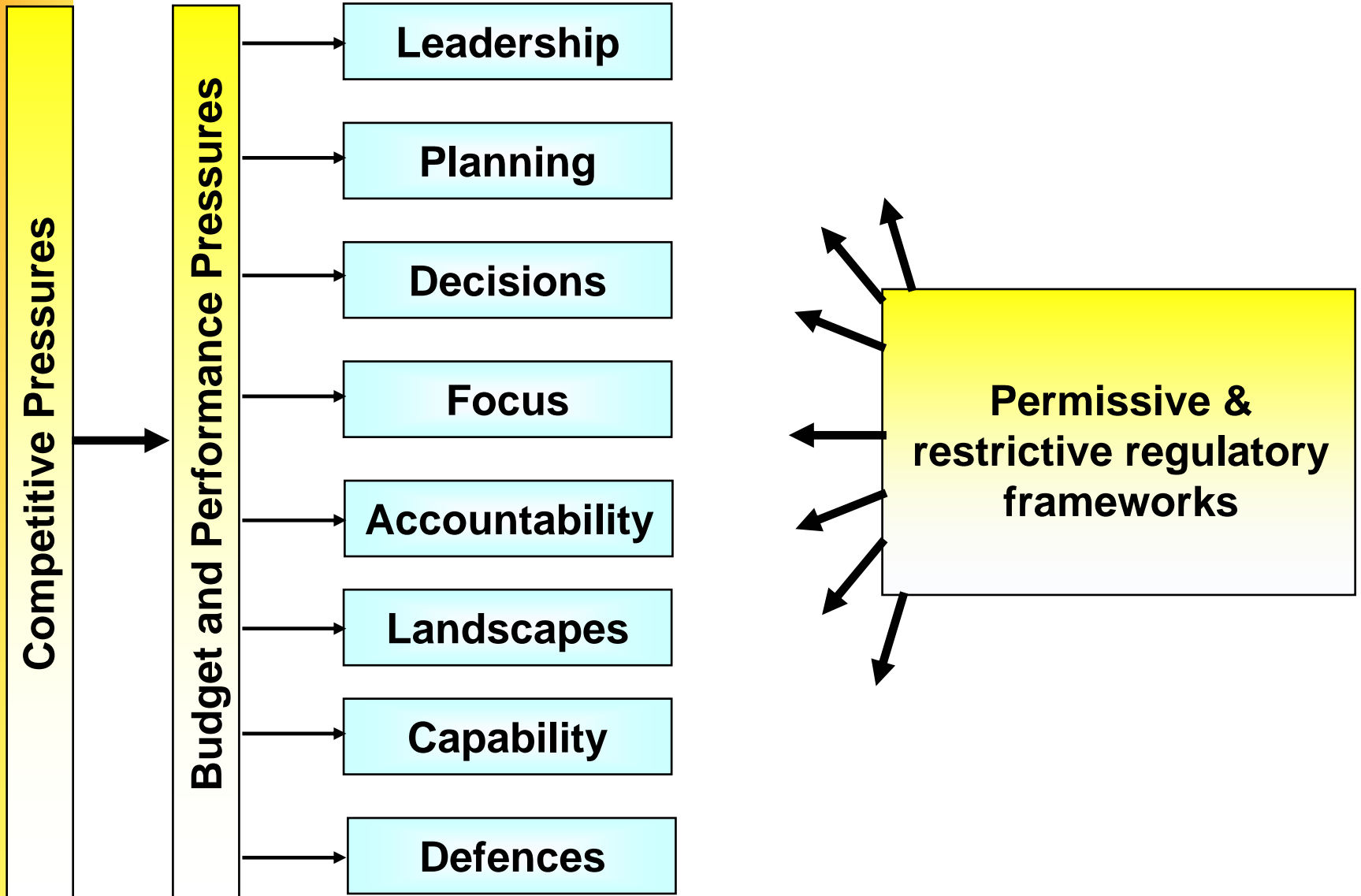


A look at some case studies

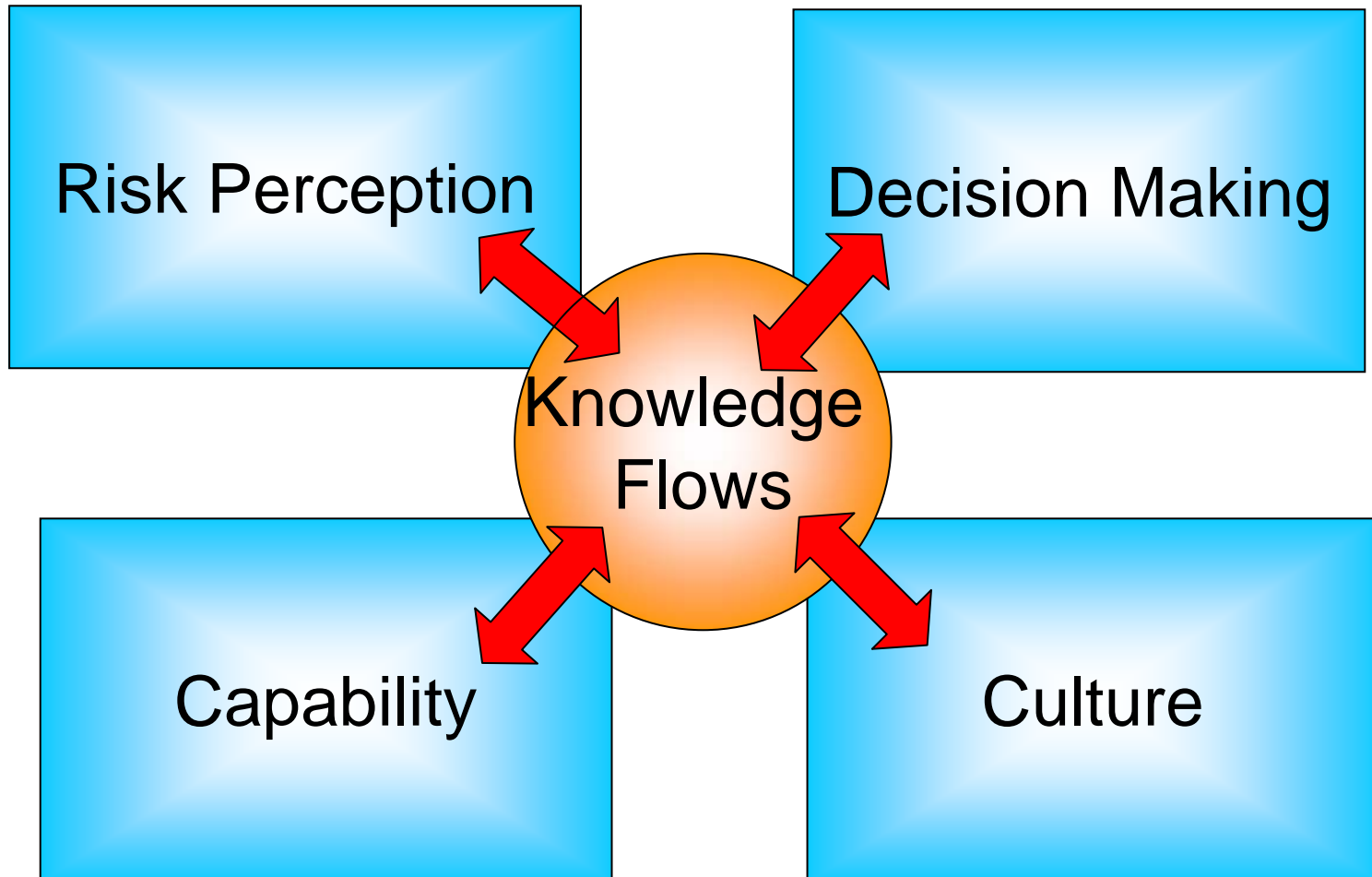
Common Features



Common Features



The Organic Model



A Case Study

- 18 November 1987
- Fire – Kings Cross Underground Station
- 31 fatalities

Risk Perception

- Multiple fires (400) but no fatalities
- Fires = smoldering
- Focus on damage & disruption
- Smoke - not a hazard
- Staff & people = fire detectors

Decision Making

- No fire certification required
- Railway inspectorate misunderstood responsibilities
- LRT- financial not safety
- Recommendations not followed
- Assistance not called for

Knowledge Flows

Poor incident reporting
Poor liaison between directorates
Sentinels ignored
Equipment out of order
Control room not manned
PA system not used

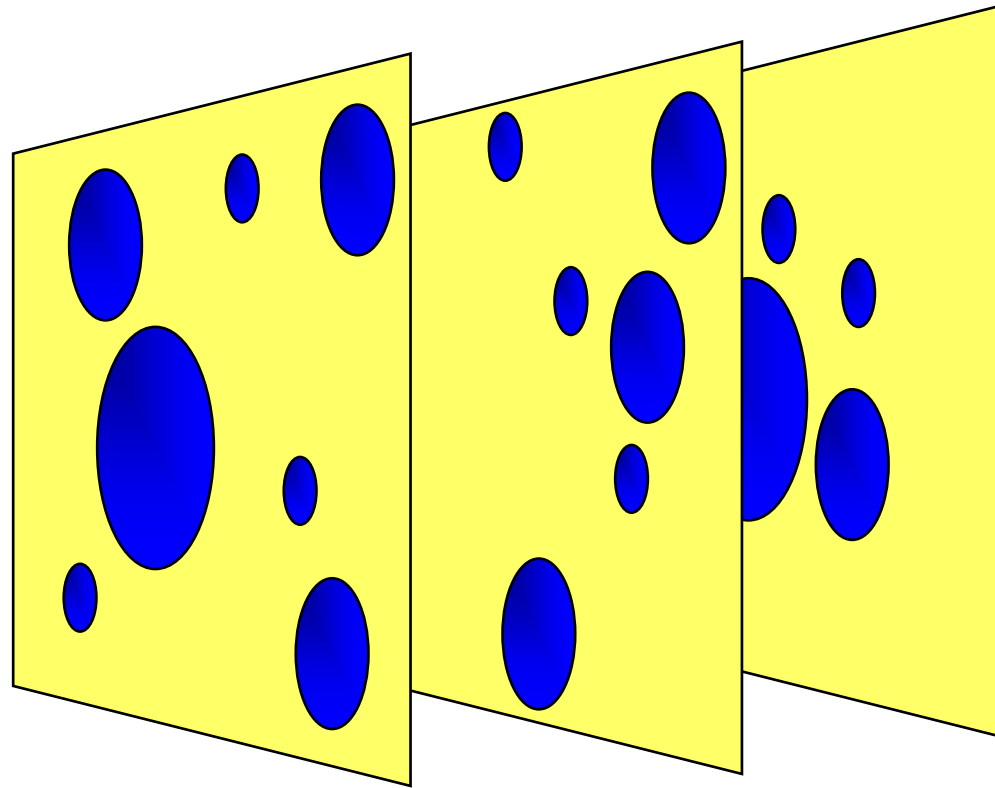
Capability

- No one person accountable for safety
- Untrained staff
- Uncertain responsibilities
- Uncoordinated response
- Lack of evac plan
- Inadequate fire suppression
- Delayed maintenance
- Loss of staff
- Police lack of local knowledge

Culture

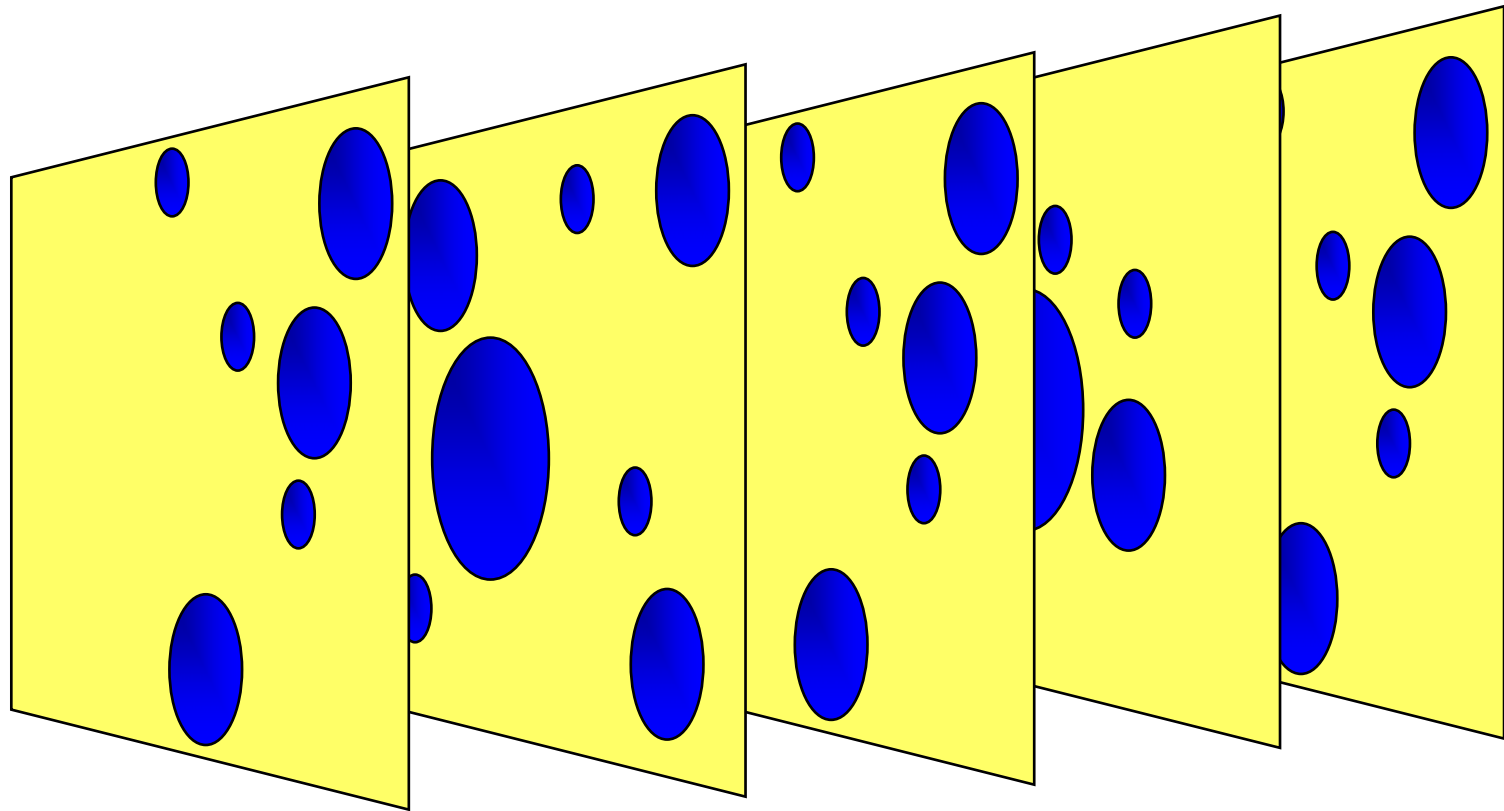
- Fires = accepted part of operating
- Lack of interest at senior level
- Old blinkered approach & fiefdoms
- Organizational change
- Complacency
- Lack of supervisory control
- Lack of accountability for job performance

The “Swiss Cheese” Model*



*After Prof. James Reason

An Adaptation



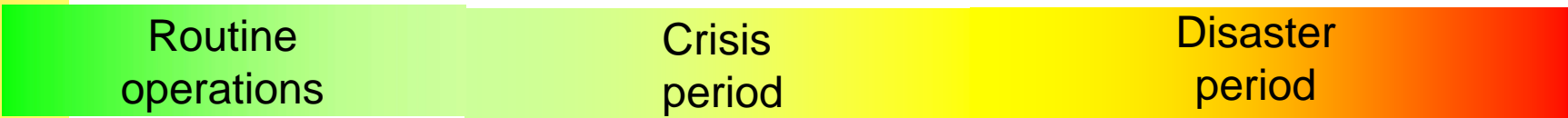
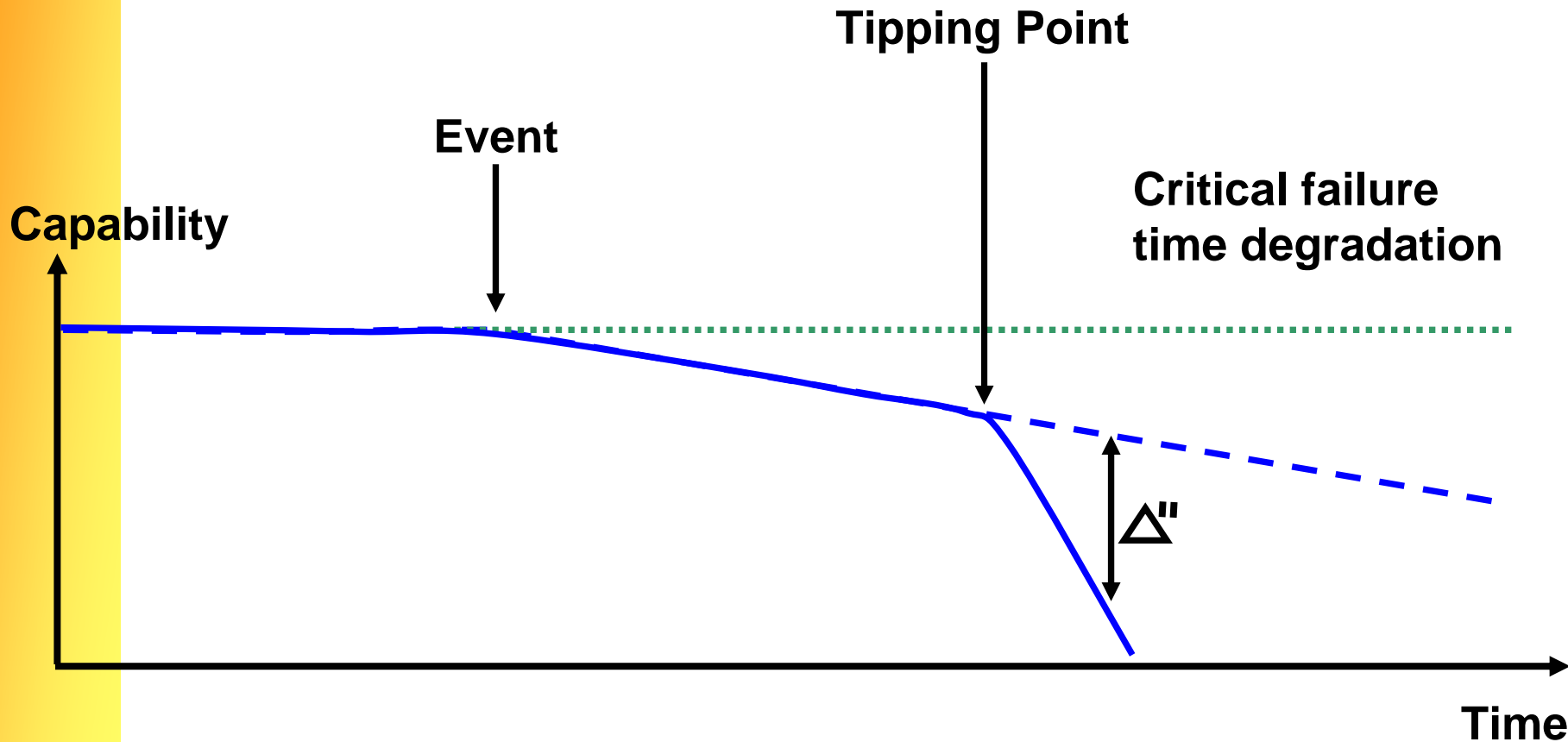
Socio-economic
political factors

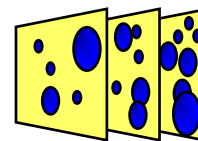
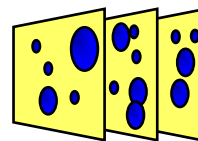
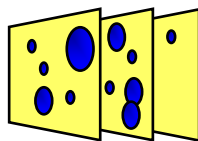
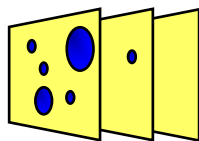
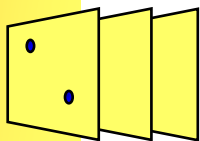
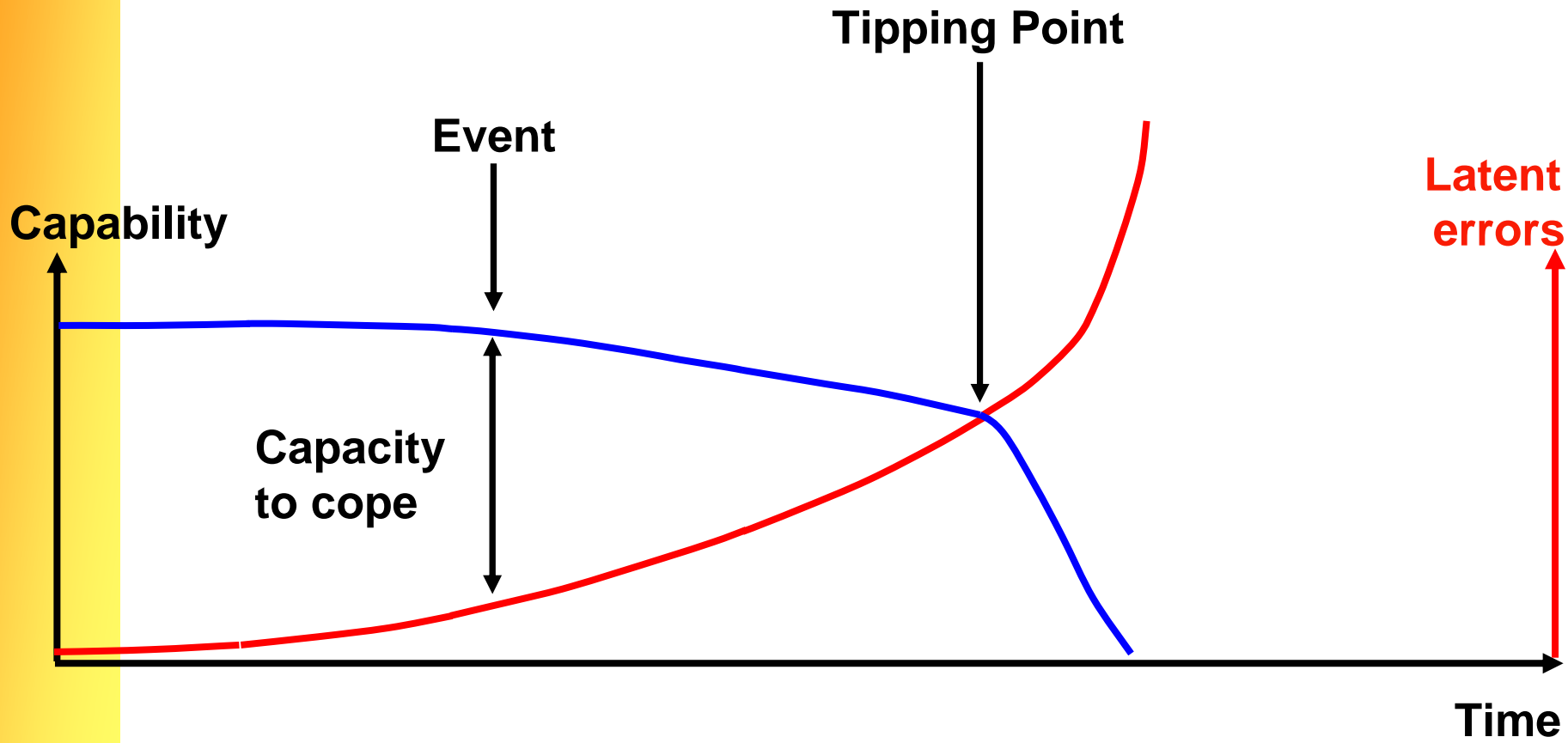
Organisational
factors

Local
factors

People
factors

Defensive
factors





A New Model for Resilience

