

Organizational Agility Model and Simulation

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International Command and Control Symposium
Quebec City
June 2011



Presentation Content

- **Justifying** Organizational Agility
- **Defining** Organizational Agility
- **Modelling** Organizational Agility
- **Simulating** Organizational Agility
- **Evaluating** Organizational Agility

Justifying Organizational Agility

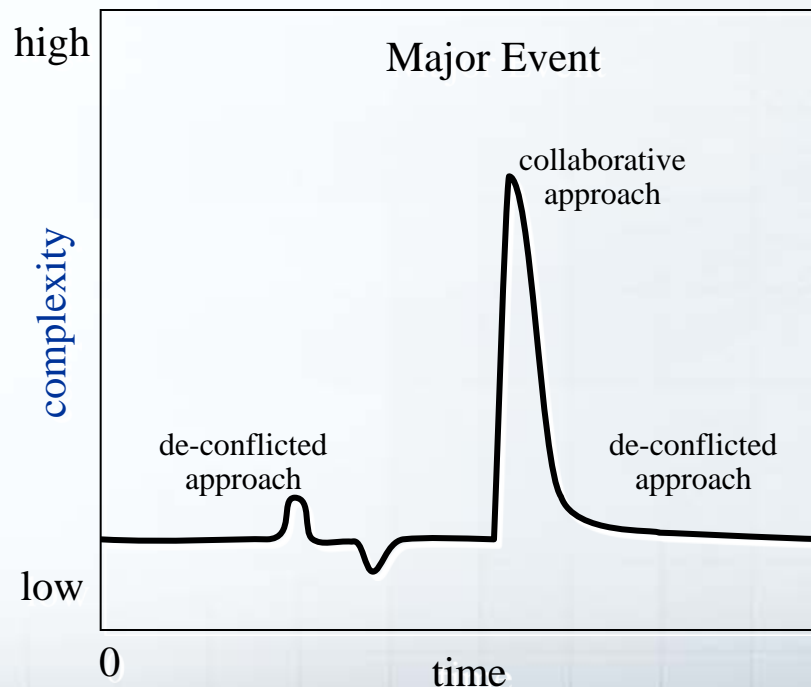
Comprehensive Approaches to Complex Endeavours is no longer “revolutionary” but rather the norm.



Justifying Organizational Agility

Different situation complexities demand different GM Approaches

- Complexity in Environment (Predictability, Dynamics, etc.)
- Complexity in “Self” (**Organizational Differences, etc.**)



Justifying Organizational Agility

Postulate that a collective's **approach** to Governance and Management (**GM**) or Command and Control (C2) must be **agile** to **successfully cope** with **complex** endeavours.



Restoring a secure and stable environment

United Nations Stabilization Mission in Haiti (MINUSTAH) peacekeepers observe a moment of silence in commemoration of the sixth month after the devastating Haiti earthquake.

12 July 2010

© MINUSTAH Photo/Logan Abassi

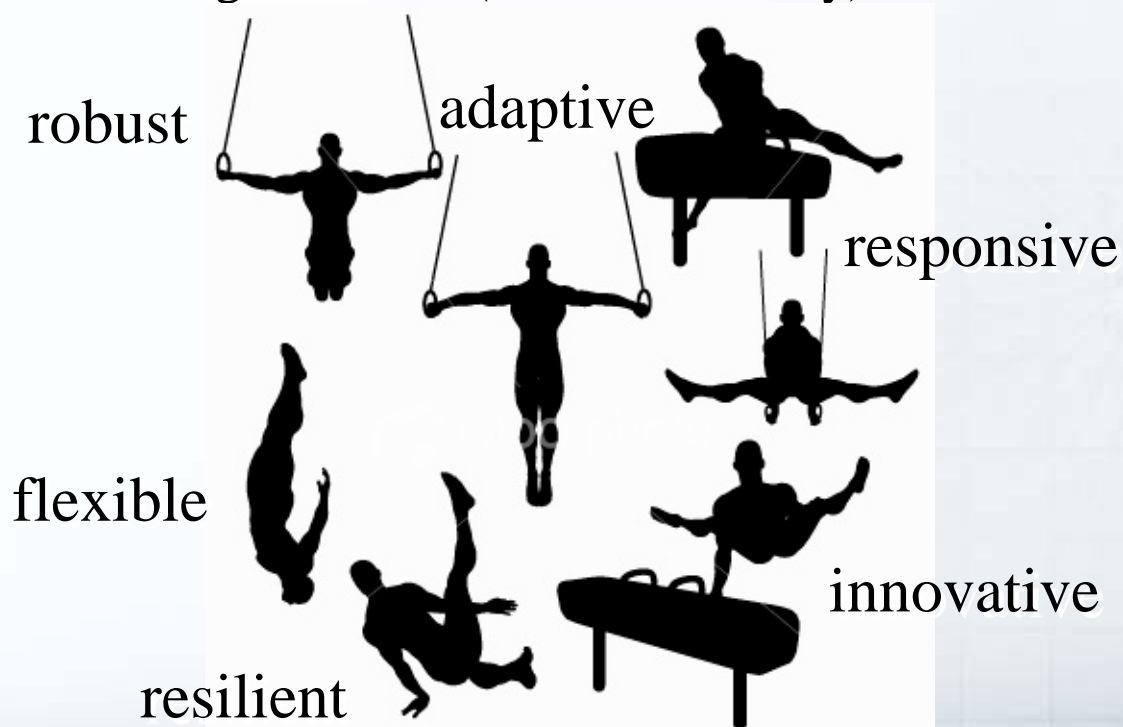
Defining Agility

- Justified Agility
- Defining Agility
- Modelling Agility
- Simulating Agility
- Evaluating Agility

Defining Agility

What is agility? What is Approach Agility?

- (Merriam-Webster, 2009): Agility: The quality or state of being agile: nimbleness, dexterity (played with increasing agility)
 - Nimble: Quick and light in motion: agile (nimble fingers)
 - Dexterity: Readiness and grace in physical activity; especially: skill and ease in using the hands (manual dexterity)



Defining Agility

- Agility is the synergistic combination of robustness, resilience, responsiveness, flexibility, innovation, and adaptation (*Alberts & Hayes, 2003*).
- Agility is the ability to change strategy when the situation calls for it. Adaptive stance is creating the preconditions for adaptation with an emphasis on learning (*Spaans, Spoelstra, Douze, Pienaman, & Grisogono, 2009*)
- **Agility as the ability to transition between approaches** as well as “Being able to choose among a larger set of C2 approaches is the essence of C2 agility” (*SAS-065, 2010*)
- Agility is the capability to **successfully** effect, **cope** with and/or exploit **changes in circumstances** (*SAS-085, working definition*).
 - Approach enables Agility (e.g., Edge is more agile than De-conflicted)
 - **Ability to transition from one Approach to another as required**

Modelling Agility

- Justified Agility
- Defined Agility
- **Modelling Agility**
- Simulating Agility
- Evaluating Agility

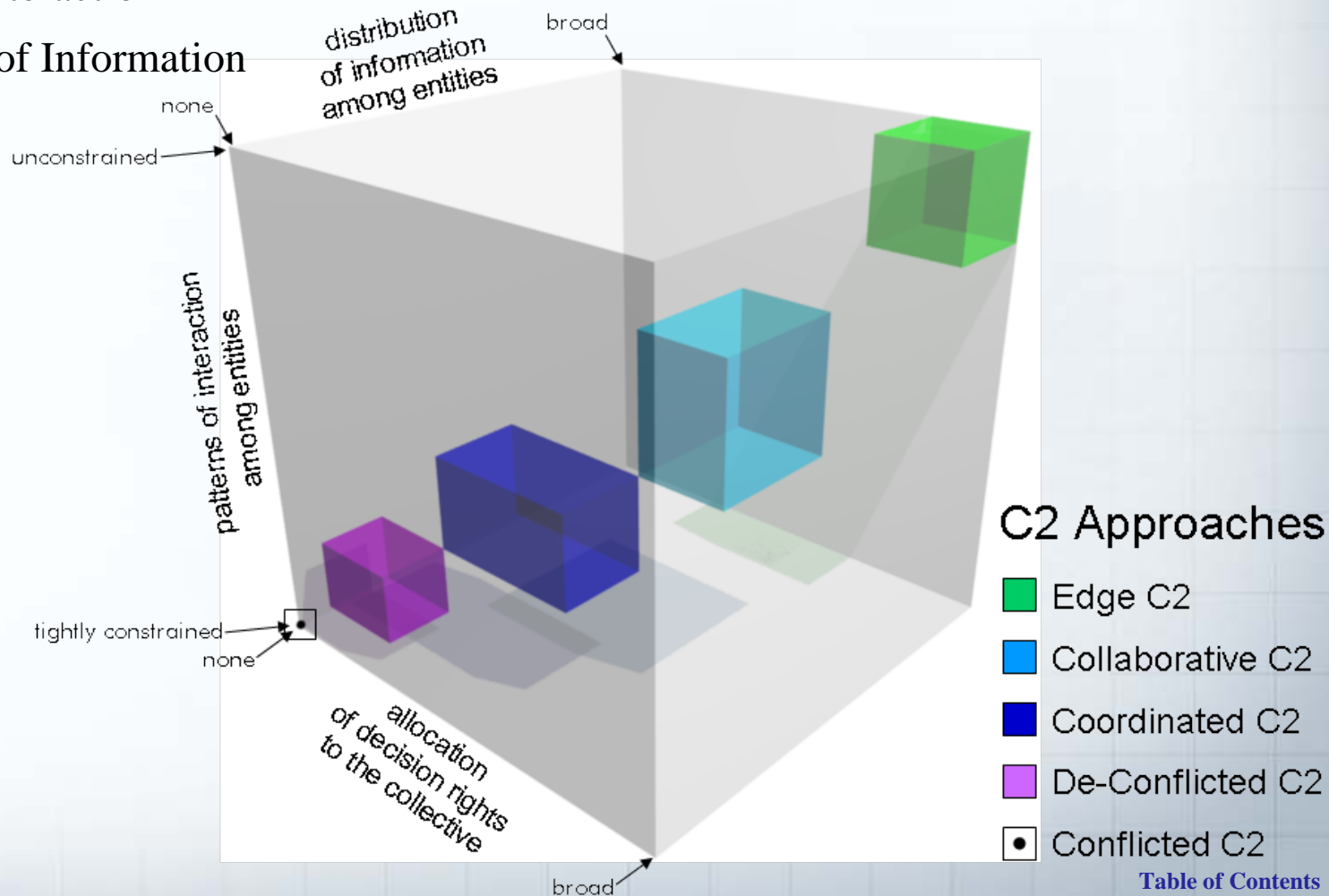
Modelling Agility

- Approach Agility: ability to **successfully transition** from one Approach to another and maintain the **required** Approach despite **disturbances**.
 - **Transition** (change in Approach over time)
 - **Required** (target or reference Approach)
 - **Disturbances** (known and unknown)
 - **Entity Behaviours** (“successfully transition”)
 - **Success** (effectiveness and efficiency)
- **Classic regulation and disturbance rejection problem** that humans and control systems solve every day.

Transition Dynamics

Approach Space

- Allocation of Decision Rights
- Patterns of Interaction
- Distribution of Information



Transition Dynamics

GM Approach Space (2D)

Moving from one approach to another over time

edge

collaborative

coordinated

de-conflicted

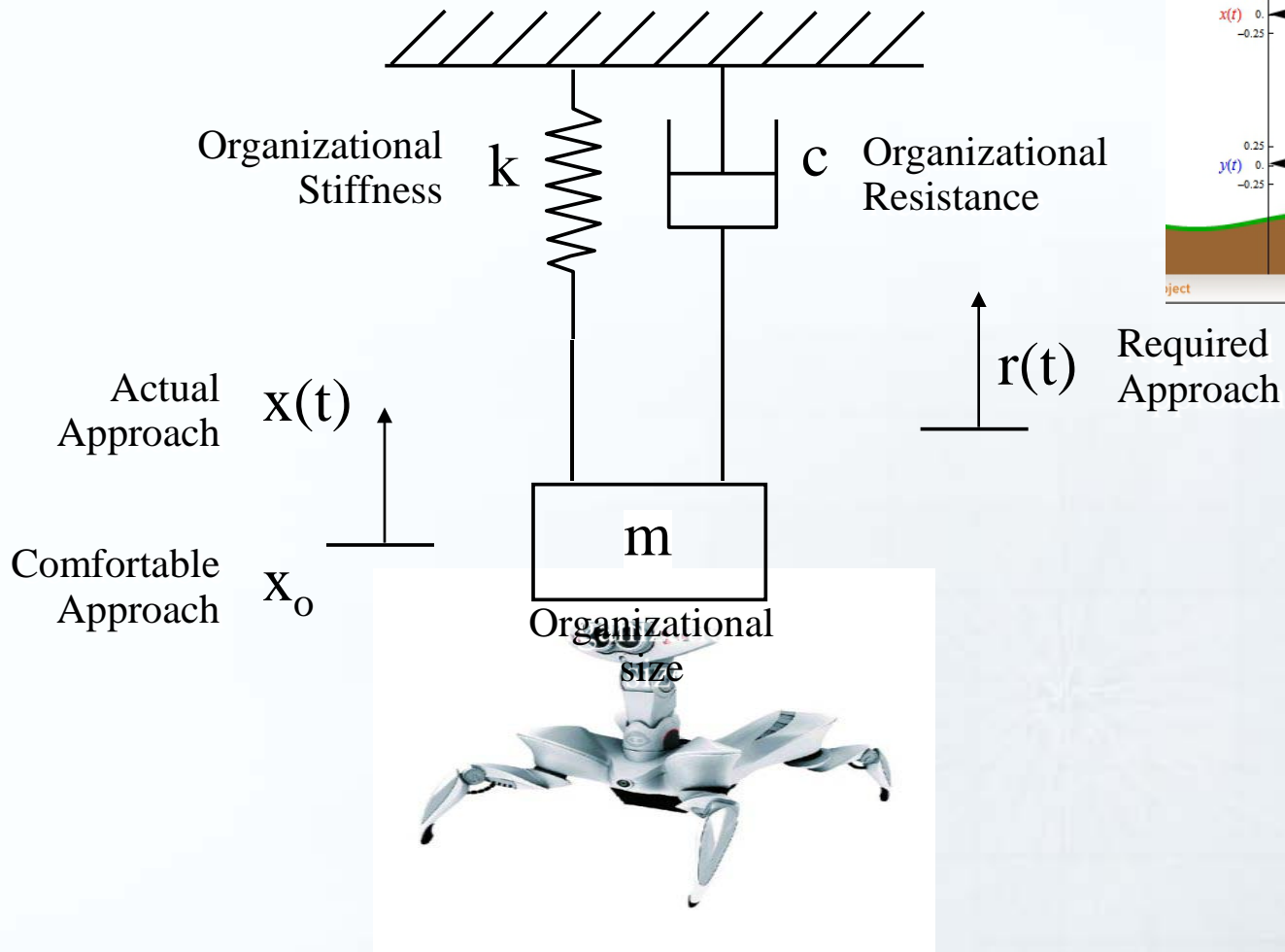
● *independent*

What causes entity to move in approach space??

Transition Dynamics

- Hypothesize that an entity **transitioning in Approach space** has similar dynamic features as an object **moving in physical space**.
 - *An object at rest will remain at rest unless acted on by an unbalanced **force**. An object in motion continues in motion with the same speed and in the same direction unless acted upon by an unbalanced **force**.*
<http://teachertech.rice.edu/Participants/louviere/Newton/law1.html>
- What causes an entity to move in Approach space?
 - External Forces
 - Momentum Forces
 - Resistance Forces
 - Restoring Forces

Transition Dynamics



$$k[r(t) - x_0] = m\ddot{x}(t) + c\dot{x}(t) + k[x(t) - x_0]$$

External
Forces

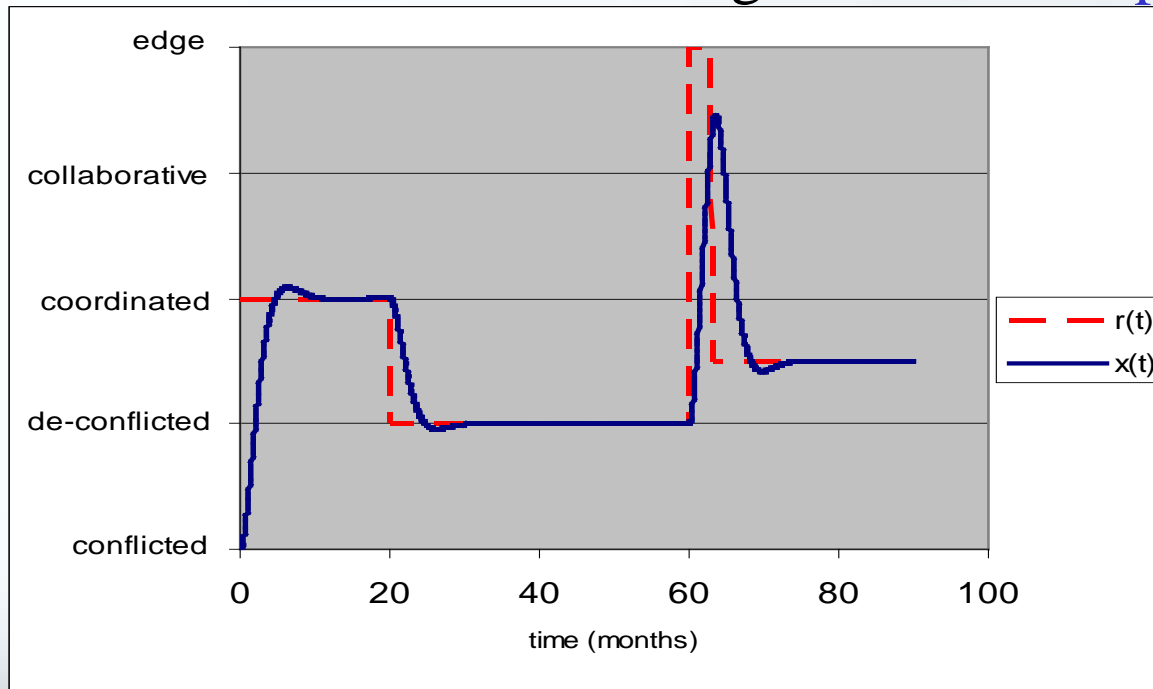
Momentum
Forces

Resistance
Forces

Restoring
Forces

Transition Dynamics

- The dynamic model yields three key parameters:
 - Size (m) (*number of resources involved in transition*)
 - Resistance (c) (*while transitioning*)
 - Stiffness (k) (*comfort level*)
- These parameters characterize the organization's **response** profile.



Entity Behaviours

- Control Theory provides methods that drive the **actual** approach towards the **required** approach (classic regulation) and maintain the approach under **disturbances** (classic disturbance rejection).
 - **Compensatory** (feedback)
 - **Anticipatory** (feedforward)
 - **Adaptive** (parameter changes online)
 - **Learning** (parameter changes offline)
- *Not surprisingly, mechanical control algorithms are based on **human behaviours!***



Entity Behaviours

- Compensatory method produces as a by-product
 - Robustness
 - Resilience
 - Varying Responsiveness
 - Varying Resistance
 - Varying Stiffness
 - Disturbance (unexpected RPOTI changes) rejection
- Anticipatory method for known disturbances, but unstable with no feedback!
- Adaptive method provides “online” parameter adjustments (requires feedback)
- Learning methods provides “offline” parameter adjustments for specific scenarios
- Missing:
 - Flexibility
 - Innovation

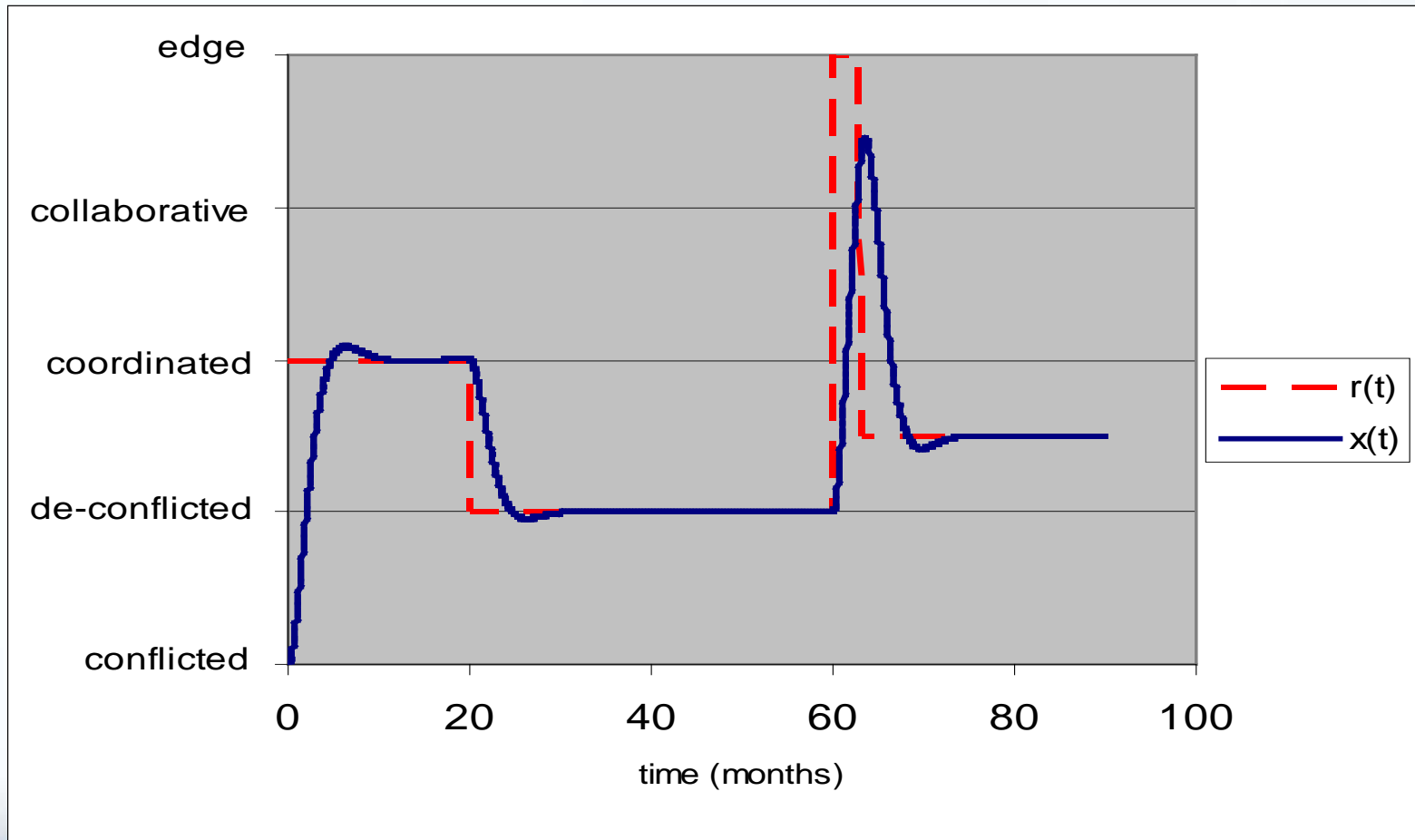
Demonstrated via Simulation

Simulating Agility

- Justified Agility
- Defined Agility
- Modelled Agility
- **Simulating** Agility
- Evaluating Agility

Simulating Agility

- True power of simulation is manipulating variables (*size, resistance, stiffness, required approach, disturbances, and behaviours*) exploring the responses and their effectiveness and efficiency.

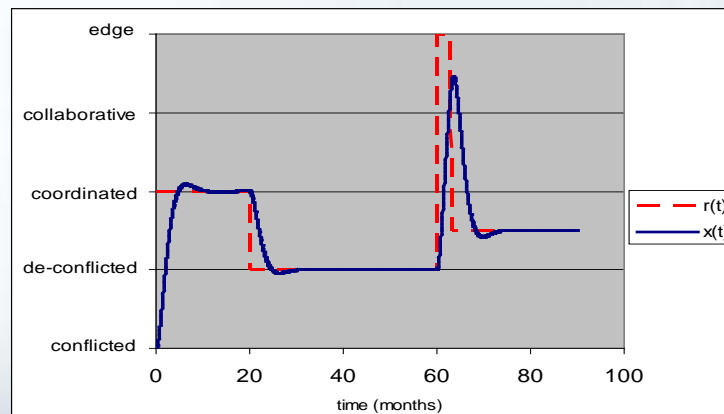


Success

$$\text{Effectiveness} = \frac{\text{Actual Approach}}{\text{Required Approach}} = \frac{x(t)}{r(t)}$$

$$\text{Efficiency} = \frac{\text{normalized time}}{\text{normalized cost}} \leq 1$$

	No Compensatory	Disturbance	Compensatory
Effectiveness	92%	41%	95%
Efficiency	80%	3%	74%



Evaluating Agility

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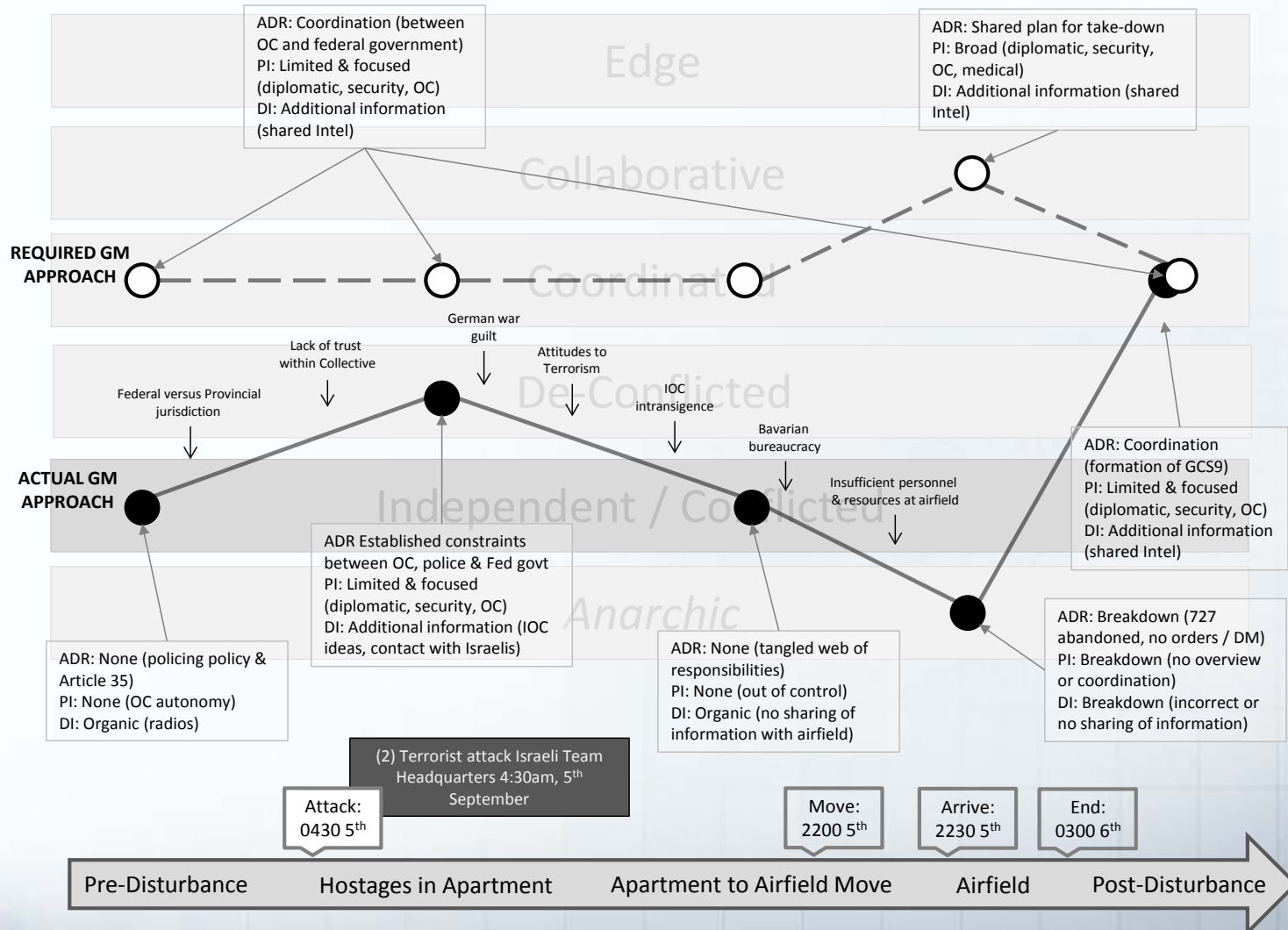
Evaluating Agility

- Finding Evidence for the model variables/concepts
- Munich 1972 and Vancouver 2010 Case Studies



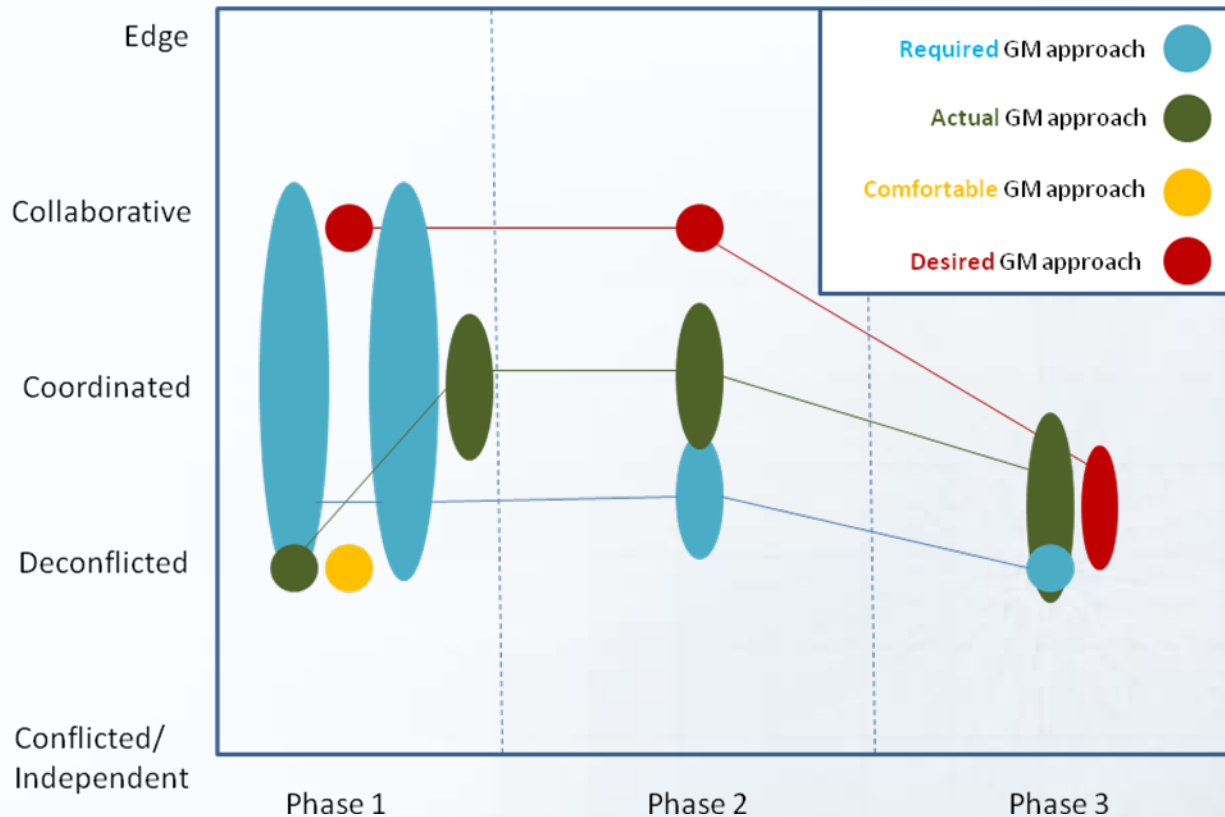
Evaluating Agility

- Munich



Evaluating Agility

- Vancouver



Conclusion

- Justified Agility
 - Agility is a key enabler for the Comprehensive Approach
- Defined Agility
 - Transitioning from one Approach to another
- Modelled Agility
 - Forces and Behaviours
- Simulated Agility
 - Transition profiles and Success calculations
- Evaluated Agility
 - Found evidence for the model variables/concepts

Conclusion

- Next Steps
 - Publish Case Study results
 - Further explore concepts with M&S as well as experimentation
 - Organizational Agility implications for strategic investments



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