A Maturity Model for Harnessing the Power of Networks and Information

ABSTRACT- -

The economics of information have, by increasing access to information and to geographically dispersed entities, dramatically expanded the ways in which individuals, organizations, and collections of organizations can work together toward a shared purpose.   Information Quality is a key link in the value chain for network-centric operations.   This paper will discuss, in the context of a maturity model for harnessing the power of information to focus collective action and convergence on a desirable outcome: 1) information quality in the context of this value proposition; 2) the factors, including approach to management and organizational structure, that affect information quality; 3) the threats to information quality; 4) strategies to improve information quality and an entity's ability to leverage information in a network-centric environment.

BIOGRAPHY- -

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Dr. David S. Alberts is currently the Director of Research for OASD (NII) / DoD CIO. Prior to this he was the Director, Advanced Concepts, Technologies, and Information Strategies (ACTIS), Deputy Director of the Institute for National Strategic Studies, and the executive agent
for DoD's Command and Control Research Program. This included responsibility for the Center for Advanced Concepts and Technology (ACT) and the School of Information Warfare and Strategy (SIWS) at the National Defense University. He has more than 25 years of experience developing and introducing leading edge technology into Private and Public Sector organizations. This extensive applied experience is augmented by a distinguished academic career in Computer Science and Operations Research and Government service in senior policy and management positions.

Dr. Alberts' recent publications include the following books: Planning: Complex Endeavors, Understanding Command and Control, Power to the Edge, Information Age Transformation, Understanding Information Age Warfare, Network Centric Warfare.

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for Complex Endeavors

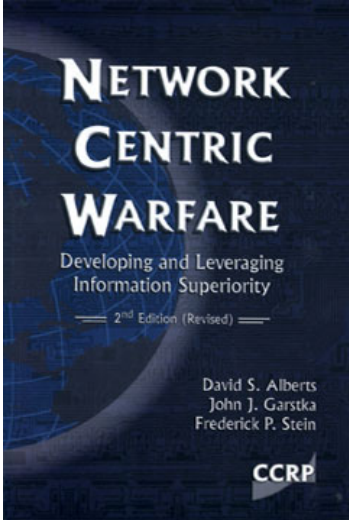## *A Maturity Model for Harnessing the Power of Networks and Information*

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MIT Information Quality Industry Symposium
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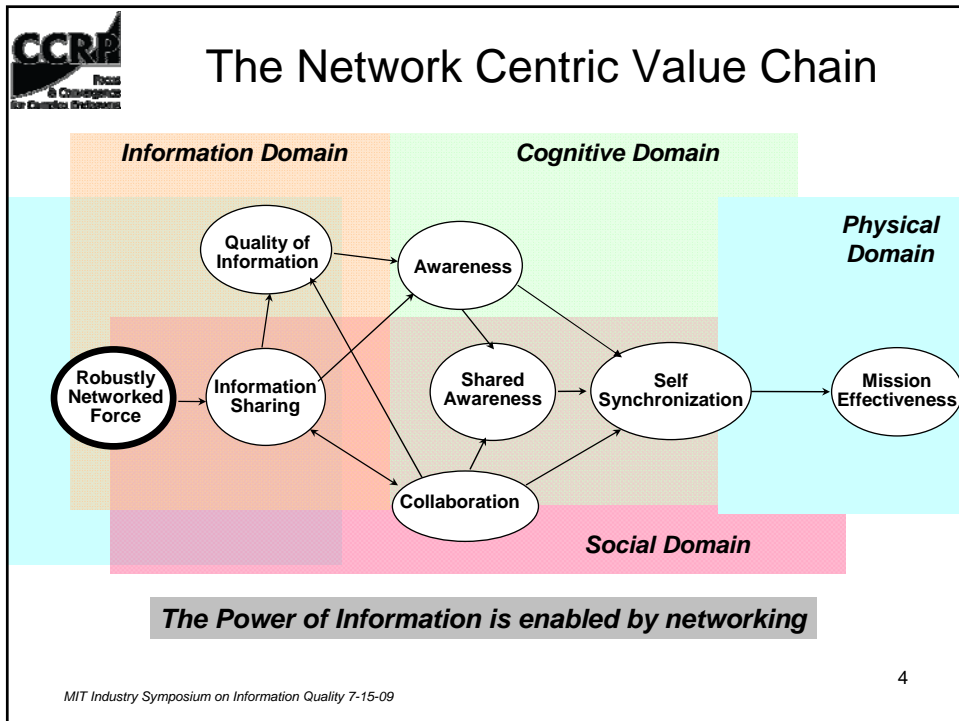

CCRP
Focus
& Convergence
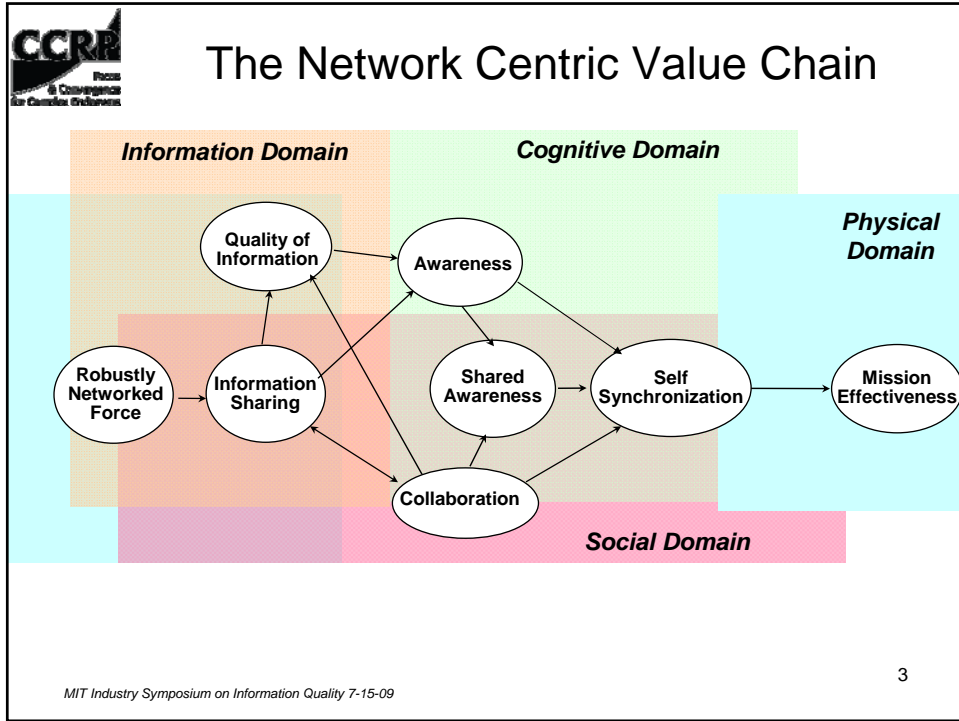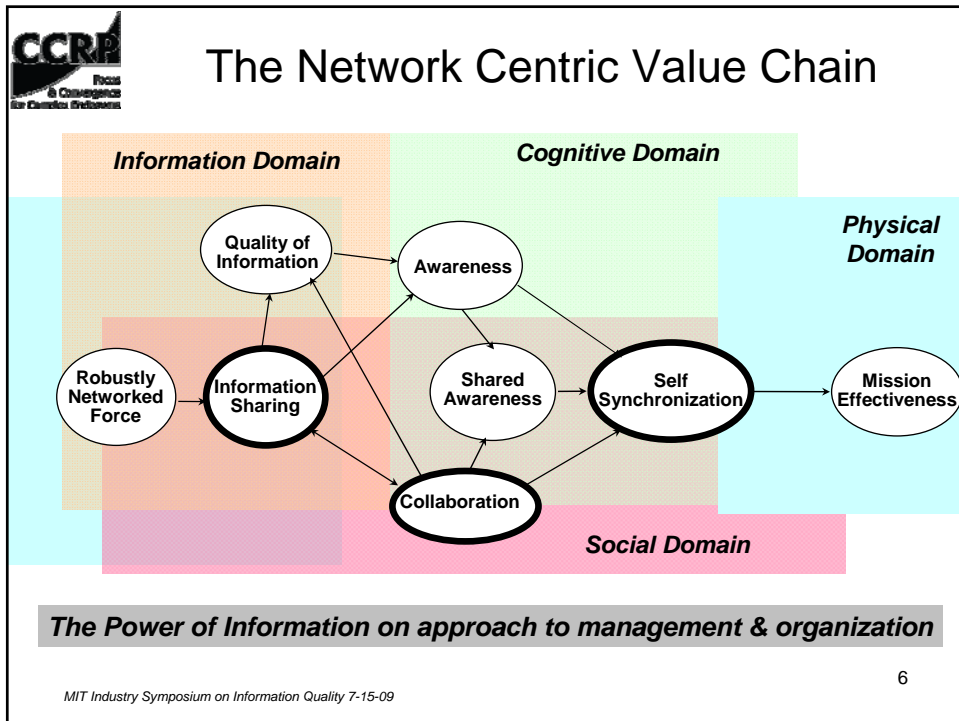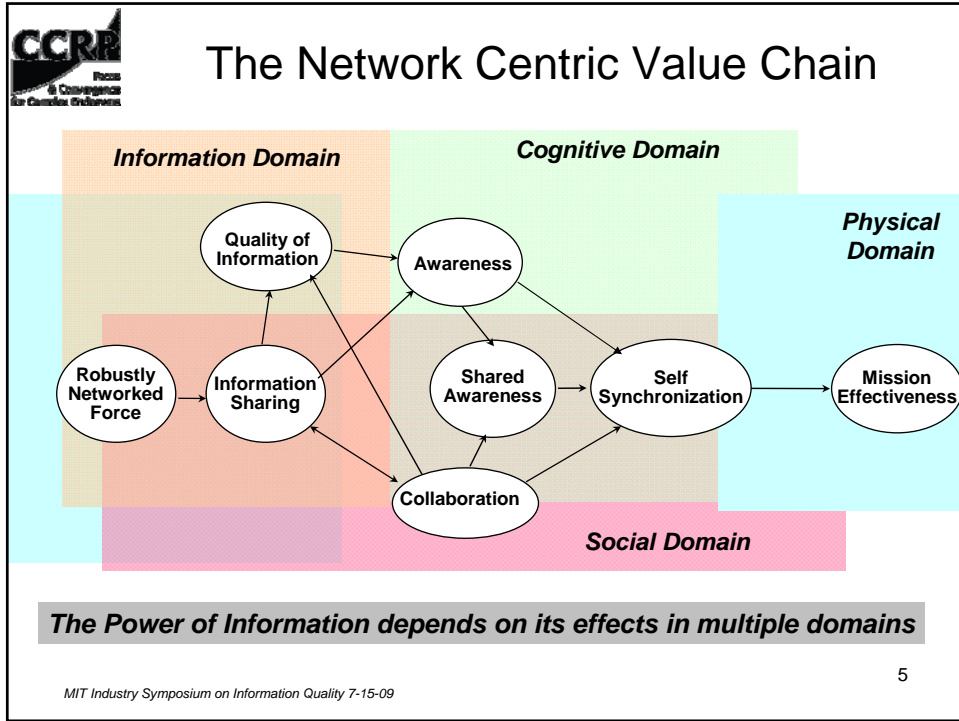for Complex Endeavors

Background

• Network Centric Warfare has provided the conceptual basis for what is known as DoD Transformation

• The application of Information Age concepts and technologies to military operations

• About developing and leveraging the power of information

NETWORK CENTRIC WARFARE
Developing and Leveraging
Information Superiority
=== 2nd Edition (Revised) ===

David S. Alberts
John J. Garstka
Frederick P. Stein

CCRP

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The Network Centric Value Chain

Information Domain

Cognitive Domain

Physical Domain

Quality of Information

Awareness

Robustly Networked Force

Information Sharing

Shared Awareness

Self Synchronization

Mission Effectiveness

Collaboration

Social Domain

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The Network Centric Value Chain

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The Power of Information is enabled by networking

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The Power of Information depends on its effects in multiple domains

The Power of Information on approach to management & organization

Agenda

- Mission Challenge

- Approaches to Focus and Convergence

- Approach Maturity

- Agility

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The Problem
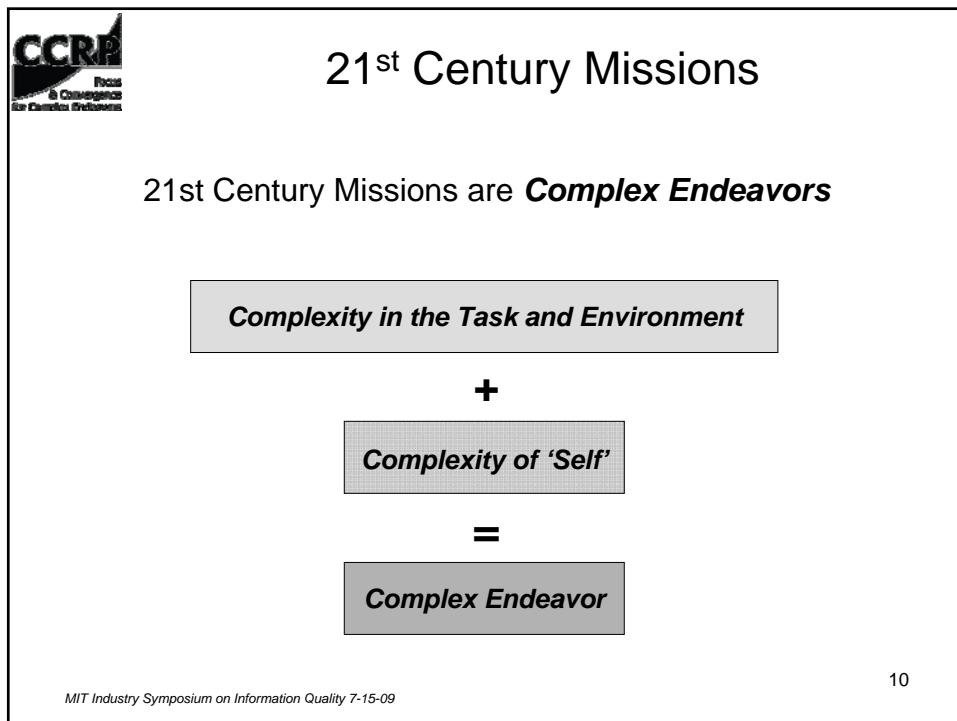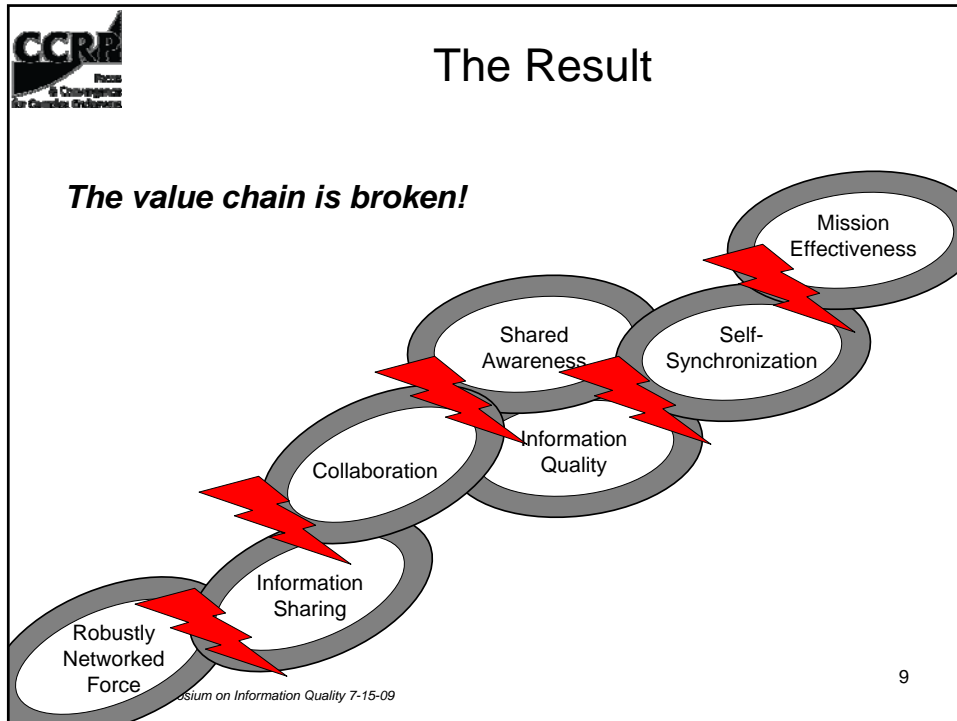
There is a fundamental disconnect between

the state of the art and practice of
Collective Action

&

21st Century
Mission challenges

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The Result

The value chain is broken!

Mission Effectiveness

Shared Awareness

Self-Synchronization

Collaboration

Information Quality

Information Sharing

Robustly Networked Force

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21st Century Missions

21st Century Missions are *Complex Endeavors*

Complexity in the Task and Environment

+

Complexity of 'Self'

=

Complex Endeavor

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Task and Environment

Humanitarian Assistance

Peace Keeping

Counter Terrorism

- The success of 21st Century Missions requires a multi-dimensional effects space
    - *political, social, economic, military*

- The complexity of the mission is a result of the interactions between and among the effects particularly across dimensions and the uncertainties associated with a cascading effects chain.

Stability Operations

Disaster Relief

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Complexity of Self

- Self = A large number of heterogeneous, independent entities that differ significantly with respect to:

    - Culture, values and norms
    - Laws, policies, rules, and regulations
    - Practices and processes
    - Levels of trust
    - Language
    - Information and communications capabilities
    - Approach to organization and management

- The complexity of 'Self' comes from the nature of the interactions between and among the participating entities and the dynamics of the situation that affect entity willingness, constraints, perceptions, and capabilities.

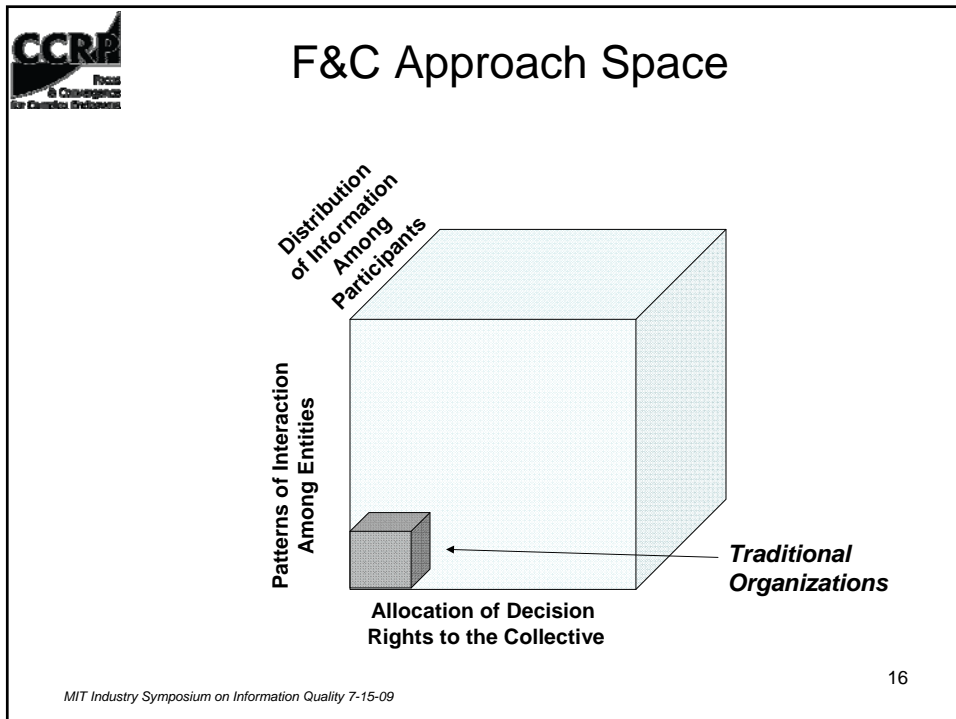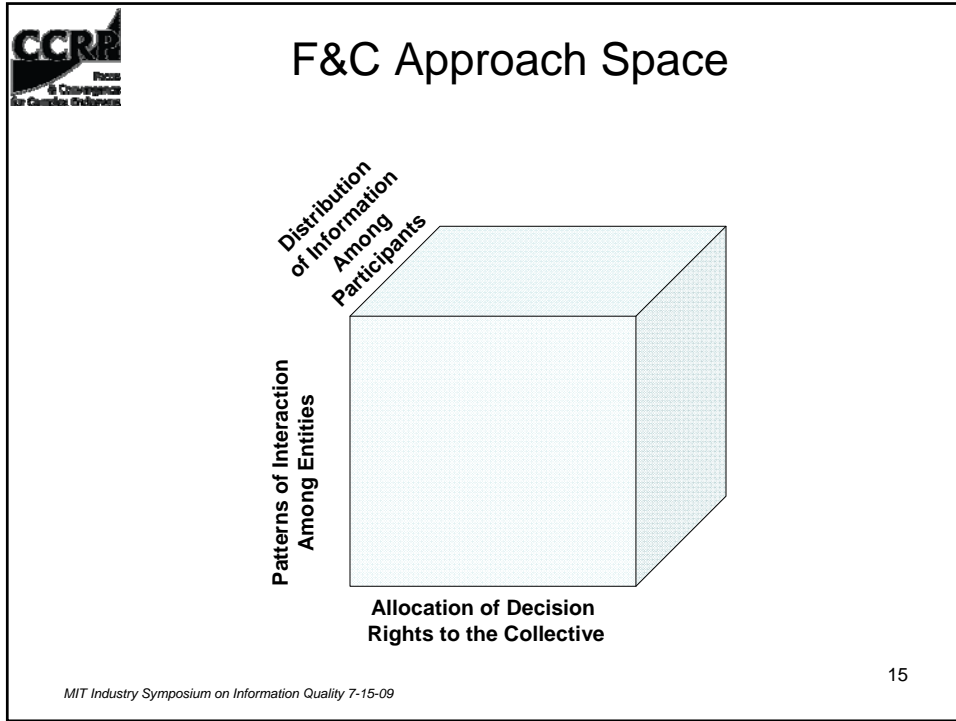*MIT Industry Symposium on Information Quality 7-15-09*
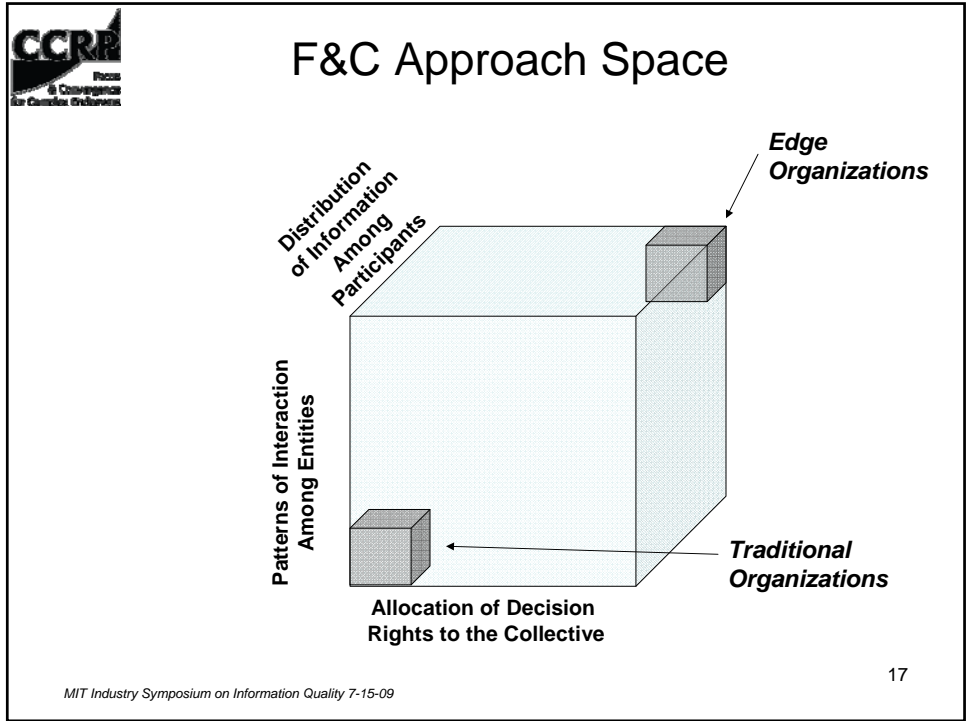
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Implications for Collective Action

- There will not be a unified chain of command.

- Entities will each have their own intent.

- The situation will be, in part, unfamiliar to all entities.

- There will be multiple planning processes.

- Critical information and expertise necessary to understand the situation will be non-organic.

- Actions, to be effective, will require developing synergies between and among entity actions.

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Focus and Convergence

- Replaces the terms
  - Command and control
  - Management
  - Governance

- Focus = developing shared intent and ROE without command or management authority

- Convergence = progress toward a set of desired outcomes without control
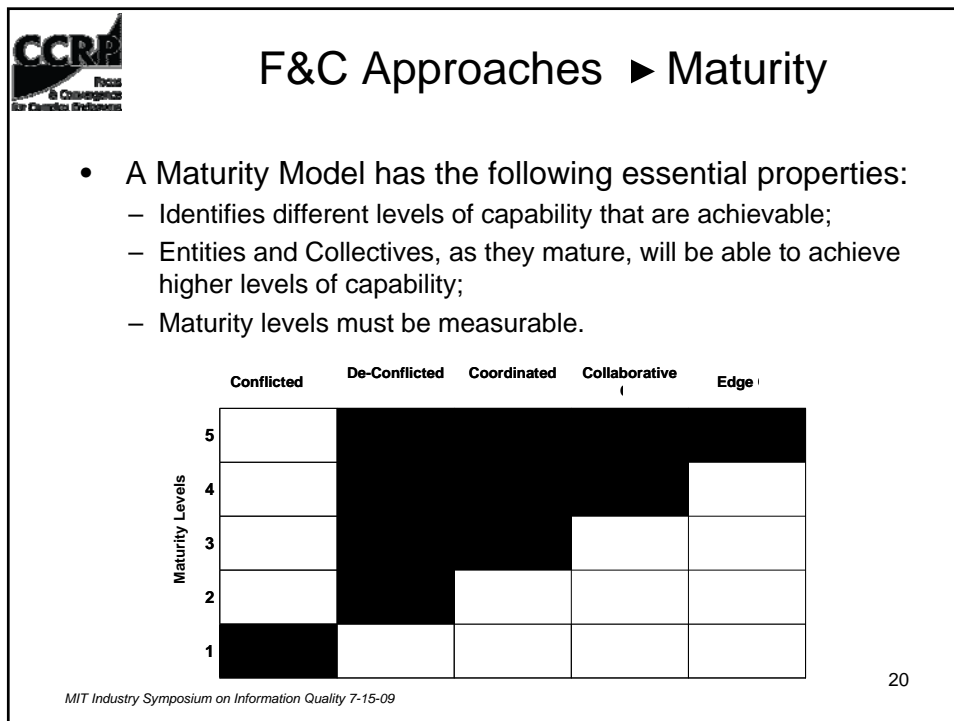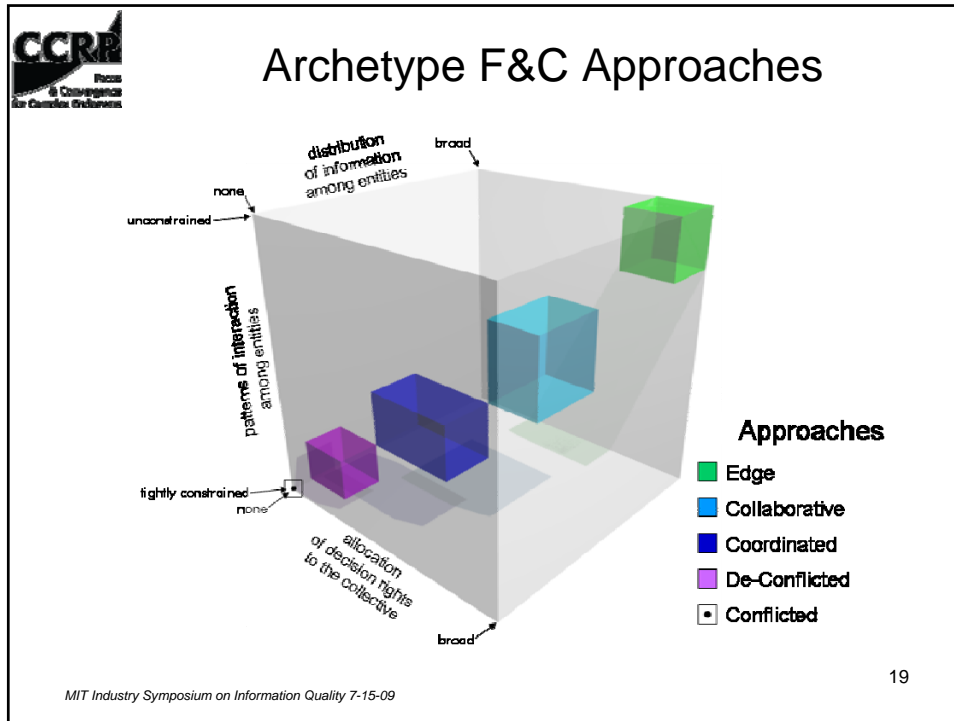
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F&C Approach Space

Edge Organizations

Distribution of Information Among Participants

Patterns of Interaction Among Entities

Traditional Organizations

Allocation of Decision Rights to the Collective

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Archetype F&C Approaches

	Allocation of Decision Rights to the Collective	**Inter-Entity Information Sharing Behaviors**	**Distribution of Information (Entity Information Positions)**
Edge	Not Explicit, Self-Allocated (Emergent, Tailored, and Dynamic)	Unlimited Sharing as Required	All Available and Relevant Information Accessible
Collaborative	Collaborative Process and Shared Plan	Significant Broad Sharing	Additional Information Across Collaborative Areas/Functions
Coordinated	Coordination Process and Linked Plans	Limited Focused Sharing	Additional Information About Coordinated Areas/Functions
Deconflicted	Establish Constraints	Very Limited Sharply Focused Sharing	Additional Information About Constraints and Seams
Conflicted	None	No Sharing of Information	Organic Information

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Archetype F&C Approaches

Approaches
- ■ Edge
- ■ Collaborative
- ■ Coordinated
- ■ De-Conflicted
- ▣ Conflicted

distribution of information among entities

patterns of interaction among entities

allocation of decision rights to the collective

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F&C Approaches ► Maturity

- A Maturity Model has the following essential properties:
  - Identifies different levels of capability that are achievable;
  - Entities and Collectives, as they mature, will be able to achieve higher levels of capability;
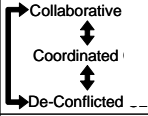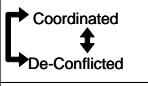 - Maturity levels must be measurable.

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F&C Maturity Levels

Maturity Levels	Content of Tool Kit	Decision Required	Transition Requirements
Level 5	Edge	Emergent	Fluid
Level 4	Collaborative Coordinated De-Conflicted	Recognize 3 situations and match to appropriate approach	Collaborative ↕ Coordinated ↕ De-Conflicted
Level 3	Coordinated De-Conflicted	Recognize 2 situations and match to appropriate approach	Coordinated ↕ De-Conflicted
Level 2	De-Conflicted	N/A	None
Level 1	Conflicted	N/A	None

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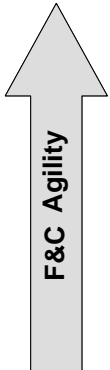
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Agility

- Agility is an umbrella concept that includes:
  - Responsiveness;
  - Robustness;
  - Resilience;
  - Flexibility;
  - Innovativeness;
  - Adaptability.

- Agility is the ability to maintain effective collective action as a function of changing circumstances and stresses.

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F&C Agility

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F&C Agility (vertical axis arrow)

F&C Agility

- F&C Agility involves more than being able to recognize the nature of the situation and adjust the F&C Approach
- F&C Agility also involves being able to maintain an acceptable level of effectiveness in the face of:
  - Physical, Electronic, and Cyber attacks that destroy or degrade nodes and/or links;
  - Information attacks that results in a loss of information or the insertion of misinformation;
  - A loss of trust in information, services, or entities;
  - An austere environment that limits connectivity and services;
  - ….

Summary

- The F&C Maturity Model enables entities and collectives to:
  - Characterize and understand current F&C approaches and capabilities;
  - Measure the extent to which they harness the power of information
  - Identify milestones on the road to a more mature capability

- For a given situation there are minimum levels of F&C Maturity and Agility required for success.

  (Requisite Maturity and Agility)

- Increased F&C Maturity is necessary, but not sufficient to achieve F&C Agility.

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