Agile and Resilient Hierarchies for Defense Departments: Lofty Ideal or an Actionable Proposal

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Characteristics of DoD Engagements

- Single/Unilateral Engagements → Coalition/Multilateral Engagements
- Material and Arsenal Domination → Information and Intelligence Domination
- Traditional Incursions → Insurgent-Based Warfare
- Known Threats and Known Spaces of Operations → Unknown Threats and Blind Spaces
- Top-Down → Bottom-Up
- Controlled → Emergent
- Predictability in terms of Preparation → Thriving on the Unknown
- Simple → Complex

The Design Challenge

- The Department of Defense (DoD) must demonstrate agility and resilience in operations at the strategic, tactical, and operational levels.
- The appropriate Command-and-Control (C2) structure must be deployed and continuously optimized.
- The Design Challenge –
  - Designing the appropriate C2 structure
  - Transforming current the current C2 structure to the desired C2 structure?
- Be realistic – We cannot start with a clean slate, must build on the existing architecture and protocols in place.

Designing?

About Designing

- "The process of design is the same whether it deals with the deign of a new oil refinery, the construction of a cathedral or the writing of Dante's Divine Comedy"

  » Sydney Gregory, (1966). *The Design Method,* London: Butterworths

Risks in Designing

- "The designer has a prescriptive rather than a descriptive job. Unlike scientist who describe how the world is, designers suggest how it might be. Designers are therefore all "futurologist" to some extent. The very essence of their job is to create the future, or at least some features of it. This is obviously a rather hazardous business and it carries with it at least two ways becoming unpopular. First, the new often seems strange and therefore to some people at least unsettling and threatening. Second, of course, the designer can turn out to be wrong about the future. It is very easy with that wonderful benefit of hindsight to see design failures."

» Bryan Lawson, (2006). *How Designers Think*, Oxford: Architectural Press

Designing as Fixing

- "A new house-style for a commercial organization, refitting a shop interior, extending a house, planting trees to form a shelter belt or declaring a housing action area are all deign responses in different fields to existing unsatisfactory situations. For this reason design is referred to by many writers as providing a 'fix' of some kind. The designer is seen as attempting in some way to improve or fix something which is wrong".

  » Bryan Lawson, (2006). *How Designers Think*, Oxford: Architectural Press

Two Major Issues in Designing

- **Multi-dimensional nature of design**
  - Coupling
  - Cohesion
  - Emergent complexities
  - Sub-optimizing
- **Communication among the designers**
  - Think about your house: Architect, town planner, interior designers…
  - Accidental versus planned communication
  - Timing of communication

Designing the C2 Structure?

Current C2

- Hierarchical, *for the most part*
- Centered around experiences, *not necessarily expertise*
- Highly efficient, *questionable effectiveness*
- Good for unilateral and simple environments, *troublesome from multilateral (coalition) and complex environments*
- Safe and risk-averse, *not proactive and risk-eliminator*

Edge Organizations

- Distributed and decentralized control
- Centered around information flows, *especially pushing information to the edges of the organization*
- Highly efficient and effective, *if the forces are well-trained and specialized*
- Good for multilateral engagements and complex environments, *if there is shared awareness and consciousness*
- Risky, *radical in its approach*

Pushing the Edges?

- Will the movement of information to the edges compromise agility?
  - Information overload
  - Information paralysis due to analysis
  - Moving information in the form of commands is not the same as moving information that is subject to open interpretation
  - Confusion due to multiple interpretations of information
  - Confusion due to multiple sources of information (e.g. coalition engagements)
  - Information distortion during communication – orders are singular and standard commands, edge organizations call for movement of more complex forms of information to the edges.
  - Lack of expertise to manage information

Agility and Resilience

- How do we identify the desired level of agility and resilience for an organization?
  - Task characteristics
  - Worker characteristics
  - Organization characteristics
  - Environmental characteristics

Fixes needed to the current C2

Improved management of *information* and *knowledge* for agility and resilience at the strategic, tactical, and operational levels

Getting to the Roots

- The challenge is to design the organization around the flows of information, or the management of information – information-based operations

- In order to do this, we need a comprehensive approach to information management

Knowledge [Information] Management

- *Knowledge management is defined as the collection of activities involved in managing the sources of information, analytics used to derive relationships from information, mechanisms for interpreting meanings from relationships, and calibrating actions based on meanings, in an effective and efficient manner, to meet the challenges of the organization. The components, source management, analytics management, interpretation management, and action management, are in escalating order of dependence as each determines the basis upon which the others will build upon sequentially. The components of knowledge management are linked with one another in a circular manner. The goals of knowledge management are to contribute to increased business value of the organization and also to improve the process of knowledge management in the organization.*

Source Management

- *The objective of source management is to ensure that the organization uses the right sources to obtain the right information, of the right quality, at the right time, at the right cost. Sources are the agents (human) and objects (physical) that possess or emit information of interest to the organization. To do so, the organization has to know its current sources and the characteristics of the information they provide. It has to protect the sources and retrieve information from the sources in a timely manner. It has to continuously evaluate these sources and seek new sources as its internal and external conditions change.*
  - Activities:
    1. Identifying sources
    2. Evaluating Source Characteristics
    3. Organizing Sources
    4. Retrieving Information from Sources
    5. Protecting Sources
    6. Updating the Collection of Sources

Analytics Management

- *The objective of analytics management is to ensure that the organization uses the appropriate analytical tools to discover and validate relevant logical and empirical relationships using the information it has from various sources. To derive the relationships, the organization has to deploy a range of heuristic, mathematical, statistical, logical, and qualitative techniques. It has to continuously evaluate these techniques and seek new ones as its information base changes. The organization has to maintain the right skill base so that analytics can be conducted in an effective and efficient manner.*

- Activities
  1. Discovering Relationships
  2. Training Users
  3. Validating Relationships
  4. Devising an Analytical Framework
  5. Visualizing Relationships
  6. Managing, Reusing and Evaluating Analytical Tools

Interpretation Management

- *The objective of interpretation management is to ensure that the organization correctly interprets and tests the meaning of logical and empirical relationships discovered through analytics. The relationships have to make sense in the context of the organization and its environment. To derive the meaning of relationships, the organization has to deploy a range of computer, individual, and group based methods. It has to continuously evaluate these methods and seek new ones as its information base and relationship types change.*

- Activities:
  1. Generating Interpretations
  2. Testing Interpretations
  3. Sharing Interpretations
  4. Storing Interpretations
  5. Evaluating and Updating Interpretation Methods

Action Management

- *The objective of action management is to ensure that the organization responds correctly based on the interpretations of the relationships discovered using the information from various sources. The actions may be physical or logical. To transform meaning into action the organization has to draw upon its repertoire of experience encoded in its people, processes, and systems. It has to continuously evaluate and modify this repertoire based on its learning from the outcomes of past actions.*

- Activities:
  1. Constructing Actions
  2. Coordinating Actions
  3. Executing Actions
  4. Communicating Actions
  5. Evaluating Actions
  6. Learning from Actions
  7. Reusing Actions

Comparing the Extremes

- **Current C2**
  - Sources Management
  - Analytics Management
  - Interpretation Management
  - Action Management

- **Edge**
  - Sources Management
  - Analytics Management
  - Interpretation Management
  - Action Management

The Happy Middle Ground: *Agile Hierarchies*

Agile Hierarchies

- Agile Hierarchies are self-organizing command-and-control structures that are calibrated in an emergent and agile manner. Agile Hierarchies come into existence for to meet specific requirements, in a given environment. They preserve the integrity of centralized command, while taking advantage of distributed control.

- The DoD will be seen as the manager of a portfolio 0f Agile Hierarchies – some of these will be permanent hierarchies, while others will be transient.

- Information will be the key weapon used to create, manage, and deploy the collection of Agile Hierarchies.

Agile Hierarchies

- Hierarchies that can self-organize themselves, dissipate as needed, and spin-off units as environmental conditions demand.
- Hierarchies
  - Intent
  - Goals and objectives
  - Coherence
  - Alliances between coalitions
  - Standardization of information and knowledge management
- Distributed
  - Ingredients for *sources, analytics, interpretation*, and actions

Between Hierarchies and Edges

- Agile Hierarchies
  - Need to preserve integrity in doctrine, commands, and actions in the DoD
  - Need to be robust and agile in responding to new challenges, both on the operational and tactical fronts
- Agility in how we organize, deploy, transport, and reuse *modular* hierarchical structures
- The ability to organize into a hierarchy as needed should be done in a plug-n-play approach
- Ideally, we will have a portfolio of organizational models that can be called into play as needed by environmental conditions
- Interdependencies among units
- Interoperability across entities

An Expandable and Contractible DoD

- An Expandable and Contractible House, by L. Jankovic (University of Central England)
  - Ease of refurbishment (house space and services can be expanded and contracted based on the needs of the occupants or the housing association)
  - Prefabricated elements (components are made of the highest quality and are reusable)
  - Minimum on-site time (less of re-creation and more of re-use)
  - Open architecture (transparency and the ability to integrate)
  - Upgradeability of performance (low cost to beef up performance as environmental conditions demand)
  - Upgradeability of space (new rooms can be added with ease)
  - Upgradeability of services (new services)
  - Recyclablity
  - Energy conversation

Transforming to the Desired State?

Approaches to Fixing?

- ## Gradual change models
  - Let us make small incremental changes over time and eventually we will have the desired state [temporal change]

- ## Turnkey approaches
  - Radically halt current operations and the switch over to desired state operating principles

- ## Divide and Conquer models
  - Let us make changes in one unit/entity and then diffuse change through the rest of the organization [spatial change]

Stages of Maturity in Info. Driven Change

Stage
- Ad-Hoc
- Reactive
- Appreciative
- Organized
- Optimizing *ad infinitum*

Outcomes
- Barely Operational
- Flexible
- Adaptable
- Agile
- Agile and Resilient

How are we doing in terms of *sources management, analytics management, interpretation management,* and *action management?*

My Suggestion

- **Think about re-designing a historic building**
  - Must realize that you cannot pull down everything and start from ground zero
  - Do not pull down the foundations and the pillars
  - Keep the external façade as it needed to meet the needs of the external environment
  - Work to modernize the interiors
  - Keep the defining cultures of the building, but modernize the interiors so that it can be used in the most optimal manner.

Design Traps

- Category trap
- Completeness trap
- Measurement trap
- Icon trap
- Image trap
- Sunk-cost trap
- Power trap
- Harmonious trap

DoD - Fixes

- **Do not disrupt the good aspects of C2**
  - Unity of command
  - Internal congruence and cohesion
- **Begin by**
  - Redefining the knowledge and training procedures of the forces
  - Make the front-lines more agile and knowledgeable
  - Engage in coalition-based efforts
  - Significantly improve the intelligence capacities

Closing Thoughts

Designing can result in modular, incremental, architectural, or radical innovations. However, all designs call for change. The reactive think of change as risky, the proactive embrace risk as opportunity. We cannot sit back and let our enemies embrace opportunities, while we get paralyzed by risk.