

## UNDERSTANDING AND DESIGNING MILITARY ORGANIZATIONS FOR A COMPLEX DYNAMIC ENVIRONMENT

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USAWC STRATEGY RESEARCH PROJECT

**UNDERSTANDING AND DESIGNING MILITARY ORGANIZATIONS FOR A  
COMPLEX DYNAMIC ENVIRONMENT**

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## **ABSTRACT**

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The intent of this paper is to apply two distinct theoretical frameworks from organizational science in an analysis of organizational design as it relates to the Department of Defense (DoD). The first perspective of organizational design will be from a traditional more rational, mechanistic approach and the second will be from complexity theory. The two theories will be used to describe the external environment and how it relates to DoD organizations, current DoD organizational structures, and transformational concepts related to organizational design. The context of this paper is based on the concept of global environmental conditions changing due to a transition from the Industrial Age to the Information Age and will be the foundation for demonstrating transformation necessity within the DoD.



# UNDERSTANDING AND DESIGNING MILITARY ORGANIZATIONS FOR A COMPLEX DYNAMIC ENVIRONMENT

## Introduction

Today's military organizations are slowly evolving and transforming to meet the demands of a complex ever changing global environment. Unfortunately, this evolving process will not be quick enough to keep pace with the rest of the world and an accelerated more deliberate transformation is required to maintain a competitive advantage. As such, it is important strategic leaders not only understand environmental dynamics but also recognize and develop an understanding about the relationships between organizational design, organizational processes, and the attributes of leadership needed to enable success in this area.

The current comprehensive global environment formed relatively rapidly over the last two to three decades and has been deemed a new age – The Information Age. The Department of Defense (DoD) has been slow to adapt to this new age. DoD's controlling processes, structures and prevailing cultures are relics of the Industrial Age and not fit to meet the challenges of the Information Age. In order to cope, DoD will need to create and foster cultures that provide for organizational behaviors reflective of agility. But in order for this to occur, military professionals need to understand the historic context of DoD's current organizational structure and associated culturally derived behaviors

Typically, military professionals take for granted or do not understand the types of organizational structures in which they operate beyond recognizing they are "stove piped" bureaucracies. Granted, most professionals will recognize an organizational chart of their organization, but have little knowledge of what type of organization they are in or what the structure and controlling mechanisms were actually designed to

accomplish. This becomes a liability or handicap with regards to effective management and more importantly, transformation efforts.

The intent of this paper is to examine concepts describing the external environment and the organizational structures and controlling mechanisms or processes within organizations from two different perspectives of organizational science. The intent is to demonstrate the necessity for transformation.

### Organizational Theory Approach

There are two “Camps” of organizational theory. The first is an older more rational and mechanistic approach that tends to break down organizational analysis into parts of the whole. This systemic method of analysis provides a good perspective of historic and many current organizational models but begins to fall short with regard to the road ahead in the Information Age. The second approach to organizational theory is derived from chaos and complexity theory and underlies the concepts of DoD transformation efforts with regard to Network Centric Operations (NCO).

The older rational approach espouses that when analyzing organizations and their respective environments, it is essential to clearly define the boundary of the organization being studied. Boundaries simplify analysis by defining context and system relevance. Organizations within the Department of Defense (DoD), for example, can be analyzed at all levels from a platoon squad to the DoD as a system itself. Environmental conditions can potentially be different for each organization and the structural design and processes chosen for the organization should match the complexity and dynamic conditions of the environment relative to the boundary.

The second theoretical approach is informed by complexity theory and, as stated, is derived from chaos theory. Both chaos and complexity theorists believe that systems reflect more than simple “If A then B” casual relationships. They believe system behavior results from non-linear, complex interactions among constituent parts and that behavior is difficult or even impossible to predict.<sup>1</sup> Chaos theory focuses on physical systems in which nonlinearity is intense and mechanistic. Chaotic systems are mathematically deterministic but their equations are unsolvable.<sup>2</sup> Weather patterns and fluid turbulence are examples of chaotic systems. Complexity theory, on the other hand, has similarities to chaos theory but is also relevant to biological and social systems. Complex systems deal with adaptation, deliberate behavior, conscious and unconscious activities that are based on past experiences.<sup>3</sup> While still primarily unpredictable, complex systems are more stable than chaotic systems and are associated with evolution, ecological niches, social process, human behavior, and economies.<sup>4</sup> In other words, complex systems can be considered learning organizations and are referred to as “complex-adaptive” systems.

Both approaches to organizational theory are still being published in various books and journals but DoD research teams have adopted the complex-adaptive system approach. Regardless, both perspectives will be applied in the following sections as it provides a historical account of Industrial Age models and thinking with a transition to current and future relevant transformational concepts.

### External Environment

The external environment surrounding the United States military is a complex system that requires regular analysis and to which organizations must adapt for

success. Strategic leaders must have the ability to transform and design military organizations so they are capable of properly interpreting their external environment while learning and adapting through analysis and action.<sup>5</sup>

### Defining External Environment

The Strategic Leadership Primer published by the Department of Command, Leadership and Management within the United States Army War College describes the external environment as Volatile, Uncertain, Complex and Ambiguous (VUCA).

Volatility describes rate of change for information and situation. Uncertainty refers to the inability to know everything about the current situation. Complexity illustrates the enormous number of factors that have causal bearing on a given situation while ambiguity relates to an inability to understand the significance of a given event or situation.<sup>6</sup>

Richard Daft, a rational theorist, defines the organizational environment as “All elements that exist outside the boundary of the organization and have the potential to affect all or parts of the organization.” This external environment Daft describes consists of domains, sectors and task environments.<sup>7</sup> Keep in mind; these terms change depending on the author. Gareth Jones, for example, refers to sectors as “Forces” and task environments as forces within a specific environment.<sup>8</sup>

Domain is an organization’s chosen environmental field of action or where the organization decides to pursue its goals including markets, products and services.<sup>9</sup> For DoD, domain is, on a macro level, national defense - a service domain. Nested organizations within DoD all operate within the national defense domain but when

analyzing a nested organization, it is important to identify a more specific domain for that particular organization.

Sectors are subdivisions of the external environment and are defined by domain.<sup>10</sup> The domain of national defense, for example, covers numerous sectors including government, economic conditions, technology, foreign countries, NGOs, socio-cultural, industry, terrorism and physical environment. An organization's domain, however, does not typically cover entire individual sectors. DoD's domain covers the terrorism sector but not the portion involving terrorist funding. As stated before, nested organizations within DoD have more specific domains but not necessarily more specific sectors, just smaller portions of the same sectors. The U.S. Army's domain, for instance, can be defined as ground warfare or the U.S. Navy's as maritime superiority, both subsets of national defense. Yet both domains cover the sectors described for DoD only on a smaller scale.

The task environment includes sectors unto which the organization interacts directly and that have a direct impact on the organization's ability to achieve its goals.<sup>11</sup> These are sectors to which organizations will pay the most attention and in which they will expend more energy. The sector of foreign countries, for example, can be denoted a task environment for any branch of the armed forces as well as the DoD as a whole.

### Conditions of the External Environment

Daft describes levels of uncertainty within the external environment in two dimensions – The simple-complex dimension and the stable-unstable dimension.<sup>12</sup> Jones labels these two dimensions as factors causing uncertainty and adds a third factor called richness.<sup>13</sup>

The simple-complex dimension refers to the number and dissimilarity of external elements relevant to an organization's operations.<sup>14</sup> A sector can be considered an element by itself but can also contain numerous specific elements. Regardless, as relevant elements (or factors from the "C" in the VUCA description) increase and become more diverse within the external environment, the scale moves from simple to complex with increased uncertainty. The simple-complex dimension deals with quantity and diversity. Take any organization within DoD and just list and count elements within its external environment that may have an influence. The list will be large and diverse and may include: Chain of Command (CoC), physical environment, local community, foreign countries/militaries, sister organizations, FAA, NGOs, and Congress. The list for the DoD and the majority of its lesser organizations is undoubtedly complex.

The stable-unstable dimension describes the dynamics of elements within the environment or more accurately – how dynamic. Stable environments rarely change and do so slowly while unstable environments change often and rapidly.<sup>15</sup> The scale on this dimension is measured from more to less stability but is easier to describe and think of in terms of dynamics and will be referred to as static-dynamic. As environmental condition moves from static to dynamic, uncertainty increases. This concept can be related to the "V" in VUCA but not limited to just information and situation. Environments can be very dynamic and understanding change is important but difficult and warrants further exploration.

Time relevance to change is perhaps one of the more difficult concepts to understand when analyzing the simple-dynamic dimension. Rates of change can be measured from explosive such as a literal explosion to very gradual similar to plate

tectonics occurring over geological eons. However, global warming (assuming it is a current event) that occurs over a 30-year period may seem gradual but could be, in fact, an explosive change relative to geological time. Rates of change therefore, must be examined within context of the system being analyzed but also in conjunction with how often change occurs and variance in occurrence.

Greater rate, occurrence, and variance of change create greater uncertainty with variance being the catalyst. Variance is considered “The mother of all evils” with regard to organizational systems and immense measures are taken to lessen the effect. Variance is obviously not unique to change; change would not create as much uncertainty if it occurred often, rapidly, and regularly. Change that occurs haphazardly or, as scientifically described, with large variance relative to organizational perspective creates the greatest uncertainty. With variance, environmental changes become unpredictable “surprises” that disrupt organizational goal achievement and require adaptation to overcome its effects.

Change in the external environment can be measured when analyzing but it can also be difficult and sometimes impractical to do so. Change in the business world may be measured by asking questions such as: How often are new products introduced within a domain or how fast did the automotive market shift to SUVs? The same can be applied to the DoD – How often do foreign countries introduce new weapon systems or how fast is radical Islamic ideology spreading? The difficulty in answering is twofold. The first problem is establishing beginning and end states (if there is an end state at all) to measure. The second dilemma is determining if rate, occurrence, and variance of change are actually relatively dynamic on the stable-dynamic scale. Even organizational

scientists have a hard time quantifying this dimension as can be gleaned from Daft's statement "An environmental domain is stable if it stays the same over a period of months or even years."<sup>16</sup>

Getting back to dimensions or factors of environmental conditions, the third dimension, richness, is a function of resource availability to support an organization's domain.<sup>17</sup> This is a straightforward concept that relates resource availability to uncertainty. It can be placed on a scale of plentiful to scarce where a scarce environment creates more uncertainty. Resources can be considered skilled labor, customer base, technology availability, and specific to DoD – the budget.<sup>18</sup>

Environmental conditions, from the perspective of the rational approach, are defined by the above scales of simple-complex, static-dynamic, and plentiful-scarce. These environments can be on the extremes or somewhere in the middle. The VUCA concept leads one to believe there is nothing but a complex-dynamic environment which is true at the strategic level. However, nested organizations may have complex-stable, simple-dynamic, or even simple-static environments. These organizations may not need transformation or internal change to stay competitive within their domains. Furthermore, the condition of an organization's environmental can change, especially in the context of a nested military organization. Take an army brigade, for example. The brigade, when overseas and conducting combat operations will be engulfed in a very complex and dynamic environment with potentially scarce resources. However, place that same brigade in the states conducting training during peace time and its environment may take on a whole different picture.

The rational theory provides a way to frame external environmental analysis and is typically appealing to a mechanistic managerial perspective. It is fairly easy to understand and apply and provides for an initial foundation for understanding external environmental concepts. However, the model tends to break the environment down into specific pieces for analysis neglecting many overlaps and interactions found throughout a system of systems.

### Complexity Theory and the Environment

The rational approach to defining environmental conditions was used in detail because it lays the ground work for developing an understanding of the environment. Complexity theorists will not deny there are varying sectors or, more accurately, systems within the external environment; it is they believe that the varying systems themselves are complex, interactive and unproductive and misleading to analyze part of a system in isolation. Analysis of the external environment needs to be from a perspective of the system as a whole with interactive overlapping systems that do not have a direct cause and affect on one another. In other words, the external environment is defined by interactive chaotic and complex systems that continuously change in an unpredictable manner.

Bounding a system for observation, such as an organization, is not necessarily wrong but it must be understood that the boundary is used only for defining the system being examined or a particular point in time. The boundary cannot be the limits of observation or analysis as the system in question is almost always part of a larger system it interacts with and adapts to. To put in context, the systems interacting with the “observed” system make up the external environment.

## Organizational Designs

Military professionals typically understand their chain-of-command and the internal processes of their organization but unfortunately it is often these same leaders who do not understand or recognize the type of organization they work within. The design or structure of an organization not only denotes vertical and horizontal reporting chains, it also describes organizational culture which in turn influences organizational behavior. Having the ability to recognize and understand organizational structures allows leaders to comprehend and potentially influence behaviors.

Rational theorists have been espousing optimal structural designs for many years and their recommendations and theories have changed and evolved over time. In the latest (as of this writing) "Organizational Dynamics" journal, Bahrat N. Anand and Richard L. Daft describe current thinking and analysis of the "right" design for today's organizations. The two authors provide a historic rational approach consisting of three organizational design eras.<sup>19</sup>

### Era 1: Self-Contained Organizational Designs

Era 1 began in the mid-1800s, lasted until the late 1970s, and was dominated by self-contained hierarchical structures with clear but steep chains of command.<sup>20</sup> These organizations have been described as "Functional, Divisional, and Matrix."<sup>21</sup> Though the era is said to have lasted until the late '70s, these types of structures still exist in abundance today. Era 1 organizations were created for internal control and efficiencies in producing an enduring output or, in other words, building the same widget or service for the same market over time. These structures work well in a simple-stable

environment but began to suffer as the environment progresses to a complex-dynamic condition.

Anand and Daft write: “In a functional structure, activities are grouped together by common function from the bottom to the top of the organization.”<sup>22</sup> This is commonly referred to as “Stove Pipes” and it is well understood they exist within DoD. As a matter of fact, each branch of the armed services can be labeled a functional component of DoD. Choosing the US Navy and drilling down further, one can identify three more functional components; aviation, submarine warfare and surface warfare.

According to Anand and Daft, “The divisional structure occurs when departments are grouped together based on organizational outputs.” In the business world, most large corporations have divisions that encompass numerous functions. The people within these divisions focus on a common product and the functional boundaries are more transparent.<sup>23</sup> Taco Bell is, for example, a division of PepsiCo. The divisional structure is still pyramid in nature but is supposedly suited for a slightly more complex-dynamic environment than the functional organization.

Divisional structure exists in DoD; at least in design. A Joint Task Force (JTF) created by a Geographic Combatant Commander (GCC) is designed to be a divisional entity of the GCC but in reality is a series of functional component commanders that tend to operate within their domains. The organization becomes divisional when planning and efforts are combined to achieve a common goal with understood responsibilities. However, as seen in a great deal of literature, defining supported and supporting commands is considered an important function for the JTF commander. But this is indicative of stove-piped elements concerned more with self-relevance and

internal desires than the overarching purpose of why they were put together as an organization. In other words, it is an organization designed to be divisional but behaves functionally.

As the environment has become more complex and dynamic over the last three decades, structures have evolved. Anand and Daft state, once again, “Few organizations can be successful today with a pure functional structure. Functional or divisional silos inhibit the amount of coordination needed in a changing environment.”<sup>24</sup> Horizontal coordination is needed between functional components and organizations have used inter-department liaisons, networked information sharing, and other means to achieve this. However, organizations that needed even stronger horizontal cooperation evolved into matrix organizations.<sup>25</sup> The matrix organization contains a traditional vertical hierarchy but overlays an equally strong horizontal coordinating chain of command. The DoD is itself, a matrix organization. Each service provides functional components that report to operational or combatant commanders. These same components are organized, trained, equipped, and maintained by the service chiefs – two different chains. Matrix organizations do allow for greater flexibility and divided responsibilities but can also create confusion for lesser organizations or commands. Confusion based on whom to report or answer to.

Matrix organizations exist within specific services as well. Naval Aviation is a perfect example. Carrier based squadrons report operationally to a Carrier Air Wing Commander (06) but are resourced through a shore-based commodore (06). The two chains continue upward. The Air Wing Commander’s chain continues up through the operational hierarchy while commodores report directly to Commander Naval Air Forces

(CNAF) – a three star resource provider. The functions and responsibilities of the two chains are completely different but allow for the commanders to concentrate efforts within their lanes while coordinating their work.

Era 1 organizational structures have been referred to as Industrial Age structures indicative of their period of creation. This connotation is descriptive of “old” or “outdated” relative to the views of those analyzing organizations within the context of the information age. These organizational structures are common within DoD and it’s important to recognize what they are, how they evolved, and the behaviors they display.

#### Era 2: Horizontal Organization Design with Team and Process Based Emphasis

Era 2 began in the 1980s as the global market place began to become more complex. The internal structures of traditional designs began to hinder the ability of organizations to respond readily to rapid changes in the environment.<sup>26</sup> To cope, layers of hierarchies were removed and cross-functional teams created to break down stovepipes. A flattened organization reacted faster by eliminating vertical control measures and teams of various functionaries provided for greater innovation through close coordination of the various “stove-piped” departments. The teams effectively managed organizational processes instead of hierarchies.<sup>27</sup>

Examples of “Flat” organizations are plentiful in the tech sector of industry as that market is known to change rapidly with ever newly introduced or improved products. While not as wide spread, organizations within DoD have also flattened to better respond to internal and external requirements. CNAF (mentioned earlier) eliminated several internal structural levels during the early 1990s creating a vertical chain that went from 3-star flag level directly to the O6 level. Relative to traditional military

structure, CNAF is a flat organization and it uses cross-functional teams to manage resource allotment, repairable manufacturing, personnel distribution, planning, and scheduling.

Flat organizations tend to react and adapt better to dynamic environments. It is the behavior of the organization that allows for adaptability and flattened organizations produce cultures conducive to adaptive behavior. Somewhat unique to the military are organizations structured traditionally that behave adaptively or “flatten out” when operating. As discussed, environmental conditions change for organizations, especially military units that may be either in “garrison” or conducting combat operations. As such, some military organizations have evolved cultures that allow behavioral change based on current environmental conditions. Special Forces teams are great examples, they are administratively steep in rank and hierarchy, like most military units, yet allow and push decision allocation to near equal levels during operations. This is an evolved and desired organizational behavior realized through environmental influence - A concept beyond scope here but deserving more study.

Era 2 organizations are not as prevalent in the DoD but the behaviors are desired. Decentralized operation is a trait of the flattened organization; a trait derived from the culture a flattened organization creates. This organizational trait derived from structural design and controlling processes is necessary for complex dynamic environments.

### Era 3: Organizational Boundaries Open Up

Era 3, as described by Anand and Daft, began in the late 1990s as a result of improvements in communication technology and emerging economies that produced pools of skilled expertise around the world. This era produced managers less reluctant

to go outside the organization for processes traditionally kept in-house resulting in “Hollow” and “Modular” organizations.<sup>28</sup>

The hollow organization is more a method than design centered on outsourcing to organizations that can provide a desired process better or cheaper than the parent organization. The modular organization is the same with the only difference being outsourcing portions of a product instead of process.

Outsourcing is profuse in the DoD and Anand and Daft use DoD and Halliburton as an example of a hollow organization outsourcing to another business.<sup>29</sup>

Cost reduction is the primary reason for outsourcing and is relevant to competitiveness in the external environment. Cost reduction is important in DoD as reductions in one sector provides resources to another and abundant resources reduce uncertainty. However, leaders within DoD must tackle the difficult problem of balancing feasible outsourcing with actual cost reductions, risk, and benefits of resources gained.

Era 1 and Era 2 organizational designs are both great historical descriptions of industrial age organizations and define most current DoD structures. However, the Era 3 design seems to be indicative of the rational theory loosing steam in the Information Age. Describing cost saving methods as a modern organizational design is overreaching and illustrates the limits of the rational approach and Industrial Age thinking.

The corporate realm has pursued aggressive structural transformation in keeping pace with global change but DoD has been more reluctant to do so. Traditional military leaders have and will have a disinclination to abandon current Napoleonic structures but, at the same time, desire behaviors found in modern organizations. As such, it will

be imperative to incorporate processes and controls that provide for agile organizational behavior in the Information Age.

### Edge Organizations

The edge organization is a conceptual framework for organizational design relevant to the Information Age. A concept promoted by the Command and Control Research Program (CCRP), it is an agile organization centered on information sharing, decentralization and self-synchronization. While Industrial Age organizations are still considered complex-adaptive systems, they are slow to adapt and far from agile. The concept of Edge Organization is a product of complexity theory that is not only highly adaptive but very agile.

In the book, *The Agile Organization*, Simon Atkinson and James Moffat write: “Agility is the gold standard for Information Age militaries. Facing uncertain futures and new sets of threats in a complex, dynamic, and challenging security environment, militaries around the world are transforming themselves, becoming more information-enabled and network-centric.”<sup>30</sup> The CCRP, in a series of books, outlines processes and concepts required for organizational agility in the Information Age. The premise is based on networked edge organizations managed and led through flexible command and control structures orchestrated around thoroughly understood commander’s intent.<sup>31 32</sup>

<sup>33</sup> Understanding, acceptance, and corporate-wide implementation of these concepts will enable the DoD to maintain global superiority among conventional and asymmetrical competitors.

## Agility

Before diving into the processes that enable organizational agility, it's prudent to define and or describe the attributes that contribute to agility. Alberts and Hayes write: "Agile organizations just don't happen. They are the result of an organizational structure, command and control approach, concepts of operation, supporting systems, and personnel that have a synergistic mix of the right characteristics."<sup>34</sup> The same authors describe six attributes of agility:

1. Robustness: The ability to maintain effectiveness across a range of tasks, situations, and conditions.
2. Resilience: The ability to recover from or adjust to misfortune, damage, or a destabilizing perturbation in the environment.
3. Responsiveness: The ability to react to a change in the environment in a timely manner.
4. Flexibility: The ability to employ multiple ways to succeed and the capacity to move seamlessly between them.
5. Innovation: The ability to do new things and the ability to do old things in new ways.
6. Adaptation: The ability to change work processes and the ability to change the organization.<sup>35</sup>

In the context of DoD, robustness is the ability of an organization to successfully complete a diverse set of missions in pursuit of goal achievement. This is obviously a highly desired trait as today's forces are expected to perform a myriad of missions beyond traditional conventional warfare.

Resilience and responsiveness are closely tied attributes and should be analyzed in the context of environmental dynamics. A battalion sized organization, in combat, that experiences a literal explosive event within a command and control facility must recover and react within a very short period to be successful. The explosion is a very rapid and potentially destabilizing change in the environment relative to the battalion and system time relevance. The battalion, in this example, must correctly react within a matter of minutes in order to recover and adjust appropriately to the change. Now, expand system observation to that of Central Command and associated efforts in Iraq. Subsequent to “Major Combat Operations,” the environment changed including destabilizing perturbations in the form of an insurgent movement. In this example, time reference is much different than in the battalion example and when analyzing, one must determine if Central Command adjusted and reacted in a timely manner relative to the system. The effort in Iraq is approaching the five year mark with some positive results. Is this indicative of a responsive and resilient organization in relation to mission type and goals? There is no definitive answer, but, keep in mind, it may be a matter of perspective based on past performances during similar situations (insurgencies) or based on organizational expectations relative to current global environmental dynamics.

Flexibility, innovation, and adaptation are qualities that are also closely related. These three traits are highly desired and advocated through all levels of DoD. However, DoD’s steep bureaucratic hierarchy with tomes of written doctrine and standard operating procedures tends to limit these desired attributes. “Employ multiple ways,” “Do new things,” “Do old things in new ways,” and “Change work processes” are all

actions not conducive to an organization managed through bureaucracy and written procedure.

Achieving organizational agility will require transformation. It should be recognized that organizations within the DoD have and are taking transformational steps, but the changes are slow, incremental, based on historic events, and often overcome by external events. The latest transformational efforts in networking combined with restructured command and control practices will be the best process enablers in creating agile organizations across the force.

### Command and Control

Today's militaries are reflective of Industrial Age organizational evolution and associated command and control processes. The underlying principles of these methods and designs applied to Industrial Age economies, businesses and warfare and encompassed decomposition, specialization, hierarchy, optimization, and deconfliction. In essence, industrial age organizations became very controlling. They distinctively defined roles dividing activities into subsets with specialized professionals to oversee activity conduct. Hierarchies formed to control and focus these efforts towards alignment with higher goals while providing a mechanism for advancement based on conformity. A characteristic assumption of the Industrial Age organization was that every problem had a best solution. As such, optimizing became the norm for problem solving, patterns of employment or execution and specific to the military, optimized weapons employment against specific threats. With all this specialization, controlling mechanisms had to be put in place to ensure the elements did not conflict with one another.<sup>36</sup> To some, these are great and desirable qualities. However, and to put in

context of organizational science, these attributes and behaviors are descriptive of the functional organizational structure of Era 1 described by Anand and Daft and are not conducive to the environmental conditions of the Information Age.

The Information Age can be defined as the simultaneous improvement in information richness, reach and the quality of virtual interactions. All of these qualities decrease the impediments to collective action by individuals or groups of individuals separated by distance or time, or divided by function, organizational, or political boundaries. Information is power but not in the sense of individual ownership. Information is power in the sense of sharing and the collaborative self-synchronization efforts of individuals and groups acting on the information.<sup>37</sup>

Command in the Information Age involves creating conditions for success. The actions involved are not unfamiliar to military leaders and include establishing visions and associated goals, setting priorities, resource allocation, and defining constraints. In all, these actions should define the problem to be solved or mission to be accomplished.<sup>38</sup> In essence, it is nothing more than clear command intent.

Control becomes more problematic for current Industrial Age organizations. The mechanisms of the centralized hierarchy described above cannot effectively impose control on a complex adaptive system. The best bet is to set initial conditions that will result in desired behaviors with follow-on adjustments. Instead of being in control, the organization leadership creates conditions that are likely to give rise to desired behaviors.<sup>39</sup> Control will need to take new forms.

The ideal edge organization will have wide dissemination of decision rights, wide distribution of networked information, and relatively unconstrained patterns of interaction

among its participants. Networking is the catalyst. Patterns of interaction are constrained through limitations and deconfliction. Deconfliction at the tactical and even operational level, for example, entails boundaries and zones such as altitude restrictions, operating areas, kill boxes, and designated sea lanes. As discussed earlier, this is a controlling mechanism of the industrial age organization but an important measure for military organizations as it prevents fratricide. A high-fidelity real-time network of rich information would allow for self-synchronization of elements and thus requiring less control measures. In other words, networking allows for unconstrained patterns of interaction that in turn, leads to self-synchronization. Decision rights in the Industrial Age organization are centralized in order to manage stovepipe elements. Allocation of decision rights in the edge organization must be distributed lower and wider and on extremes, peer-to-peer. This obviously allows for higher responsiveness to changing conditions in the environment but, to be successful, it needs to be a collaborative effort. Networking allows collaboration of those organizational elements closest to the changing conditions.

## Networking

Network Centric Warfare (NCW) and or Network Centric Operations (NCO) are well documented incrementally evolving practices within the DoD. Steps in implementation have been relatively slow due to technology development, bandwidth, interoperability, and, of course, transformation resistance. However, these barriers are beginning to fall and efforts to accelerate integration across and outside the DoD need to be pursued.

Application of information sharing through robust networking takes on different appearances relative to tactical, operational and strategic realms and is reflective of time relevance of the system.

At the tactical level, networking needs to provide real-time information of dynamic battle space conditions as far down as individual operators. This, of course, requires integrated ISR resources seamlessly collecting and disseminating reliable and useable information throughout the domain. Tactical aviation has made relatively recent strides in this direction. Though not completely seamless, sophisticated data links are now used to integrate sensors from airborne, sea, and land based platforms that present high fidelity information in an easily understood context to individual operators. The Joint Tactical Information Display System (JTIDS) and Multi-Information Display System (MIDS) used in conjunction with U.S. interoperable secure data links has become aviations new “Sliced bread.” This technological transformation has become so important to this community that “If you can’t get in the net; you can’t be in the fight.”

Critics may point out that the above example is great for conventional warfare but of little applicability to asymmetric warfare. However, the US Army’s Stryker Brigade has proven different. The Rand Corporation conducted two studies involving Stryker Brigades, one from the Joint Readiness Training Center (JRTC) and the other from actual combat operations in Iraq. Stryker Brigades incorporate new elements related to NCO including operational concepts, organizational structure and networking capability realized through new technologies.<sup>40</sup> The Rand Corporation compared the Stryker Brigade to a Light Infantry Brigade and found overwhelming performance improvements for the Stryker Brigade. The JRTC study, for example, revealed speed of command

reduced from 48 to 3 hours and the blue-red casualty ratio decreased from 10:1 to 1:1.<sup>41</sup> With regard to Iraq, the Rand Corporation presented over 200 pages of positive results for the Stryker Brigade relative to “Legacy” organizations. The JRTC data proved relevant to Iraqi stabilization operations. The Stryker Brigade suffered less than one-tenth the number of U.S. casualties during enemy attacks and offensive operations when compared to the Light Infantry Brigade.<sup>42</sup>

Tactical successes are important but when expanding into the operational and strategic realms, networking changes shape. Real-time information may be available for strategic leaders but the information is typically, but not always, less relevant to strategic decision making. Useful networked information at the strategic level comes in the form of information collection, storage, posting, and dissemination through internet based architecture. It is an effort intended to cut across vertical hierarchies to enable horizontal coordination. And it enables a collaborative effort in making sense of actionable information.

As stated many times, DoD requires structural transformation to remain competitive in the Information Age and networking may very well lead to these required changes. The resultant changes may not necessarily be physical such as removal of hierarchical layers but rather virtual in the sense of collaborative decision making and actions made and executed at the edge. In other words, the vertical decision making practice currently used in DoD will evolve to that of widely distributed decision rights granted to groups or individuals closest to the problem.

Incorporating networks alone will not reshape DoD into an agile organization. Transformation will require cultural changes, education and training that provide for

desired behaviors reflective of an edge organization. This topic will not be examined in detail as it would encompass the content of an entire research paper alone. Nonetheless, it is an important topic completely interrelated and relevant to organizational design that must be taken into consideration.

The edge organization is conceptual but it ties together necessary elements for an agile organization. And an organization will undoubtedly need to be agile to successfully compete in the complex-dynamic environment of the Information Age. Designing an edge organization (or one close to it) will not be easy. It will be a major transformation effort requiring much more than structural adjustments and networking infrastructure; it will require a change in DoD's Industrial Age culture - A change, that will not be easy.

### Conclusion

DoD transformation is a fundamentally accepted concept in early stages of implementation, and the "how to" and content of transformation are still of great debate. In view of these issues, one must not only consider the context of why transformation has come to be, but also the principles and designs of organizations that transformation is intended to create and replace.

DoD transformation emanated from the necessity to create an agile force capable of full-spectrum operations within the Information Age. The Information Age brought with it a complex-dynamic environment of intertwined systems resulting in great uncertainty. Current Napoleonic Industrial-Aged organizations and associated cultures are dated and ill designed to cope with it. As such, transformation must embrace organizational restructuring and process implementation that enables agility, not just from internal

tactical to strategic realms, but across agencies, external non-governmental entities and global partners.

Finally, transformation, as stated, will be necessary to meet the demands of the Information Age and transformation will occur. However, how transformation occurs will be determined by DoD leadership. It can be left to the slow process of evolution, it can be thoughtfully applied incrementally, or it can be in step with the information age-revolutionary.

### Endnotes

<sup>1</sup> Russ Marin, *The Edge of Organization: Chaos and Complexity Theories of Formal Social Systems*, (London-Sage 1999), 5.

<sup>2</sup> Ibid, 6.

<sup>3</sup> Ibid, 7.

<sup>4</sup> Ibid.

<sup>5</sup>Richard L. Daft and Karl E Weick, "Toward a Model of Organizations as Interpretation Systems" *Academy of Management Review* 2 (1984): 286 12.

<sup>6</sup> U.S Army War College Department of Command Leadership, and Management, *Strategic Leadership Primer 2<sup>nd</sup> Edition* (Carlisle, PA, U.S. Army War College, 2004), 12.

<sup>7</sup> Richard L. Daft, *Organization Theory and Design*, (Cincinnati, Ohio: South-Western College Publishing 2001), 130.

<sup>8</sup> Gareth R. Jones, *Organization Theory, Design, and Change* (Upper Saddle River, New Jersey: Pearson Education 2004), 60.

<sup>9</sup> Daft, 130.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid., 131.

<sup>12</sup> Ibid., 136-137.

<sup>13</sup> Jones, 67.

<sup>14</sup> Daft,136.

<sup>15</sup> Ibid

<sup>16</sup> Ibid., 137.

<sup>17</sup> Jones, 68.

<sup>18</sup> Ibid.

<sup>19</sup> N. Anand and Richard L. Daft, "What is the Right Organizational Design?" *Organizational Dynamics* 36, no. 4 (2007): 329.

<sup>20</sup> Ibid., 329.

<sup>21</sup> Ibid., 330.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> Ibid.

<sup>25</sup> Ibid.

<sup>26</sup> Ibid., 331

<sup>27</sup> Ibid., 332

<sup>28</sup> Ibid., 334

<sup>29</sup> Ibid., 334

<sup>30</sup> Simon Rey Atkinson and James Moffat, *The Agile Organization from Informal Networks to Complex Effects and Agility* (CCRP Publications, 2005), xix.

<sup>31</sup> Ibid.

<sup>32</sup> David S. Alberts and Richard E. Hayes, *Power to the Edge, Command and Control in the Information Age* (CCRP Publications, 2005).

<sup>33</sup> David S. Alberts and Richard E. Hayes, *Understanding Command and Control* (CCRP Publications, 2006).

<sup>34</sup> Alberts and Hayes, *Power to the Edge, Command and Control in the Information Age*.  
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<sup>35</sup> Ibid., 128.

<sup>36</sup> Ibid., 37-46.

<sup>37</sup> Ibid., 75.

<sup>38</sup> Ibid., 205.

<sup>39</sup> Ibid., 208.

<sup>40</sup> Daniel Gonzales, Michel Johnson, Jimmie McEver, Dennis Leedom, Gina Kingston, Michael Tseng, *Network Centric Operations Case Study The Stryker Brigade Combat Team* (Rand Corporation, 2005), III.

<sup>41</sup> Ibid., summary xxi.

<sup>42</sup> Daniel Gonzales, John Hollywood, Jerry M. Sollinger, James McFadden, John DeJarnette, Sarah Harting, Donald Temple, *Networked Forces in Stability Operations 101<sup>st</sup> Airborne Division, 3/2 and 1/25 Stryker Brigades in Northern Iraq* (Rand Corporation, 2007), 118.

