



## **The Practical Challenges of Realizing Toffler's Third Wave**

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## INTRODUCTION

Fifteen years ago, Alvin and Heidi Toffler proposed a 'Third Wave' of societal structure.<sup>1</sup> The primary force behind this new post-industrial society is its ability to use information effectively. While the industrial society extended man's effort through the use of mass-produced machines, the post-industrial society extends and refines the use of specialized machines through increased knowledge. The post-industrial society is characterized by electronic information flow and manipulation in its many forms, but primarily through the computer chip. Information and collective memory is stored in massive electronic archives, and this data moves across vast networks to be fused into new information. Individual worth is measured in how easily one can access and fuse on-line information into knowledge. Industrial-era societal structures begin a still ill-defined transition into newer structures designed to support the flow of information and creation of knowledge. Normal industry remains important, but the emphasis shifts from mass production of crude machines into specialized production of task-specific 'intelligent' machines. Post-industrial wars are characterized by the extensive use of information to identify key elements in an operating environment and orchestrate their subsequent destruction, disruption, or state-change by precise means. Post-industrial militaries must deal with the political and social phenomena caused by a near-instantaneous media that enjoys the same level of information technology as the military.<sup>2</sup>

In 1998, Toffler published a follow-up article - "Preparing for Conflict in the Information Age" - that refined the original 'Third Wave', and raised significant problems concerning military attempted use of information technology. The key to the Third Wave is the importance of knowledge - not just of information.<sup>3</sup> One senses Toffler's frustration with the military when he says "...Third Wave tools applied to a Second Wave organization deliver only a fraction of their potential. The military has barely begun to recognize this as an issue."<sup>4</sup>

The purpose of this paper is to assess where we are today in terms of Toffler's 1998 update to Third Wave. In order, this paper will: examine why it is important for modern military staffs to understand complex operating environments; resurrect a few comparative frameworks to examine the requirements of 'knowledge,' look at some illustrative case studies, take a quick glance at 'Third Wave' industry, and then offer a critique of the current state of affairs and a way ahead. While other authors have examined these topics in greater depth elsewhere, this paper

seeks to provide a fusion of recent operational experience with prior academic work to reach a meaningful contribution - whether the paper offers something constructive to the current discussion is left entirely up to the reader.

### **THE IMPORTANCE OF UNDERSTANDING**

Modern military staffs are experts at managing and applying violence to a broad spectrum of potential adversaries - it's what they are designed to do. Yet, these same staffs depend on effective intergovernmental and interagency effort when faced with conflicts that cannot be won entirely with military means. Military staffs generally lack deep knowledge in economics, politics, and social sciences and so depend (by design or default) on other organizations to supply this expertise in a crisis. How is this arrangement working? Using the US Government as an example, a 2004 Harvard study concluded that

“As we put pen to paper, the U.S. is a colossus ... In spite of this unprecedented power and reach, our strategic efforts are often expensive, redundant, and clumsy.... Simply stated, the US Government's Interagency operates poorly because it is structurally designed to do so. Its legal architecture has no strong central authority, and therefore it has trouble planning and controlling itself. The budgeting and resourcing system, again a function of US law, forces agencies into a unique strategic game of infighting to avoid expenditures of limited (and congressionally-controlled) resources which may not be reimbursed. By design, its organization is a set of legally mandated functional stovepipes, unsuitable for effective combined effort in an unpredictable geopolitical environment. The authority, organization and budget issues all combine to overwhelm any sustained effort at staffing the Interagency by growing a cadre of effective and experienced officers. The onus of responsibility for this problem lies squarely on accumulated layers of U.S. Code. Even the best efforts of the most enlightened administrations since the 1947 National Security Act have been insufficient to sufficiently reform the Interagency. Further, a good number of our Interagency successes are due to the simple fact that the largest agency, DOD, retains the ability to do big things quickly. DOD will probably continue to lead in the interim and get the job done, not with precision and grace, but with enough weight and expertise to plow forward and buy enough time in a foreign contingency to allow the other agencies to eventually catch up. This *modus operandi* is dangerous for a number of reasons, including a statutory lack of authority, an absence of refined expertise in critical functions (diplomacy, commerce, agriculture, etc), and a real danger of upsetting the civil-military relationship in our democracy.”<sup>5</sup>

The structural dependency of military staffs on other agencies is an arrangement whose time has passed. With or without effective intergovernmental or interagency participation, a military organization must understand the component systems of complex operating environments for three good reasons:

1. The military is almost always the first actor deployed to a crisis - with non-military agencies deploying slower, or not at all.

2. Military operations (with or without other agencies in support) must be designed to - at a minimum - avoid irreversible damage to planned or ongoing activity in other spheres of effort. Operations must be planned to be at least neutral, or hopefully reinforcing, to non-kinetic activity planned and conducted by other agencies.

3. Even when operating in close concert with other agencies, military units and individuals are often required to act as surrogates to replace agency shortfalls.

A reasoned approach to crisis response, therefore, implies that military commanders and staffs be much more than 'effective appliers of violence.' Modern militaries must possess 'sufficient' knowledge of their operating environment in order to operate in effective support of other agencies - or act as surrogates in the absence of other agencies - without unintentionally disrupting complex social, economic or political systems.

#### **THE REQUIREMENTS OF THEORY**

Toffler's criticism of the military circles around two important points. First, we may be guilty of attempting to append Third Wave tools onto Second Wave (Industrial) military organizations. Second, we have trouble distinguishing information from knowledge. In order to provide a framework to evaluate our approach to the Third Wave, it's important to define briefly the important parts of knowledge and their internal relationships to each other. When the word 'knowledge' is used, most people are referring to one of the four classical functions of theory - Describe, Explain, Predict, and Control.

Describe. A variety of methods may be used to organize and classify concepts and phenomenon associated with a theory. However, for the general requirements of description to be met, three facts must hold true: (1) All concepts must be placed within a scheme (exhaustiveness); (2) There is no confusion about where to place a concept in the typology (mutual exclusiveness); (3) The typology and associated terminology must support the next levels of theory.<sup>1</sup> If a conflict requires large-scale force on force combat, we believe that the current state of military theory and doctrine is sufficient to describe the phenomenon. If a conflict is an insurgency, however, it requires an understanding of concepts and theories outside the realm of conventional military operations such as social science, economics, politics, etc.

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**Explain.** In order to explain historical events, three things must exist. First is a description of the causal mechanisms within a phenomenon - including dependent and independent variables. Second, system conditions at any point in time must be understood. Last, knowledge of external or environmental conditions that impact upon a system must be understood for that point in time. With these three conditions met, an analyst will be able to say "This event occurred because these external events effected a system with this state and these causal laws."

**Predict.** Prediction is similar to Explanation in its formal demands, with one exception. The analyst must be able to foresee system states and environmental conditions at some point in the future, and then apply the same causal mechanisms on this set of conditions to reach a prediction.

**Control.** The final step of theory is to be able to control a phenomenon. Two pre-requisites for control : (1) Each preceding step of theory must exist; and (2) the organization must possess the capability to change the system state, the environmental conditions, or the causal laws in order to effect a change that conforms with desires.

The requirements of theory (summarized below) are straightforward, and provide any organization with a framework for evaluating its doctrine, procedures, organizations, etc. It is important to note that you cannot skip a level - one level of theory depends on the preceding level being complete and functional.

<b>Level of Theory</b>	<b>Corresponding Requirements of Theory</b>
<b>Describe</b>	Concept Exhaustiveness
	Concept Mutual Exclusiveness
	Descriptive Scheme Supports Explanation
<b>Explain</b>	Description of System Causality
	Description of System Conditions
	Description of External Conditions
<b>Predict</b>	Forecast of External Conditions
	Forecast of System Conditions
	Forecast of System based on Conditions
<b>Control</b>	Capability to Change System Conditions
	Capability to Change External Conditions
	Capability to Change System Laws

Earlier, we noted that our knowledge (theory) is relatively complete and functional for large-scale conflict, but that special cases of smaller-scale conflict theory - such as counter-

insurgency knowledge (theory), regime-change knowledge (theory), and sectarian conflict knowledge (theory) is lacking. Additionally, we note that understanding these conflict sets will require the use of knowledge (theories) outside the normal military sphere. It is sobering to consider that a military organization's capability to control events in a complicated battlespace is dependent - in the final analysis - on the general state of political, social, information, and economic (knowledge) theory in terms of its ability to describe, explain, predict and control these complex social systems.

Without the prospect of prompt and effective interagency action, it becomes increasingly clear that today's military commanders and staffs must be able to Describe-Explain-Predict-and Control phenomenon and systems across an ever-broadening canvas of activity. One established framework used to conceptualize the work space of modern militaries is the acronym PMESII (Political, Military, Economic, Social, Information, and Infrastructure) - describing the broad categories of human action and systems found in most cultures.

#### **THE CURRENT ASSESSMENT**

In order to completely understand the contemporary operating environment, more than military knowledge must be considered. Economics, social structures, religion, information and media, politics - all these areas of human action must be part of a soldier's understanding of conflict. However, the military (in general) possesses deep institutional knowledge in few of these areas. Given the elements of knowledge - and the outlines of six cultural systems - described above, the question becomes "...how do we assess our ability to Describe - Explain - Predict - Control a culture's Political, Military, Economic, Social, Informational and Infrastructure systems?"

Political. The field of politics presents a deep and persistent reluctance to be predicted with certainty. The actions of a politician, the platform of a party, the vote of a citizen all have much to do with individual choice and perceived benefit (or 'expected utility'). However, over the last 20 years, some areas of politics are becoming more understandable and predictable with statistical tools and deep longitudinal surveys, demographic analysis, and analysis of electoral rule structures. In the military, our main challenge in understanding a political system is that we normally do not possess true political scientists (or consultants) equipped with the latest analytic tools.

Military. Our understanding of conventional military affairs is deep and substantial. It is our job, as organized militaries, to devote our professional lives to the DEP-C of military phenomenon. As we know (or are occasionally reminded),

our understanding of unconventional struggles against non-state actors is not as robust, and our control of these types of phenomenon always contains a significant degree of uncertainty.

Economic. John Kenneth Gailbraith once remarked to a Congressional panel that "We have two classes of forecasters (in economics): Those who don't know, and those who don't know they don't know." Economics, when analyzed in certain limited areas and specific aggregations, can yield predictive results. Clearly, the availability of storehouses of data and computer modeling and analytics has made a difference in this field. Like the political realm, however, economics at some levels centers on individual choice, belief and expected utility. In economics, the military staff is faced with the same problem - we normally do not possess trained economists with the current state of analytical tools and data necessary to understand a culture's economic systems.

Social. Social science - in many ways - is far removed from reliable predictive ability. To illuminate this, consider Arabic nomenclature - or naming conventions. The fully evolved Arabic nomenclature follows in this order : *laqab* (Nickname, honorific or profession), *kunya* (Father / Mother of), *ism* (personal name), *nasab* (male ancestry), and *nisba(s)* (tribal or geographic reference). A person in the Middle East may have some or all of these names on his official papers. A third person reference to the same individual may use a different schema. Additionally, the name may change with the birth of a child.<sup>6</sup> Why is this important? If a staff officer is attempting to lay out a social network of nodes and links, or enter a detainee's name or known acquaintance into a data base for cross-reference, the format and stability of the nomenclature used by a society or a region matters a great deal. The problems associated with the various spelling of Arabic names with the English alphabet adds further misery to the task. The concept of a cultural-specific nomenclature becomes critical to the entire staff - not just a few specialists.

Understanding the cultural and religious structures of a society is crucial to the descriptive task of theory. Whether more advanced theoretical tools such as entity-based computer modeling can accurately predict a society's reaction to kinetic or non-kinetic activity remains to be seen. Like political and economic analysis - military staffs generally do not contain social scientists equipped with state-of-the-art analytics. Nor do most militaries possess tested staff processes for bringing these complicated systems into some internal form of disciplined treatment.

Information. Like politics, the general topic of 'information' presents a persistent reluctance to come under control. The various uses and analysis of information create a broad space

that is difficult to parse. In general, information will eventually come to rest in the mind of a person, thereby effecting belief and choice. Micro-economists used to argue that every person was a rational, utility-maximizing decision maker. Over the last 20 years, a new branch of economic science called 'behavioral decision making' has taught us that human beings often do not make rational decisions. Where an individual gets information from, how he or she uses it, and what decision he or she finally makes remains individual-based and therefore difficult to predict. Still, commercial firms exist that specialize in focus-group and biometric analysis to determine the right message (and even the right words) to use in an information campaign.

Infrastructure. Of all the areas under scrutiny, infrastructure remains the easiest to explain, predict and control. For the most part, different pieces of infrastructure represent an almost deterministic relationship to one another. A water system, for example, may consist of a source, a treatment plan, and a distribution system - each of which can be conceptualized thorough basic math. Infrastructure is generally static, easy to locate, and hard to hide.

Despite this sobering assessment, there are positive points to consider. We know that commercial firms exist that are consistently profitable in the economic realm - implying that they have functional theory in parts of these systems. We know that firms exist that are consistently successful in the information realm. 'Madison Avenue' firms use sophisticated group and biometrics survey techniques to determine the message that appeals to the majority of viewers. We know that some parts of social science - at varying levels of aggregation - are predictive. This implies that there are some areas of human effort - defined and delimited - that have been brought under marginal control with particular expertise, tools, data and techniques.

However, none of the specialists or techniques used by these firms exist in a normal military staff - nor, in many cases, does the military officer realize that these capabilities exist in the public realm. Considering all this, it is probable that our use of the term "Full Spectrum Operations" is accurate only to a degree, and largely rhetorical.

#### **FURTHER COMPLICATIONS**

Even if a military organization is able to harness all the available expertise, bring in all the analytical tools, and possess the required data and achieve a repeatable level of prediction or control, the issue is not settled. In each of the following case studies, internal and external politics impeded - and sometimes completely disrupted - military attempts at situational understanding. The first case study - the



destruction of the German economy in WWII - contained significant obstacles generated by senior Allied military and political leaders. The second case study - Project Camelot in the 1960's - was derailed because of Interagency friction between government departments.

### **Case One - Attacking the German Economic System**

Before WWII, Air Forces around the world were engaged in struggles for their autonomy. In the US, this struggle became intertwined with the idea of using precision daylight bombing to collapse societal systems - particularly economies. As a theory, the combination of daylight bombing and systems collapse was elegantly constructed, and advocated with conviction and skill, but had no historical precedent to lean upon, and no real test existed for the concept short of actual war. Yet, the combination of these two ideas lay at the heart of the US Air Corps' argument for independence.<sup>7</sup> If the Air Corps was correct, the nation would possess a new tool capable of winning any war in short order. If incorrect, the nation would spend blood and treasure for nothing.

After 3 years of strategic bombing, the German war economy continued to post gains, and air campaign losses continued to mount - often passing 10% loss per mission. By late 1943 - relative ineffectiveness in modeling and then attacking the German economy had given birth to more than ten intelligence and analysis offices - all competing in the effort to identify the 'golden screw' that would collapse the German economic system.

Senior leaders (both political and military) had a variety of differing opinions. Some thought population centers were the key; others favored power plants, or ball bearing plants, or synthetic oil production. No method of analysis or single data source was strong enough to overcome these strongly held opinions. As the prospect of quick and easy success faded and losses continued to mount, the entire process of intelligence collection, analysis and decision making in terms of target selection became highly politicized. In the effort to control target selection, critical intelligence gathered by one part of the intelligence system was even masked from other analytical offices.

In the end, the Allies stumbled upon the 'Golden Screw' target set during the effort to freeze German transportation in place during the Normandy invasion. Two types of 'nodes' - marshalling yards, and their associated self-repair capability - coupled with one single measure of effectiveness indicator - daily rail car placings in marshalling yards - proved to be the key to unraveling Albert Speer's carefully controlled war economy. This type of target was initially championed by only

one voice in the Allied system - not enough to decisively effect the politics involved.

### **Case Two - Project Camelot**

In 1964, as the conflict in Vietnam was escalating, the US Army's Special Operations Research Office (SORO) launched the largest social science project yet attempted by a government. Its goal was to develop "...a general social systems model which would make it possible to predict and influence politically significant aspects of social change in the developing nations of the world."<sup>8</sup> After contracts were let, grants written and a methodology approved, social scientists from the U.S. traveled to the first country under scrutiny - Chile. There the scientists began interviews, observations, and data collection.

Within weeks, the knowledge of Project Camelot caused a series of riots, demonstrations, and political criticism in Chile. Very quickly, the US State Department and Congress pressured the Defense Department to freeze the contract, and Congressional hearings began.<sup>9</sup> Closed door hearings focused on military intrusion into foreign policy, the lack of interagency coordination, and the general allocation of responsibilities.<sup>10</sup> Although the State Department had no equivalent study effort, and no plans to start one, DOS objected in principle to DOD crossing the line into Foreign Affairs. Secretary of Defense McNamara cancelled Camelot within days of the hearings.

### **A COMPARATIVE APPROACH**

In 2006, the Commander of the 18<sup>th</sup> Airborne Corps - recently redeployed from Iraq - remarked that the military has paid for billions of dollars of computer technology, and it still doesn't help a bit. Contrast the current military dilemma with a general pattern to knowledge taken by Fortune 500 companies over the last twenty-five years.

**Data Warehousing.** Starting with domain-specific data in a variety of formats, corporations began assembling various data sets into substantial data warehouses and formatting data to allow distributed access.

**Data Mining and Modeling.** With the data assembled in the warehouse, corporations assembled domain experts and modelers to look for knowledge imbedded in the data.

**Process Engineering.** Once knowledge (and therefore profit) was extracted, corporations set out to engineer large-scale knowledge processes that combined warehousing, mining, modeling, and knowledge delivery to decision makers.

Reorganization and Acceleration. With the explosive growth of data and computing power, corporations were able to deliver near real-time knowledge of past events coupled with current trends to domain-specific decision makers. In many cases, industrial-age (Second Wave) organizations and staffs were re-designed to match the knowledge process. In all cases, the Second-Wave corporate ethos and decision-making paradigms were broken.

Common Operating Picture (COP) Fusion. Having mastered the ability to create knowledge from historical data and deliver it to domain-specific decision makers, corporations have now begun efforts to fuse historical analysis and knowledge with real-time streaming COP data to allow strategic market-altering decisions to be made by domain and location-specific executives.<sup>11</sup>

None of the above has been particularly easy or cheap, and some corporations still struggle with the general framework. But... corporations who succeed in mastering the pattern described above have an overwhelming advantage over corporations who do not.

### **TENTATIVE CONCLUSIONS**

This paper has briefly touched on a number of powerful and controversial topics. Twenty pages is certainly not deep enough to fully unpack all these complex issues in full. Yet, for many of us, these problems represent real and chronic issues in conflict after conflict. Before offering one way ahead, it's useful to re-pack the arguments made to this point into five general statements:

- We remain some distance away from achieving Toffler's Third Wave. The organizational confusion of 'information' with 'knowledge', and the practice of appending Third Wave tools to 'Second Wave' organizations are Toffler's two main criticisms of our approach to date.
- Some areas of human action can be described, explained, predicted and controlled. Others less so. Some not at all. In general, today's militaries go into combat without a full understanding of their operating environment. More importantly, modern militaries enter complex operating environments without the basic 'tool kit' needed to make subsequent sense of social and cultural phenomena after conflict entry. This lack of reasonably predictive and agreed upon theories to understand complex social phenomenon is the norm rather than the exception.
- Western militaries (particularly the US military) have consumed a large measure of spending authority - and mortgaged a significant amount of force structure - in

order to create digital command and control systems. In general, these systems do well at depicting data - but they do not create knowledge. In the mind of at least one Corps Commander, we simply do not have the tools we need. In the year 2007, our staff colleges continue to train Napoleonic staffs on analog versions of the Military Decision Making Process (MDMP), while Fortune 500 companies have already re-tooled and re-structured to capitalize on digital knowledge-creating processes.

- In the absence of true shared knowledge, other processes (mostly political) exist or emerge that create significant friction between branches of the military, between agencies of a government, and between governments. Each assumes a unique approach to conflict and rarely do they agree.

- The current organizational architecture places the military in a supporting and dependent role to other agencies in cases short of high-intensity conflict. Yet, the military is often the only agency in the arena for months or even years in any crisis. Without full interagency participation, the military is left to its own devices (and these are normally blunt, crude and systems-insensitive devices).

#### **A Way Ahead - Recommendations**

What to do? For the moment, we will bypass a discussion of how to fix the architectural and legal shortcomings of Interagency activity in a crises.<sup>12</sup> Other contemporary work treats this problem extensively. Clearly, the military needs a Third Wave ability to understand and control a variety of systems across a society with or without an effective interagency presence - and it is here we must press the fight. In order to describe, explain, predict and control complex social, political, economic or informational phenomena, an organization must have in place specialists with analytic and Knowledge Management tools, the right staff processes, data collection and data disciplining systems, and a corporate culture that can use all this to the greatest benefit. The following paragraphs speak to the next generation of military staffs, processes, and architectures that will hopefully better enable operations in a complex environment.

Recruit Domain Specialists. For decades, the US military depended on the mobilization of civil-domain experts into the Civil Affairs branch to augment a standing military staff in time of conflict and, for decades, the system worked to a degree. One result of the scattered conflicts of the 1990's was the depletion of civil experts from the rolls of the reserve component. The Civil Affairs reserve system no longer provides actual city managers, economists, legal experts, etc to a staff in time of war. But, in truth, even when the system functioned as designed,

it never brought in enough of the real experts - successful domain-specific experts - who made a serious living of explaining, predicting and controlling complex phenomena. Yet, we know they exist in commercial niche or proprietary domains that sell their expertise to well-paying customers. If we are serious about Toffler's Third Wave and Full Spectrum conflict it is time to either recruit these types, find a way to grow them internal to a military organization, or create persistent contracting vehicles that can generate what today's staffs need.

Get Serious About Knowledge Management. Once you possess a collection of Domain Specialists, you rapidly realize that they require a robust computing and communications environment with special (even proprietary) software and data. It's likely that you will have to reproduce something like a Fortune 500 approach to Knowledge Management in order to enjoy the same level of domain-specific knowledge during a conflict. This single decision invokes associated decisions to reproduce a Fortune 500 chain of effort: data warehousing, mining and modeling, process engineering, and COP fusion.

Revise Staff Processes. Process is inseparable from using Domain specialists and exploiting Fortune 500 Knowledge Management. We have reached the point where the explosion of data, bandwidth, and computing power simply overwhelms a Napoleonic staff using analog processes. Measured on the Fortune 500 chronology, we probably reached this point 15 years ago. Yet, as of February 2007, neither processes taught by our staff colleges nor our authorized staff structures have changed significantly. Where many Fortune 500 companies have reorganized their staffs to match the process, the dead hand of tradition keeps us in the analog mode.

Expand Data Sources and Discipline. I've heard four pieces of tribal lore repeated over and over during Operation Iraqi Freedom: "Most of the data was available off the Internet," "This is company-level fight," "Every soldier is a scout", and "We're fighting a war one year at a time for four years." Each of these provides insight to the next generation of data systems.

- 'Most of the data was available off the internet.'  
Robert Steele is a US intelligence officer with eighteen years experience, including tours with the CIA as a clandestine field officer. He Discovered that

"...he could have found immediate and correct answers to his queries on the "open" market of information - commercial databases, academic sources, and public computer networks...Steele quotes internal studies that show up to 75 percent of classified information is available from open sources at an incredibly cheaper cost."<sup>13</sup>

If Steele's comment holds any truth, our Knowledge Management system must systematize data search and ingestion from a variety of structured and unstructured sources directly from the Internet - as well as classified sources. Data bases, bandwidth capability, query and search engines, data delivery and associated electronic wizardry must be designed from the start with this sort of 'agnostic data' in mind.

- 'Every Soldier is a Scout.' Intuitively, we know this is true, but how do we - corporately - capture this capability and put it to work? How is a soldier trained and equipped to enter items of interest into the data grid as he conducts daily patrols? Further, how do we push knowledge down a restricted bandwidth to the last domain- or location-specific actor in our system?

- 'This is a company-level fight.' Absolutely true. Yet, if you look at a company commander's decision support structure, you'll see that the bulk of intelligence collection, processing and knowledge output takes place far above his level. The decision support apparatus is not where the decision maker lives - nor does it respond to his specific needs.

- 'We're fighting a war one year at a time for four years.' When units rotate in and out of combat on a periodic basis, a Knowledge System should capture terabytes worth of data, and act as the primary Knowledge base for each subsequent rotation. We must pay close attention to archiving and search methodology and architecture so that a new unit is equipped with the same level of knowledge as a re-deploying unit. Soldiers and junior leaders must have the discipline to record daily data on electronic media and enter it into the data grid so that each echelon captures and maintains awareness on entities (friendly and adversary) and relationships throughout a conflict.

Examine Corporate Culture. Bran Ferren, head of Disney's Imagineering division, once said "You can tell you're in an anti-innovation organization if it takes everyone in the chain to say 'yes' to approve new idea, and only one person to say 'no' to stop it." Re-tooling a corporation from a 'Second-Wave' analog decision support structure to a 'Third Wave' knowledge generating and deliver structure is high adventure. But it's here that the transformation must begin, and receive occasional impetus to continue. Such a transformation is never easy, and the more tradition-bound an organization is, the greater the pain.<sup>14</sup> New approaches to data capture, archiving and knowledge extraction - like CIDNE/SIGACTS, FusionNet, JIOC, TCogMos, and others - reveal the next step we need to take in order to draw closer to Toffler's Third Wave.

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<sup>1</sup> Alvin and Heidi Toffler, War and Anti-War, (Boston: Little, Brown and Co., 1993), pp. 2-10.

<sup>2</sup> Major Kevin B. Smith, The Crisis and Opportunity of Information War, (Fort Leavenworth, KS, 1994), A School of Advanced Military Studies Monograph.

<sup>3</sup> Alvin and Heidi Toffler, "Preparing for Conflict in the Information Age," in The Futurist, Volume 22, Issue 5: June-July 1998, World Future Society, p. 26.

<sup>4</sup> Ibid, p. 26.

<sup>5</sup> Kevin B. Smith, Colonel, U.S. Army, Kenneth Dahl, Colonel, U.S. Army, Leah R. Fuller-Friel, Lieutenant Colonel, U.S. Army, Chuck Harrison, Lieutenant Colonel, U.S. Army: "Teaching Colossus to Dance: Improving the Interagency, (" Cambridge, Massachusetts, Harvard University, John F. Kennedy School of Government National Security Program, 7 May 2004), pp. 12-33.

<sup>6</sup> A.F.L. Beeston, "Arabic Nomenclature,: A Summary Guide for Beginners," Oxford: University Press, 1971, pp. 1-6

<sup>7</sup> Alfred Meirzejewski, The Collapse of the German War Economy, 1944-1945, (Chapel Hill: Univ of North Carolina Press, 1988), p.62

<sup>8</sup> Irving Louis Horowitz, The Rise and Fall of Project Camelot: Studies in the Relationship Between Social Sciences and Practical Politics, (Cambridge: Massachusetts Institute of Technology, 1967), pp4-5.

<sup>9</sup> Ibid, p.14.

<sup>10</sup> Ibid, p.16.

<sup>11</sup> Vivek Ranadive, The Power to Predict, (New York: McGraw-Hill, 2006), p.4.

<sup>12</sup> In "Teaching Colossus to Dance" the authors make a case for a new Goldwater-Nichols Act, aimed directly at the interagency on p.52."

'The current environment is too demanding to continue plodding forward as we have. A system designed for a slow-changing, bi-polar world is becoming less and less able to handle the demands of a rapidly shifting, context-sensitive world. With every new threat, we incur an increasingly unacceptable level of risk in our own inability to deal with crises in a coordinated, efficient manner. We believe the changing world, and the United States' position in it, has made the current Interagency process of execution dangerous and obsolete.

The effects of globalization, the global war on terrorism, an age of asymmetric threats, and the proliferation of weapons of mass destruction brought about a broad consensus for change. September 11, 2001, Operations Enduring Freedom, and Iraqi Freedom are defining moments that demand our urgent attention for improvement. Current initiatives by senior senators indicate that champions in Congress are emerging to make this a legislative priority. The time to launch this campaign is now. In the near term, we have little choice but to continue with DOD as the lead agency to coordinate Interagency activity. A regional focus by the Combatant Commanders and the newly authorized Joint Interagency Coordination Groups and Task Forces is a logical interim measure. But the future must provide a more permanent solution. We must maintain focus on developing an Interagency process that moves away from DOD as the leader and toward an independent executive structure. Legislation aimed at a dual approach of closing the gap between DOD and the other departments and developing a functional and efficient Interagency process is indispensable. We simply must prepare the

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United States to fulfill its national and global responsibilities by taking action to improve the operational execution of the Interagency.'

<sup>13</sup> Kevin Kelly, "Intelligence Without Secrecy" in WiReD Magazine 1.5, Nov 1993.

<sup>14</sup> Edward Feigenbaum, Pamela McCorduck, H. Penny Nii, The Rise of the Expert Company: How Visionary Companies Are using Artificial Intelligence to Achieve Higher Productivity and Profits," (New York: Time Books), p.263