

WEB 2.0 SYSTEMS IN THE BRIGADE COMBAT TEAM
AS AN ENABLER OF MISSION COMMAND: A
DIALECTIC IN INFORMATION DISCOURSE

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by

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ABSTRACT

WEB 2.0 SYSTEMS IN THE BRIGADE COMBAT TEAM AS AN ENABLER OF MISSION COMMAND: A DIALECTIC IN INFORMATION DISCOURSE, by Michael D. Villalobos, 105 pages.

This qualitative research in the field of information science aims to examine the use of Web 2.0 systems in the Brigade Combat Team as an enabler of mission command. This thesis explores three research questions: 1) does the utilization of Web 2.0 systems as a facilitation mechanism for mission command serve as a benefice or an impediment to the decision cycle? 2) Do commanders and staffs benefit from the overabundance of available data and information as tools to improve the quality of decisions? Or, 3) does excessive user content impede decisions, manifesting as a form of buffer overflow? This work uses a combination of qualitative analysis, abductive reasoning, and case studies to analyze existing scholarship on the communications environment and how contemporary Web 2.0 systems affect military populations' decision making with implications for further study.

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— Dostoyevsky, *Crime and Punishment*

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in a brief but life changing conversation, taught me to reform my life paradigm as Vincent Freeman did. I would not be here otherwise.

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To my daughter, who I hope will one day understand the reason why:

γνῶθι σεαυτόν.

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Ende gebidan worolde lifes;
wyrce se þe mote domes ær deaþe;
þæt bið driht-guman unlifgendum æfter selest.

Last but not least, to my four Muses, without whose catalytic influences this thesis would have never originated . . . you know who you are:

Καλλιόπη, for whom Prospero’s sentiment in *The Tempest*, act 4, scene 1, lines 156-8, is still true almost two decades later:

We are such stuff as dreams are made on;
and our little life is rounded with a sleep.

Εὐτέρπη, for whom Theocritus, *Idyll* 8, lines 53-6, carries the same meaning it did that first December day in the desert:

Μή μοι γᾶν Πέλοπος, μή μοι χρύσεια τάλαντα
εἶη ἔχειν, μηδὲ πρόσθε θεεῖν ἀνέμων·
ἀλλ' ὑπὸ τᾷ πέτρᾳ τᾷδ' ἄσομαι, ἀγκὰς ἔχων τυ,
σύννομα μᾶλ' ἐσορῶν, τὰν Σικελὰν ἐς ἄλλα.

Θαλία, who I hope now knows what is in the dark at the top of the stairs:

Veritatem cognoscere.

And finally to *Μελπομένη*, for whom Hugo's comment in *Les Misérables*, Volume 1, Book 5, Chapter IV I hope one day will resonate with understanding:

Le suprême bonheur de la vie, c'est la conviction
qu'on est aimé; aimé pour soi-même, disons mieux,
aimé malgré soi-même; cette conviction, l'aveugle l'a.

and therein her two sons, who I hope will grow to be *καλὸς κάγαθός*, to venerate their mother, and to embrace Kalidasa's message in *The Salutation of the Dawn* becoming greater than the sum of their parts:

ह्यस्तु स्वप्नः ।
श्वस्तु आभासः ।
कर्मकुशलतया आचरिते अद्य
गतदिनानि आनन्दस्वप्नमयानि भवन्ति ।
भाविदिनानि आशाप्रभया ज्वलन्ति ।

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ACRONYMS

ATP	Army Technical Publication
BCT	Brigade Combat Team
COP	Common Operating Picture
IS	Information System
KM	Knowledge Management
NCW	Network-Centric Warfare
SBCT	Stryker Brigade Combat Teams

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CHAPTER 1

INTRODUCTION

Gatsby believed in the green light, the orgastic future that year by year recedes before us. It eluded us then, but that's no matter—tomorrow we will run faster, stretch out our arms farther . . . and then one fine morning—
So we beat on, boats against the current, borne back ceaselessly into the past.
— F. Scott Fitzgerald, *The Great Gatsby*

Introductory Vignette

Many works, organizations, or transformational events—scholarly, cultural, or otherwise—have some etiological story for their genesis. As a thematic norm across all of humanity, we crave some form of narrative to account for origin, development, and eventual end. In some manner, some capacity, a random event, chance encounter, or unusual happenstance occurred at the right time and place for an individual or group to serve as a catalyst for transformation. Most often these apocryphal tales make for better entertainment than factual discrimination (take most of Herodotus, for example, and by larger context, much of popular culture's historical narrative itself) but that is of little matter herein. Tradition accords of how the United States Marine Corps was initially formed in Tun Tavern, how Watson and Crick's discovery of deoxyribonucleic acid debuted at Cambridge's Eagle, and of course, the indelible trope of how Ingrid Bergman walked into a gin joint in 1941 Morocco. This thesis is likewise no different: it has an etiological story.

So, one day, a Command and General Staff College student walks into a bar . . . likely, this is one of the rarest scholarly introductions in the annals of the school's history, but delightfully cliché nonetheless.

Mid-afternoon on 18 July 2015, a promotable captain walks into a bar on Delaware Street in Leavenworth, Kansas equipped with a copy of Nate Silver's *The Signal and the Noise* and a cynical touch of *Weltschmerz*.¹ Highly introverted, bespectacled, anti-social, and cerevisaphillic, he sits in the corner, orders a beer, selects Copland on his phone, and sets to reading while enjoying the relatively quiet atmosphere. Silver, in his conversational style, elaborates on Bayesian choice patterns and their everyday use.² Soon he overhears the female bartender conversing with another male customer in lowered tones in an otherwise empty room. Shortly, it becomes discernable that the conversation is rather personal and distinctly trystic in nature. The couple discuss without referent a certain point of discontent in their relationship, leaving the author to infer their dialogue, body language, combined with their tone, attitude, and demeanor to the situation at hand. Soon he remembers the couple of Hemingway's "Hills Like White Elephants" and lecturing to his high school students on it almost twenty years before.³ How not unlike the couple in the Spanish train station they are, he muses, as he looks at his cold beer.

He insouciantly chuckles it off with quotidian banality, looking at the bedazzled youths' expression of distress, albeit humorously remembering Irving's comment

¹ Nate Silver, *The Signal and the Noise: Why so Many Predictions Fail-but Some Don't* (New York: Penguin Group, 2012).

² Ibid., 243-259.

³ Ernest Hemingway, *The Complete Short Stories of Ernest Hemingway* (New York: Simon and Schuster Adult Publishing Group, 1998), 211-215.

regarding Ichabod Crane's story.⁴ But they persist, engaging in the most recognizable of romantic disagreements—the mutual misunderstanding of intent, emotion, and reaction therein, replete with the obligatory injections of “you just don't understand,” “that's not what I meant,” and other prototypical staples of discord—he becomes more piqued at the intrusion of the exchange than voyeuristically intrigued, with Copland's melodic layering and Silver's paratactic narration providing the refrain. *Plus ça change, plus c'est la même chose*, he hears his inner voice utter.

Hitherto, the conversation was of little import, until the topic turned to debating the other's ulterior and umbral motives with nothing other than their use of social media and the logic they used to ascribe meaning to their partner's actions. The logic, assertions, and positions they mutually concluded in a relatively short period of time using each other's multimedia activities as evidence for their positions, were notably intriguing, albeit highly irrational and distinctly myopic. Notable more so for the meta-cognitive implications than the content itself, the conversation's implications were singular and distinct in its clarity. Eventually, they disengaged from their discourse and parted, their disenchantment plainly visible.⁵ Intriguing, indeed.

⁴ “and he would have passed a pleasant life of it, in despite of the Devil and all his works, if his path had not been crossed by a being that causes more perplexity to mortal man than ghosts, goblins, and the whole race of witches put together, and that was - a woman.” Washington Irving, *The Sketch-Book of Geoffrey Crayon, Gent*, ed. Susan Manning (Oxford: Oxford University Press, 2009), 298.

⁵ The related vignette was overheard by the author in a public space and is used only as a narrative technique. Given the nature of the conversation and anonymity of the parties, no credit is ascribed to the couple, the establishment, or any other agents therein.

Background and Context to the Research Problem

Granted, none of this vignette insofar is scholastically noteworthy: the couple's discourse, romantic turmoil, and exchanges have no merit in themselves to advancing information or knowledge management (KM) scholarship. However, in the macrocosmic view, their discourse approach underpins an important theme in contemporary communication theory, information science, and KM; it is the theme of an individual aligning meaning to a highly transitory and discrete in space and time data input in an attempt to determine a predicted outcome. As the author progressed through Silver's work, which too explores how and why people and organizations assign meaning to patterns to attempt prediction and why they often fail, the officer was struck by a blinding glimpse of the obvious: apophenia and its sensory sibling pareidolia are intrinsically human precepts and affect us all, regardless of our cultures, stations, or occupations. The struggle to derive meaning, rationality, correlation, and causality from data inputs affects all people irrespective of culture, time, or station in life. Moreover, the couple's exchange mirrors on the emotional and personal level what organizations endure as they process information through the various levels of assimilation and synthesis.

As Silver's title underscores, the couple are searching for the signal of meaning through the static of the noise. In this, their logic predicates several assertions: that there is meaning to the data, the aggregated data leads to increased understanding, and in some way, the other partner's motives, intent, and emotions are reviled through the outcome of the analysis. Elementary assertions, a reader could assert; clearly this is a regurgitation of the cognitive hierarchy theory, which frames how individuals synthesize data—raw

inputs of facts, numbers, and data points—and processes it into information.⁶ This is then applied through the mental process that receives the data and develops unverified assertions (effectively a series of beliefs, embracing a Cartesian framework) and attempts to apply some form of validity testing or analysis (another point of conjecture to be explored in this thesis), which turns the information into knowledge.⁷ From knowledge, one can apply judgment (itself another entire topic of discussion and philosophical contextualization, which forms the final chapter of this thesis) to gain understanding of a given situation, the environment, and ultimately facilitate decision-making.⁸ Figure 1 graphically depicts the model.

⁶ Department of the Army, Field Manual (FM) 100-6, *Information Operations* (Washington, DC: U.S. Government Printing Office, 1996), 2-1. The author acknowledges that FM 100-6 is superseded by FM 3-13, *Inform and Influence Activities*, but found it removed the previous description of CHT. CHT is now found elsewhere in Army doctrine.

⁷ Ibid.

⁸ Ibid.

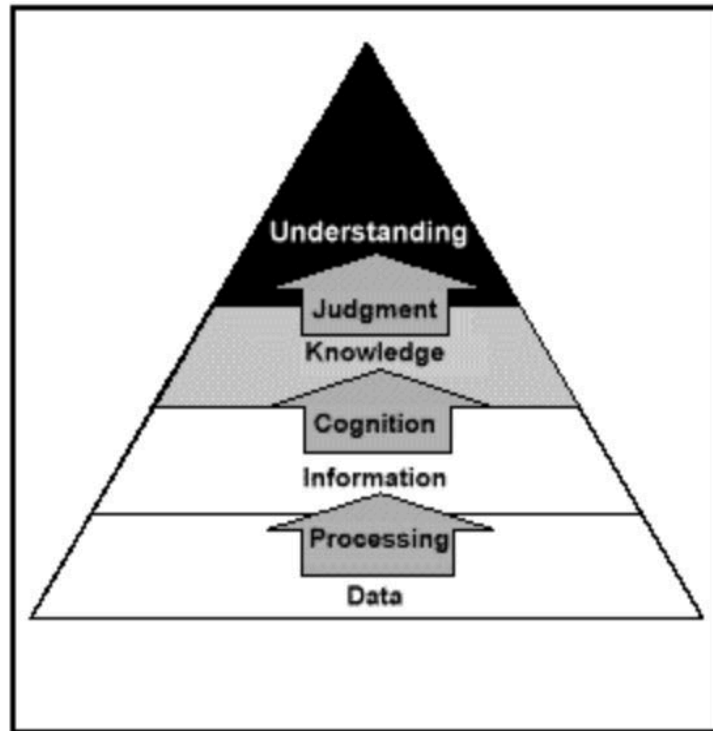


Figure 1. The Cognitive Hierarchy

Source: Department of the Army, Field Manual (FM) 100-6, *Information Operations* (Washington, DC: U.S. Government Printing Office, 1996), 2-1.

Clearly, this is nothing innovative: information science notables such as Olson Mancur Jr., James G. March, or Herbert Simon have promoted cognitive hierarchy theory and its parental framework, bounded rationality, since the 1950s.⁹ Bounded rationality interweaves with semiotics at multiple junctures. Returning to the vignette above, one again sees the theme of the couple attempting to assign incessantly meaning to data, thereby knowledge, and in turn emotional points of import which will aid in their search

⁹ See Mancur Olson, Jr., *The Logic of Collective Action: Public Goods and the Theory of Groups*, 2nd ed. (Harvard University Press, 1971); James G. March, *A Primer on Decision Making: How Decisions Happen* (New York: The Free Press, 1994); Herbert Simon, "A Mechanism for Social Selection and Successful Altruism," *Science* 250 (1990): 1665-8.

to understand the situation and mutual cognitive dissonance they experience with each other. One needs only a superficial understanding of Saussure's *Cours de Linguistique Générale* to recognize the interplay of semantics, semiotics, and pragmatics and their manifestations in society along with their derivative permutations.¹⁰

Yet again, the import of the vignette is not the discourse, the content, the empathetic relatability, or the situation it describes, but the underlying universality we as users and consumers of data, information, and knowledge commonly overlook. The importance rests in recognizing how users frame expectations of data, how systems of systems are designed to facilitate the expectation needs, and what are the larger implications of how the suites interface. In many cases, we take for granted the mechanisms, interplay, and process we arbitrarily assign to information that drives our methods for decisions. As technology increases the available amount of data, information, and possibilities of decision making, commanders, staffs and planners need to have a thorough comprehension of not only how to make decisions and how to use information, but what is meta-decision and meta-choice theory really all about and why it is important. The military organization seemingly overlooks the import of decisions, choices, and the information these two thought processes predicate.

This organizational precedent clearly did not evolve in isolation. The story of any organization, culture, or gathering of humanity is a dialogue of change, evolution, and development. The United States Army is no different in this respect, for as an organization, it seeks continued development and change in order to remain operationally

¹⁰ Ferdinand de Saussure et al., *Course in General Linguistics*, 18th ed. (Chicago, IL: Open Court Publishing Co., 1998), 72-78.

and strategically relevant as a mechanism to achieve national goals. Clearly, this is tautologous and self evident, but what is important is the acknowledgment of the organizational culture's intrinsic nature. Yet, in this endeavor to continually improve itself, the Army has arrayed itself with a plethora of information systems all designed to increase the commander and staff's ability to collect data. For example, in an Infantry Brigade Combat Team, there are over thirty separate information systems that feed into the staff and influence situational awareness and ultimately the decision cycle. Using the cognitive hierarchy theory framework, seemingly the organizational culture believes that by having more points of data input, more information will result. With more information, greater situational awareness and judgment will arise, and with better judgment comes the ultimate operational and strategic advantage. Information and the power it conveys has become a weapon system in its own.

With the dawn of the Internet, senior leaders asserted the digital age would end the fog of war.¹¹ Two decades later, many commanders would assert much the opposite, as the forthcoming case studies illustrate. Armies of across time all have sought to gain an advantage over their opponents by various means. In the Western way of war, the pursuit of technology as a physical, tactical, or operational advantage is one of the prime means of achieving decisive military victory leading, at least in the aforementioned model, to achieving the political objectives of the belligerent nation. This assertion presupposes the acceptance of Victor Davis Hanson, Gregory Parker, and J. E. Lendon's theses supporting the cultural trends and systems of warfare, for Western armies

¹¹ P. W. Singer, *Wired for War: The Robotics Revolution and Conflict in the Twenty-First Century*, 7th ed. (New York: Penguin Group, 2009), 13-25.

historically do follow systemic patterns that are not, as this author argues, aphophenic.¹²

While many armies historically copy, parody, or model themselves after the paradigm army of the time, Western armies collectively seek with definitive purpose the advancement of technologies to their advantage.

The theme of armies contending in arms and technological races well before the twentieth century is a historical truism. Case in point, the incorporation of contemporary telecommunications equipment throughout modern armies predicates the acknowledgement of its value as a means of organizational improvement. This facet of Army organizational culture resonates within the larger American military culture's affinity technological dominance. Colin Gray's monograph provides an exceptional analysis of how this cultural trend affects the American way of war at the National level.¹³ As a historical parable, the American military in macrocosm, and thus its culture, is one of technological plenty. The technological challenges that afflicted our European counterparts never manifested within our organizations or culture.¹⁴ Gray articulates it best:

Given the range of potential demands that foreign policy may place on the Army, the only sound plan for the future has to be one that is flexible and adaptable. The enemies of tomorrow are at least as likely to take regular as irregular forms. The issue is not technology, nor is it any particular set of weapons and support systems. Instead, the difficulty lies in the fact that the American armed forces are

¹² Geoffrey Parker, ed., *Cambridge History of Warfare* (Cambridge: Cambridge University Press, 2005), vii-xiii.

¹³ Colin Gray, 'Irregular Enemies and the Essence of Strategy: Can the American Way of War Adapt?' (Monograph, Strategic Studies Institute, Carlisle, PA, 2006), accessed January 10, 2016, <http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=650>, 35.

¹⁴ Ibid.

culturally attuned to favoring technological solutions over other approaches, while irregular enemies pose problems of a kind where technology typically offers few real advantages. Indeed, machines and dependence upon them are apt to have negative value, because although they can save some American lives, they tend to isolate American soldiers from the social, and even the military, context which is the decisive battleground in irregular conflict. Contrary to appearances, perhaps, this is to condemn neither machines nor technology in principle. Whatever technology can do that is useful in COIN and for counterterrorism certainly should be done. It is the use, or misuse through overuse, of technology that is at issue, not technology itself.¹⁵

A superficial examination of the mission command suites and KM platforms available to the Brigade Combat Team (BCT) staff illustrates this concept well. Again, the thought process is very Jominian, very rote and formulaic: more information equals better decisions, which in turn yields war-winning advantages. The pursuit of the latest, most agile, most adaptable technological advantage yields itself to the notion that more capability equates to more capacity. Supporters of this position would immediately cite Turing and the other Bletchley Park mathematicians' contributions to cryptology as an Allied strategic gain in the Second World War . . . indeed, how could more data not render the possibility of better information and thereby more refined intelligence analysis? Insofar, this is nothing new and is well accepted within the military community: information technology has become so imbedded throughout our personal and professional lives, one loses perspective as to question its use. The cultural narrative balks at the question of how could technology not improve an organization?

With modern telecommunication assets, military leaders have the ability to ameliorate organizational efficiency through increased information collection, synthesis, dissemination, and analysis. Indeed, there is clear evidence, from the organizational

¹⁵ Ibid., 36.

perspective, of the merits in using common operating suites to enhance the commander and staffs' awareness. Contemporary KM doctrine, Army Technical Publication (ATP) 6-01.1, *Techniques for Effective Knowledge Management*, outlines how KM is intended to enhance the commander's ability to execute mission command through four components: people, process, tools, and organization.¹⁶ Further, the ATP articulates the role of KM succinctly within the guise of mission command:

Executing the mission command staff task of 'perform knowledge management and information management' provides commanders the information and knowledge to create and maintain understanding and make decisions. The staff studies the operational environment, identifies information gaps, and helps the commander develop and answer information requirements. The staff performs information management to organize and process collected data into information and applies analysis to develop information into knowledge.

The commander is the central figure in mission command. Commanders drive operations through understanding, visualizing, describing, directing, leading, and assessing operations. The staff supports the commander by performing operations. Knowledge management is integral to commanders and staffs as they perform these tasks.

During operations, knowledge flows between individuals and organizations. Staffs manage this exchange and use knowledge management practices to enable knowledge transfer. Knowledge transfer occurs formally through processes and procedures and informally through collaboration and dialogue. Army-wide knowledge management implementation enables the Army, through mission command, to execute decisive action. Shared understanding creates adaptive learning organizations. This helps the commander achieve a relative advantage on the battlefield.¹⁷

Here one sees the Army's doctrine advocating best practices for KM and mission command systems, but the ATP gives little discussion to the higher systemization and

¹⁶ Department of the Army, Army Technical Publication (ATP) 6.01-1, *Techniques for Effective Knowledge Management* (Washington, DC: U.S. Government Printing Office, March 2015), 1-4.

¹⁷ Ibid., 1-16 - 1-18.

meta-awareness of what KM and information systems really do and what information meta-cognition is really all about.

But why is this question even relevant, the reader could inquire? KM facilitates mission command, thereby enabling Unified Land Operations, and Mission Command provides the cohesiveness for centralized intent, while fostering decentralized execution through shared trust, understanding, clear commander's intent, use of mission orders, and acceptance of prudent risk. Is this key component of Unified Land Operations misplaced? Clearly not. As articulated above, this thesis argues the position that commanders, staffs, and planners should not fall into the liminal and myopic mental framework of Jominian data over-collection and misuse in the concept the guise of Fitzgerald's Gatsby rowing towards the green light, his protean idea of the future. Too easily do information systems become the green light for their users, and in it the users themselves overlook the self-awareness that they too are part of the system, and that the recognition of the self, the organization, and the system are both intertwined and separate. This thesis' message of much like that of the lesson history offers: there are few answers, but rather questions, the way is not in knowing the facts, not in finding the correct analysis, but in applying the lessons of the past to contemporary situations to enhance greater understanding of the present, and where we go from here. This thesis challenges the aforementioned position, advocating commanders, staffs, and planners embrace a more holistic comprehension of the use, and perils of misuse, of mission command systems and KM platforms. Certainly information and KM systems play integral parts in how the Army leverages mission command, but the cautionary tale that technology, in all forms, but in particular KM and

Information System (IS) suites, are tools for success, not the means to success, contrary to organizational and popular culture.

Research Question

And so, the primary research question of this work is to explore how and to what extend does the utilization of user-generated content data affect the brigade combat team organization. As such, it is rendered: “given that Web 2.0 platforms promote conversational nature, assimilative and diverging learning, and experiential-based centers of knowledge management, they have become a cultural norm. However, given the data proliferation available in knowledge and collaboration centers such as SharePoint, Wikis, communities of purpose, etc., do commanders and staffs benefit from the overabundance of available data and information as tools to improve the quality of decisions?” In order to address this question fully, two secondary questions must be considered.

1. On the contrary, does excessive user content impede decisions, manifesting as a form of buffer overflow?
2. Lastly, to what extend does the abundance of information affect the decision cycle, given the two primary theoretical models of decision making, heuristical (intuitive) and analytical (Bayesian).

This thesis uses a combination of adductive reasoning and case studies to analyze existing scholarship on the communications environment, and how contemporary Web 2.0 systems affect military populations’ decision making with implications for further study.

Assumptions

This study integrates several key assumptions into its framework to form a basis of argument. Firstly, it embraces Parker and Hanson's Western way of war model, particularly with attention to the culture's drive for technological dominance. Further in this logic flow, returning to Gray's monograph, the American model of warfare places even greater preeminence on securing the technological advantage as a means to achieving military desired states with the belief that political victory will soon follow. This study accepts these two argumentative positions as points of analytical debarkation.

Secondly, the author accepts the assertion that contemporary American society is technology dependent and embraces the credence that technology can improve the quality of life, society, and ease burdens of the self. Rendered another way, the concept of the self is now intermeshed with the concept of "the networked self" and this perspective reshapes the user's worldview and the expectations of technology within it, in much a parallel logic as the implications of the Sapir-Whorf hypothesis are to one's cognitive worldview framed by linguistic determinism. Admittedly outside the scope of this thesis, this precept is important because it underpins much of how Army leaders approach technology, their expectations, and what they believe information can do for them. It is this position that warrants the examination of contemporary thought on technology's role in the public and political commons in the forthcoming chapter.

Finally, this work argues from the position that several modern organizational thinkers advance—such as Lieutenant General H. R. McMaster, General Perkins, and elements of the Special Operations Community—that a fundamental reexamination of the Army's operating concept is warranted in order to succeed against the asymmetric threat

typified by non-near peers and non-state actors. The lessons of the past decade and a half of limited war in Iraq and Afghanistan illuminate gaps not only in the American strategic framework, our national policies and goals, but more applicable to this study, how we approach the nature of war and what our expectations of the devices we leverage to accomplish it are.

Scope

This thesis' scope is intentionally limited to the Army BCT. As is, the current IT suite inventories of the BCTs vary by unit and mission. Doctrinally, the established layout of the lower tactical internet stack is prescribed and available via the Force Management System Website, but as the case studies illustrate, many (if not all) BCTs augment the base stacks with mission specific suites that are commonly acquired from commercial-off-the-shelf or government-off-the-shelf acquisition. As such, the task of describing what a BCT has and how it uses it is highly dependent on the situation, hence the incorporation of the case studies and their derivative analyses.

Limitations

Given the nature of this thesis, the typical model of analysis would be a quantitative one. Engineers and technophiles veer away from inferential conclusions and gravitate to the empirical. To do so, as discussed below, this is not the objective of the work. One key limitation is that the core argument rests on the analysis of case studies with inherent limitations of their own in narrative view, detail, and objectives. Furthermore, the author acknowledges that for whatever the case studies illustrate, there are other studies that either are not available or were not discovered during the course of

the research. Indeed, one remembers the parable of the Black Swan fallacy, forever lurking in the wings waiting to disprove any assertion. The author recognizes his liminal perception and acquiesces that the analysis could be invalidated at any point in the future upon new evidence arising. The author expended considerable time in conducting through research to capture the problem set, but acknowledges there is more to be discovered.

Delimitations

Again, the key delimitation in this study is its relegation to the BCT construct and as such pivots on the insight gleaned from several case studies over the past fifteen years. This is done for several reasons. Firstly, examining a wider data set is impractical given the truncated nature of this graduate program and maintaining intellectual honesty. Secondly, the audience of potential readers will likely be familiar with, serving in, or destined to, the BCT construct, thereby providing the most accessibility to this thesis' message. This opus' objectives, after all, are to foster organizational awareness, self-reflection, and meta-cognition. Thirdly, the BCT is the unit of choice for future operations: the Regionally Aligned Force model predicates this form of modular unit construct. As such, for organizational leaders, the theme is not redesigning what we have, not better using what we have, but understanding more holistically what we do with what we have. Finally, this study acknowledges that studying such a narrow subset of the Army's force structure must be tempered with an understanding that the results are indicative of the subset and not the whole, lest the reader or author commit the composition fallacy.

Significance of the Study

This study does not seek to redefine the current theoretical or doctrinal impetus, of how the Army at the BCT level leverages IS and KM suites for decisions. Furthermore the author does not intend to demonstrate quantifiably through measures of performance or measures of effectiveness that Web 2.0 platforms benefit or impede commanders and staffs at the BCT. The author's position on that matter is that to do so is miscategorizing the problem set. Indubitably, data and metrics have their place in analytics; the challenge is in knowing where they are warranted. Rather, this opus proffers a counter insight and a commentary to what the current organizational norm is viewed to be, that commanders and staffs need the metadiscourse to understand that technology is a tool with best uses and applications, and admittedly blurred definitions of how not to use it. In large part, it is for this lesson that the author selected the forthcoming case studies to illustrate of successful and unsuccessful examples in the past fifteen years of conflict.

CHAPTER 2

LITERATURE REVIEW

The Internet is the first thing that humanity has built that humanity doesn't understand, the largest experiment in anarchy that we have ever had.

— Eric Schmidt, *How Google Works*

This thesis is interdisciplinary not only in scope, but in assertions as well. As such, a multi-faceted survey of seminal and substantial works is warranted to adequately place this work within the larger academic and organizational knowledge corpus. Contemporary telecommunication—be it Web 2.0, Web 3.0, the Internet of Things, or social media specifically—is both a relatively recent phenomenon and one that in the public's mind has already become passé as one cannot conceptualize the quotidian without it. Eric Schmidt's comment above underlies much of the meta-awareness and perplexity users, consumers, and enablers of telecommunications face; technicians and engineers may understand the system and its theories of how it operates, and users are intimately familiar with it in their daily lives, not only as a larger social phenomenon, but also with implications to almost any facet of modern life—organizations, academia, knowledge and understanding, etc.—whereby society only occasionally recognizes that it understands that it does not understand what the Internet and its derivative tropes are really all about.

This literature review attempts to summarize the most important pieces of the diverse literature corpus that affects the situation framing the research question. Structurally, this review categorizes the corpus into military doctrine and organizational thought and then Army case studies. For perspicuity, many of the case studies' finer

details will be discussed in chapters three and four, but are mentioned herein for contextualization.

Army Doctrine and Organizational Thought

Lieutenant General H. R. McMaster's comment regarding technology in his "Continuity and Change: the Army Operating Concept and Clear Thinking about Future War" provides the best point of debarkation in beginning this review:

Science and technology will continue to influence the character of warfare. While the U.S. Army's differential advantages over potential enemies will continue to depend in large measure on advanced technology, winning in a complex world requires powerful combinations of leadership, skilled soldiers, well-trained units, and technology. *There are no technological silver bullets* [emphasis added]. And the Army places soldiers at the center of that effort, pursuing "advances in human sciences for cognitive, social, and physical development" while fitting weapons and machines to soldiers and units rather than the other way around.¹⁸

McMaster's article, given his academic and professional record, can be viewed as the benchmark of leading thought on not only the Army Operating Concept, but of the direction of the Army's organizational culture as well. Later in this review one will see how several other key operating concepts resurface in canonized doctrine or organizational systems. The concept that technology is a means to achieving national endstates as opposed to the ends themselves is paradoxically obvious. Certainly, the message of McMaster's silver bullet analogy is tautologous, but as with so much else in the Army, one sees the opposite in practice. Frequently the parable becomes that the system or organization turns towards leveraging data and information as the end, rather

¹⁸ H. R. McMaster, "Continuity and Change: The Army Operating Concept and Clear Thinking About Future War," *Military Review* (March-April 2015): 17, accessed January 10, 2016, http://minerva.dtic.mil/doc/McMaster_Continuity_and_Change_article.pdf.

than as the means. Too familiar is the image of a meeting becoming more about the material presented, with its endless shades of minutia, details, and packaging, than for the objectives of the original agenda. Too often do data become the quagmire in which staffs either cherry pick to support their position, analysis, or agenda, or conversely become so overwhelmingly burdened that the group resorts to heuristics and superficiality of thought. For commanders and staffs across the service, the pursuit of better, more refined and accurate data becomes a mission in itself, and the interplay of discontinuous systems in a technological arms race turns into a pyrrhic quest of ineffectuality. In this blurring of concept and reality, McMaster's message underscores much of the Army's theoretical *modus operandi* and opines that the culture challenge some of its long standing assumptions about how technology is used.

Army Doctrinal Publication 6-0 *Mission Command* provides the basis for understanding how the Army approaches command methodology and is the core doctrinal publication for its operating concept. Understanding how best to use data and the ramifications of it is manifest in mission command, both as a philosophy and warfighting function. Of the six principles of mission command, the second is "create shared understanding." Army Doctrinal Publication 6-0 elaborates with:

A defining challenge for commanders and staffs is creating shared understanding of their operational environment, their operation's purpose, its problems, and approaches to solving them. Shared understanding and purpose form the basis for unity of effort and trust. Commanders and staffs actively build and maintain shared understanding within the force and with unified action partners by maintaining collaboration and dialogue throughout the operations process (planning, preparation, execution, and assessment). . . . Commanders use collaboration to establish human connections, build trust, and create and maintain shared understanding and purpose. Collaborative exchange helps commanders increase their situational understanding, resolve potential misunderstandings, and assess the progress of operations. Effective collaboration provides a forum. It allows dialogue in which participants exchange information, learn from one

another, and create joint solutions. Establishing a culture of collaboration is difficult but necessary.¹⁹

Shared understanding is certainly a critical aspect for any Army organization. Arguably, it cannot successfully function without it. APD later continues with the concept as in its manifestation of the warfighting function of mission command, stating that a mission command system consists of personnel, networks, information systems, policies and procedures, and facilities.²⁰ The graphic in figure 2 below summarizes the salient messages of the Army Doctrinal Publication.²¹ The Army Doctrinal Publication's choice of linking these five components underscores a deeper realization of network-centric warfare. The profundity is lost in the apparentness of the message. No longer are personnel, networks, the network devices themselves, nor the policies and procedures separate, but doctrine has finally caught up with what many technophiles have seen in the past decade, that all are part of a system of systems.²²

¹⁹ Department of the Army, Army Doctrine Publication (ADP) 6-0, *Mission Command* (Washington, DC: U.S. Government Printing Office, 2012), 1-3.

²⁰ *Ibid.*, 9-12.

²¹ *Ibid.*, iv.

²² *Ibid.*, 9-12.

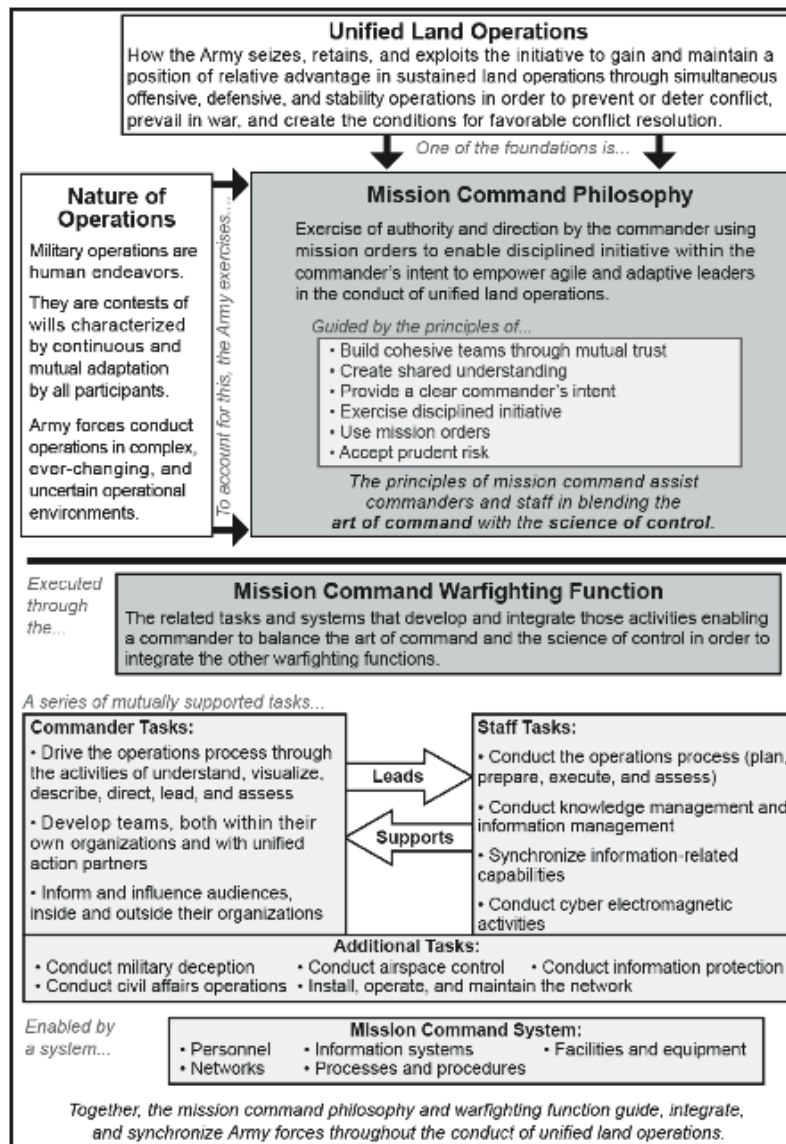


Figure 2. Overview of the Exercise of Mission Command

Source: Department of the Army, Army Doctrine Publication (ADP) 6-0, *Mission Command* (Washington, DC: U.S. Government Printing Office, 2012), 3.

Seemingly counterintuitive, this integrated systems paradigm is relatively new and, as this review will explain later, a result of the development of Web 2.0 platforms in conjunction with the rise of user-generated media content and social networking media.

Much of the techno-centric model, espousing electronic means of providing a common operating picture, stems from the 1999 work, *Network-Centric Warfare*.²³ Alberts et al., writing at the waning of the Web 1.0 and the dot com bubble, explore how to develop and leverage information superiority with tailored telecommunications suites.²⁴ Taken as a snapshot of time and place, *Network-Centric Warfare* was very much cutting edge, given the analog view of the time. Starting from the position that an organization's potential output was limited by only by its ability to process data input into the decision cycle, creating larger networks and growing more data inputs was the key.²⁵ Simply rendered, more data (and therefore more networks) equated directly to better outputs for whatever the need was, be it production, metrics, situational understanding, analysis, tracking and targeting, etc. Certainly this was the cultural narrative of the time, given that business and organizations were almost universally scrambling to become the most net-centric as possible; this was the business application of Metcalfe's law.²⁶ However, this is not to assert that the military's predilection towards information collection or analysis started in the late 1990s—far from it. Rather, one sees the military culture capitalizing on available trends in society to improve their own capabilities, itself an ironic deviation from the historical precedent as seen with the development of the Advanced Research Projects Agency Network.

²³ David S. Alberts, John J. Garstka, and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority*, 2nd ed. (Washington, DC: Command and Control Research Program, 1999), 245-251.

²⁴ Ibid.

²⁵ Ibid.

²⁶ Ibid.

Yet, pundits of the network-centric warfare (NCW) thesis saw foremost the potential for the technology and what it could enable, and less of its secondary and tertiary effects. Twenty some years later, the modern Army is a hodgepodge of IT suites differing in capabilities, capacities, interoperability, and limitations. A complete diachronic survey of the reasons for this evolution is beyond the scope of this work, so for perspicuity the reader's familiarity on the background is assumed. Paul T. Mitchell in his *Network Centric Warfare and Coalition Operations* is correct to assert that the very thing that made the Information Age so transcendent is the same that inhibits it: the commercial tailoring of systems.²⁷ While his work ventures outside the scope of this thesis, many of his points are still poignant.²⁸ Writ large, given that the commercial market drives IT development, the pressure to standardize and design from an interoperability perspective, as opposed to parochial and proprietary views, are absent. For the Army as an organization, this results in a disparate array of systems, interoperability, and knowledge base.²⁹ Furthermore, given the Army's procurement system, the culture experiences a disjunction between commercially available systems its members use in their daily lives versus that the organization can furnish.³⁰ The implications of Mitchell's thesis is that while the Army exhibits the diasporas of suites and systems with interface challenges and KM, the same issue is seen even more so at the

²⁷ Paul T. Mitchell, *Network Centric Warfare and Coalition Operations: The New Military Operating System* (London: Taylor and Francis, 2009), 1-16.

²⁸ Ibid.

²⁹ Ibid.

³⁰ Ibid.

joint service level, and compounds at the civil-military, interagency and coalition levels.³¹

In so far, this review has sought to establish several positions. First, contemporary Army thought advocates technology as a means, not an end *in ipse*, towards mission accomplishment. Second, technology and its prudent incorporation into the mission command philosophy are essential for the Army Operating Concept. Third, Army leadership pursues the newest commercially produced technology under the mindset of keeping pace with near-peer and asymmetric threats. Again, these assertions are seemingly obvious and beg the question of relevancy.

The importance of these positions sets the espoused cultural norms in juxtaposition to the counter evidence. Two important commentaries on Army culture, Lieutenant Colonel T. A Schmidt's *Design, Mission Command and the Network: Enabling Organizational Adaptation* and M. S. Vassiliou's "The Evolution Towards Decentralized C2" argue several salient points. First, the concept of mission command is historically not new to the Army; instances throughout Army history indicate an underlying proclivity for it, but the general culture is permissive of micromanagement.³² Second, traditional command and control favored by the Army fosters non-mission

³¹ Ibid.

³² M. S. Vassiliou, "The Evolution towards Decentralized C2" (Research, Institute for Defense Analyses, Alexandria VA. 2010), 12-17, accessed January 14, 2016, <https://www.dtic.mil/DTICOnline/downloadPdf.search?collectionId=tr&docId=ADA517367>.

command (i.e. centralized intend, decentralized execution) behaviors typified by hierarchal, decision-centric militaries, as depicted in figure 3.³³

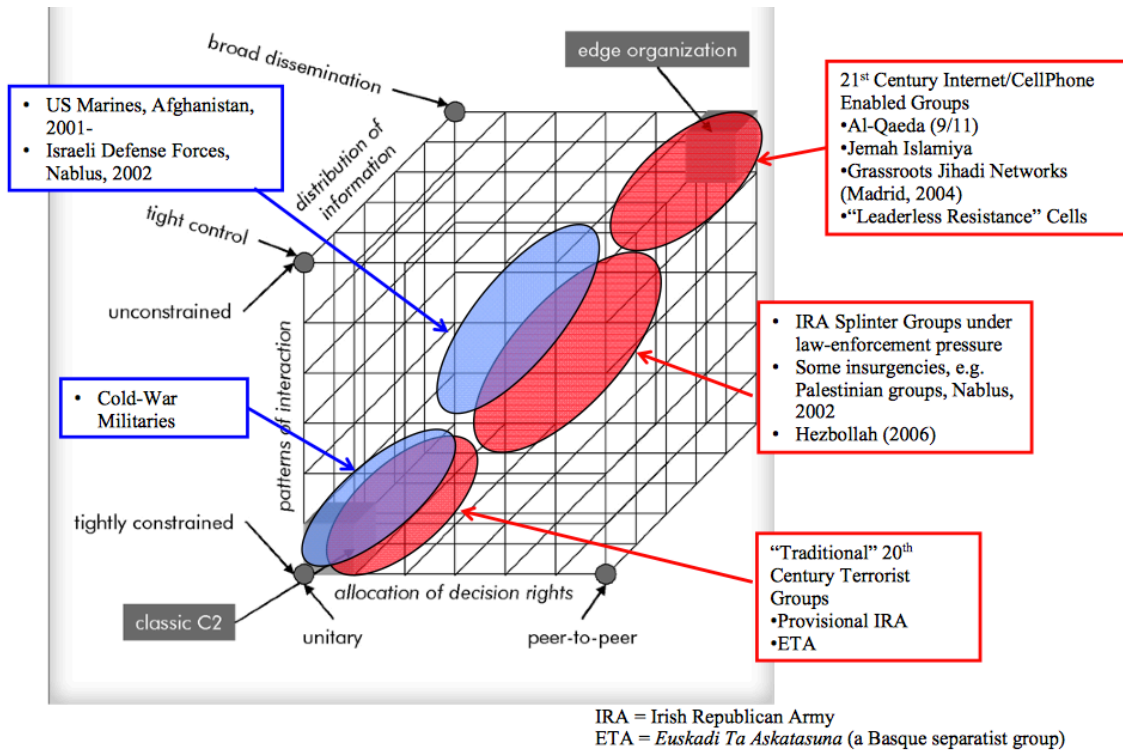


Figure 3. The Command and Control Approach Space

Source: M. S. Vassiliou, "The Evolution towards Decentralized C2" (Research, Institute For Defense Analyses, Alexandria VA. 2010), 12-17, accessed January 14, 2016, <https://www.dtic.mil/DTICOnline/downloadPdf.search?collectionId=tr&docId=ADA517367>.

Third, the Army culture canonizes mission command philosophy, itself a recast form of von Moltke's *Auftragstaktik*, as seminal to its operating concept, but in practice, tends to default to its comfort zone of centralized management and execution, in

³³ Ibid.

particular “given the visibility of modern tactical operations to upper command echelons and the media.”³⁴ Both Schmidt and Vassiliou are correct to recognize the narrative dissonance, analogous to the Japanese concept of *honne* and *tatemae* (本音 and 建前), and proffer advocacy for culture change.

Army Case Studies and Organizational Thought

Having established the precedent for the interlaying of technology within the mission command framework and the cultural challenges the Army faces, this review turns to the corpus of case studies to illustrate the known implications of Web 2.0 platforms. While an analysis of the case studies comprises the following chapter, this review provides the reader with a preliminary taxonomy and suggests where this thesis fits recognizable gaps in the scholarship.

Gonzales et al.’s 2007 RAND study of the 101 Airborne Division, and 3/2 and 1/25 Stryker Brigade Combat Teams (SBCTs) provides one of the two formal case studies examining NCW and Network Centric Operations at the BCT level. Typical of RAND productions, the study captures the operating environment in an attempt to contextualize the respective units’ mission and objectives in addition to a qualitative and quantitative analysis of the effectiveness of Web 2.0 IS suites.³⁵ The units studied conducted both offensive and stability operations prior to and during the 2006 through

³⁴ Ibid., 13.

³⁵ Daniel Gonzales, John Hollywood, and Jerry M. Sollinger, *Networked Forces in Stability Operations: 101st Airborne Division, 3/2 and 1/25 Stryker Brigades in Northern Iraq* (Santa Monica, CA: Rand Corp., 2007), 1-11.

2008 surge and were equipped with typical IS suites for the given composition.³⁶ The overall findings and recommendations indicate that the distribution of IS suites as opposed to their composition and taxonomy impacted the 101st Airborne Division to a greater extent. The Division reportedly experienced decreasing communication links the further away for the command headquarters, becoming dependent on frequency modulation tactical communication systems for forward units. Ultimately, this situation negatively impacted the respective commanders' ability to see and understand the common operating picture (COP). The SBCTs reported much the opposite experience, given that their vehicles were equipped with Blue Force Tracking/Force XXI Battle Command Brigade and Below suites which itself became the unit's COP, resulting in much greater real-time fidelity.

The second study is Cammons et al's *Network Centric Warfare Case Study: U.S. V Corps and Third Infantry Division during Operation Iraqi Freedom Combat Operations*. This three-volume Center for Strategic Leadership publication frames its study from multi-tier analysis approach examining the operations, network architectural, and resulting implications for NCW.³⁷ Like the above RAND study, this study extensively frames the operational environment to contextualize the implications of the study.³⁸ As opposed to the above study, the units profiled herein are typical of the initial

³⁶ Ibid.

³⁷ Dave Cammons, John B. Tisserand, and Duane E. Williams, *Network Centric Warfare Case Study: U.S. V Corps and Third Infantry Division during Operation Iraqi Freedom Combat Operations*, vol. 1 (United States: Createspace, 2013), 25-61.

³⁸ Ibid.

theater opening forces at the start of Operation Iraqi Freedom in 2003.³⁹ As such, more attention is devoted to the IS suites fielded to the early war Army than commercially procured suites. Distilled, the study's implications are that NCW and Network Centric Operations, when adequately trained, prepared, maintained and planned, are invaluable combat multipliers.⁴⁰ Strikingly, the study provides few negative instances of Network Centric Operations and NCW. Of the seventeen listed findings, only two illustrate a measure of improvement, indicating the ABCS suites are stovepiped by function, thereby limiting their usability for the decision cycle, and that the then current incarnation of subscriber connectively, Mobile Subscriber Equipment, was poorly suited in providing service given the operational tempo, whereby many of the subordinate COP IS suites were ineffective.⁴¹ In all, the study finds Web 2.0 systems to be critical mission enablers.

Turning to the non-conical case studies (i.e. Army Research Laboratory, graduate research projects, and white papers), several researchers illustrate successive and counter points to the aforementioned benefits of Network Centric Operations and NCW. Colonel Harry Tunnel's "Task Force Stryker: Network-Centric Operations in Afghanistan" is one of the former.⁴² Like Gonzales et al.'s conclusions regarding the two profiled SBCTs in Iraq, Tunnel also concludes Web 2.0 suites enhanced operational effectiveness. He further describes tools utilized by 5/2 SBCT, such as Stryker ASCOPE Decision Maker

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Harry Tunnel, "Task Force Stryker Network-Centric Operations in Afghanistan" (Defense and Technology Paper, Washington, DC, 2011), 13-17, accessed January 16, 2016, <http://digitalndulibrary.ndu.edu/cdm/ref/collection/ndupress/id/48990>.

and Battle Command Visualization, as greatly enhancing situational awareness and rapid decision-making.⁴³ Two of his most salient points underpin the double edged nature of user-generated content: “in such an information-rich environment, it is essential to have disciplined processes to ensure unnecessary information is not entered into a database, ensure quality control mechanisms are in place, limit redundant data basing, and develop agreements with adjacent organizations so information efforts are complementary”⁴⁴ and “network-centric operations can be viewed as a form of mass—although different than the type of mass commonly thought of with maneuver elements [and] allows units to have an overwhelming, cascading effect on an adversary that causes his collapse and subsequent defeat.”⁴⁵ These points are indicative of the overall conclusions in chapter 4.

Yet, other studies offer a differing perspective. Another RAND Study, Hallmark and Gayton’s *Improving Soldier and Unit Effectiveness with the Stryker Brigade Combat Team Warfighters’ Forum* explores a community of purpose (referred to as warfighter’s forum, or WfF) as a KM practice that originated at the SBCT organization and evolved into an Army wide phenomenon that provides lesson learned, tactics, techniques, and procedures, and best practices from learning organizations.⁴⁶ While the study concludes that on all, the forum met user’s expectation, about 10 percent of the total Stryker

⁴³ Ibid.

⁴⁴ Ibid., 14.

⁴⁵ Ibid., 16-17.

⁴⁶ Bryan W. Hallmark and S. Jamie Gayton, “Improving Soldier and Unit Effectiveness with the Stryker Brigade Combat Team Warfighters’ Forum” (Technical Report, RAND Corporation, 2011), 40-41, accessed January 16, 2016, http://www.rand.org/pubs/technical_reports/TR919.html.

population participated in it, begging the question of its utility.⁴⁷ As a KM mechanism, organizations glean improvement when the knowledge is incorporated and not ignored. Herein is an example of systems falling into a common trend—marginalization due to the culture’s reluctance to embrace it.

The Army Research Laboratory’s 2013 study into cognitive load indicates what common institutional knowledge is: information overload hinders mission command and the decision cycle.⁴⁸ The details of his research method are not as important to this research question as are his conclusions, and as such this review reflects it. Hawley expands his position in describing what many users, engineers, and designers take for granted: it is not the systems, their design (contrary to Tunnel’s position) that impedes the organization, but rather the inter-relationship of the user, the process, the system, and the external world.⁴⁹ His graph below in figure 4 illustrates this macro-cognitive concept.⁵⁰

⁴⁷ Ibid.

⁴⁸ John K. Hawley, *Human Systems Integration (HSI) and the Network Integration Evaluations (NIEs), Part 2: A Deeper Dive into Mission Command Complexity and Cognitive Load* (Aberdeen Proving Ground, MD: US Army Research Laboratory, 2015), accessed January 16, 2016, <https://www.dtic.mil/DTICOnline/downloadPdf.search?collectionId=tr&docId=ADA621983>.

⁴⁹ Ibid., 8.

⁵⁰ Ibid.

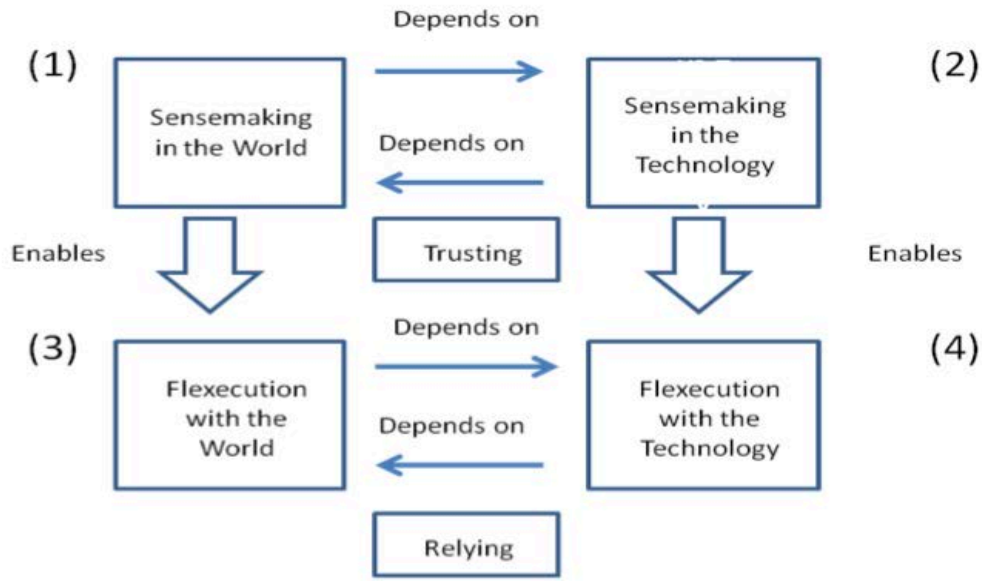


Figure 4. A Conceptual Model of Macroognitive Work

Source: John K. Hawley, *Human Systems Integration (HSI) and the Network Integration Evaluations (NIEs), Part 2: A Deeper Dive into Mission Command Complexity and Cognitive Load* (Aberdeen Proving Ground, MD: US Army Research Laboratory, 2015), accessed January 16, 2016, <https://www.dtic.mil/DTICOnline/downloadPdf.search?collectionId=tr&docId=ADA621983>.

In this model, quadrant 1 is reflects how the user (perceiver) synthesizes the various data inputs from reports, displays, sensors, etc. As mission command is described as technologically dependant, commands and staffs are required to make sense of the technology as means of data input and formulation (quadrant 2).⁵¹ Again, it is a mechanism to conceptualize the world, not the world itself: if the systems used to conceptualize the world are ineffective, cumbersome, or otherwise inhibitive, trust in the

⁵¹ Shannon R. Worthan, "Assessing the Impact of Information Channels on the Understanding of Ground Truth" (Thesis, Naval Postgraduate School, Monterey, CA, 2012), accessed January 16, 2016, <http://calhoun.nps.edu/handle/10945/7433>.

capabilities of the system suffers.⁵² Moreover, whatever benefit of the system would otherwise offer the organization diminishes as users revert to more familiar—and trusted—models of decision making. This bridge of trust allows users to remodel their sense of execution to be flexible (hence his term “flexecution”) and work around the technologies’ limitations and idiosyncrasies (quadrant 4), leading to an adaptation of how they successfully interface with the technology.⁵³

Shannon Worthan’s thesis, “Assessing the Impact of Information Channels on the Understanding of Ground Truth,” which examines cognitive workload for scaled tactical operations centers (scaled being the quantity of data input systems, such as sensor relays, situational awareness—COP suites, and telecommunication assets) parallels Hawley’s model.⁵⁴ The study finds that cognitive workload drastically increases when user training, familiarity, and ease of interoperability is negatively proportional to the converse.⁵⁵ Again, this serves as an illustration of the interplay of the user, the system, and the environment resulting in system of systems that is best conceptualized as a tool, rather than a means.

Another Army Research Laboratory study, Buchler, et al.’s “The Warfighter Associate: Objective and Automated Metrics for Mission Command,” explores the

⁵² Ibid., 67-69.

⁵³ Ibid.

⁵⁴ Ibid.

⁵⁵ Ibid.

recognized issue by leveraging technology to assist the humans using the technology.⁵⁶ With a doctrine based knowledge software suite that assists in a flow-chart decision support schematic, this study examines to what degree the cognitive workload can be ameliorated.⁵⁷ This study nests within the larger “Data to Decisions” initiative spearheaded by the Office of The Secretary of Defense in an attempt to glean more and better decisions from technology by likewise using another layer of technology. Buchler et al. conclude that while the prototype software has promise, it adds to the complexity of preexisting systems and knowledge skills required to enable it to useful functionality.⁵⁸

Returning to Hawley’s model, one sees its resonating framework in its implications. Using this framework, the preceding case studies can be conceptualized in two general themes: where organizations found the homeostatic balance of the correct leadership, with the correct requisite knowledge, using the right tools (IS, KM, and Web 2.0 suites) for the right task all resulting the synergy of amalgamation and synthesis, and other scenarios where one or more of the factors were out of balance. In all, this is the message of this review to contextualize Army thought that recognizes the need for continuing to leverage technology to better equip and train it forces for mission success, but frequently becomes lost in the pursuit of technology as an ends in itself.

⁵⁶ Norbou Buchler et al., “The Warfighter Associate: Objective and Automated Metrics for Mission Command” (International Command and Control Research and Technology Symposium (ICCRTS), June 19-21, 2013, Institute for Defense Analyses, Alexandria, VA), 19-20, accessed January 16, 2016, http://www.dodccrp.org/events/18th_iccrts_2013/post_conference/presentations/024.pdf.

⁵⁷ Ibid.

⁵⁸ Ibid.

CHAPTER 3

RESEARCH METHODOLOGY

Science is what you know; philosophy is what you don't know.
— Bertrand Russell, *My Philosophical Development*

Purpose of Research

As stated in chapter 1, the purpose of this thesis is to examine if Web 2.0 IS suites are qualitatively beneficial to the BCT commander and staff. This research question directly challenges the standing organizational and cultural norm by its very conception. In a technology driven world, the position that user generated content could even be considered counter productive can be viewed as anathema in certain environs. Yet, to promote intellectual honesty and critical thinking, the question is still valid. The literature reviewed in chapter 2 illustrates that the pursuit of technology *in ipse* does not equate to better or timelier decisions. After all, any BCT commander or staff would likely make the assertion that the plethora of IS suites in a BCT Operations Center is useful only to the ends it enables the mission, yet the organizational culture consistently returns to the notion that newer, better, and more agile and adaptive technologies predicate similar results. Seemingly, the conventional organizational logic can be distilled colloquially as, “more data equals more information equals more awareness equals better intelligence equals better decisions equals improved freedom of maneuver,” *ergo*, there is a direct correlation to the quantity of data as it predicates a benefice. *In toto*, this thesis challenges the aforementioned assertion and attempts to qualitatively discern inferential facts and conclusions therein.

Organization

This chapter consists of three parts: design, method, and analysis. Design describes the process the researcher uses to answer the primary and secondary research questions listed in chapter 1. Method vets the criteria used to determine the applicability and relevance of the case studies as well as the feasibility and suitability of examples and inferences. The analysis section provides a description of how the project's design is applied to the research question and what the standards for significance are. Finally, the summary expounds on the argument for qualitative research and outlines the points of examination for the successive chapter, Analysis. The below graphic illustrates the thesis' overall organization superimposed on a conceptualization of the topic.

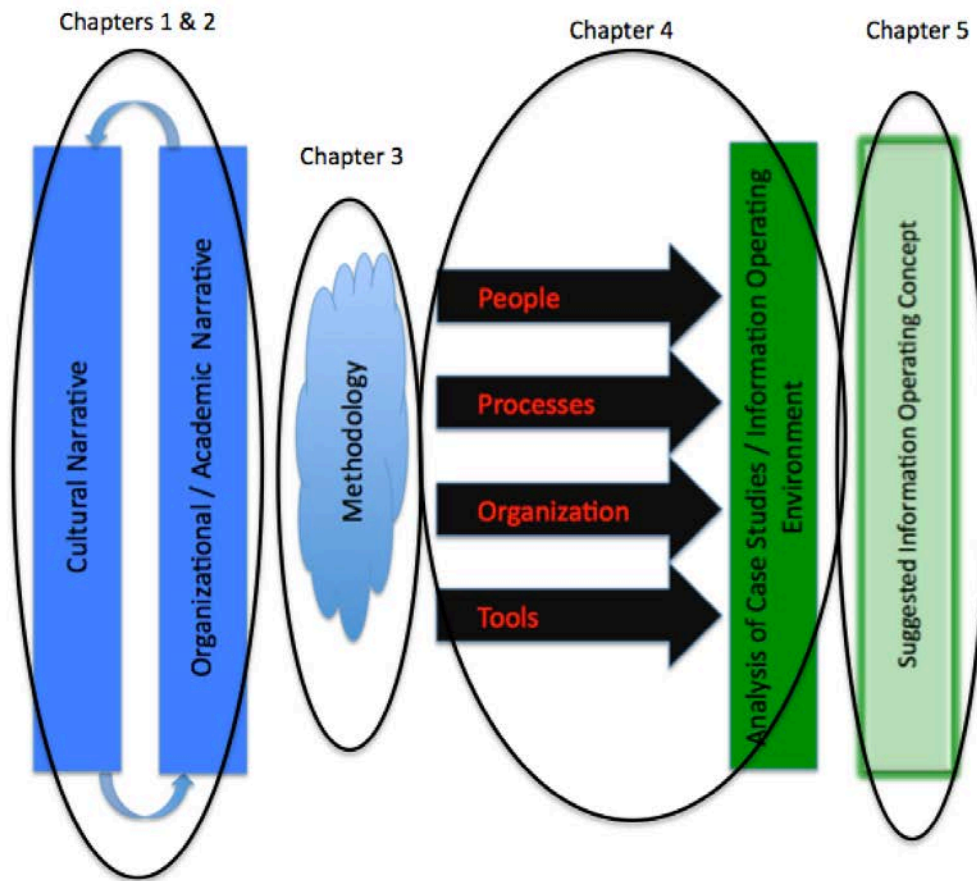


Figure 5. Thesis Organization

Source: Created by author.

Furthermore, Appendix A, Thesis Logical Mind Map, expounds upon chapter 4. Given the centrality of chapter 4 to the overall argument, a cursory discussion on its organization and objectives is warranted. Firstly, the author framed the analytical lens from the paradigm of ATP 6-01.1, *Techniques for Effective Knowledge Management* in using the four components of KM, people, processes, tools, and organization.⁵⁹ This

⁵⁹ Department of the Army, ATP 6.01-1, 1-4.

model fits the research question as it captures the multifaceted and interweaving aspects of how an organization processes, conceptualizes, acts upon information and, more importantly, how the various intrinsic elements—its people, its systems (processes), its IS suites (tools), and organizational cultural and framework—all amalgamate to form something greater than the sum of their respective parts. Attempting to deconstruct the problem set without examining its constituents would prove to be an inconclusive analysis.

Using this four-agent model allows the researcher to deconstruct the problem set and examine the incumbent and interdependent parts in an attempt to find new inner relations and meaning. As seen in the previous chapter, many researchers and scholars have explored most of the underlying themes expressed in this thesis, however this method of analysis allows for a fresh perspective that hitherto has not been explored. The author refutes any implication that this model is inclusive of all the possible affecting agents; indeed, such an inference would be myopic and illogical. Secondly, the four-agent model provides a manageable analytical venue for the scope and limitations of this work. From it, the thesis can address the primary and secondary research questions and ultimately argue for its terminal objective, information meta-cognition and awareness. Effectively, the mind map in Appendix A renders a graphical depiction of the forthcoming chapter: the subcomponents form the topic sections, factors and theories influence how the subcomponents behave allowing for continued analysis, and then postures the argument for the inferential desired state.

Design

This thesis approaches the research question with a qualitative perspective. The author originally considered using an ethnographical or grounded theory approach, but later discarded those models due to their incompatibilities with the problem set and research question. An ethnographic model seemed feasible given the complex human dynamic involved in social organization and structures, particularly when filtered through the research question focus on cultural habits, processes, and expectations, however intellectually honest data collection proved unfeasible with the author's limited time, ability to collect accurate field responses, and selecting a study population. The grounded theory approach quickly proved an incompatible model as the research question did not lend itself to a confined theoretical framework originating from participatory inputs. Instead, a framework paralleling qualitative design methods proved to be the best option for framing the research question and analyzing the case studies.

The author uses Creswell's description of qualitative methods as the basis for framing the method.⁶⁰ Arguably there are fewer restrictions and limitations when using qualitative methods as the researcher frames the inquiry with the goal to discern patterns, themes and ultimately, meaning and understanding. Furthermore, many of the case studies examined in this work have approached their respective research questions from a quantitative model seeking to prove empirically how effective a given technology, process, or system could be.

⁶⁰ John W. Creswell, *Qualitative Inquiry and Research Design: Choosing among Five Approaches*, 2nd ed. (Thousand Oaks, CA: Sage Publications, 2012), 24.

While these studies attempted to demonstrate their arguments in with concrete data, metrics, and analytics, the author saw a gap in the research: it was the researchers' perspective. The aphorism "not everything that counts can be counted, and not everything that can be counted counts" contextualizes the author's approach.⁶¹ Instead of looking at the problem diachronically—i.e. from within the problem set quantitatively expecting measurable outputs that array themselves to orderly analysis and taxonomization—perhaps more insight is discernable through a meta-synchronic analysis—i.e. externally appraising the entirety of the problem, assessing the intercourse of the comprising constituents, and drawing salient inferences and awareness of the environmental dynamics.

Method

As discussed above, method vets the selected sources for credibility, feasibility, and suitability. Initial data collection commenced by leveraging the Combined Arms Research Library to assist with research. The original search keywords were: Internet, Media, Online Systems, Social Communication, Army Personnel, Knowledge Management, Lessons Learned, Command and Control Systems, Decentralization, Military Strategy, Network Centric Operations, Military Operations, Military Doctrine, Hybrid Systems, Military Planning, Military Culture, Decision Making, Cognitive Load, Mission Command, Command and Control Communications, Information Theory, Network Centric Warfare, Technology Transfer, Situational Awareness, Collaborative Techniques, Decision Support Systems, Information Exchange, and Decision Making.

⁶¹ William Bruce Cameron, *Informal Sociology: A Casual Introduction to Sociological Thinking* (New York: Random House, 1963), 13.

This search resulted in over 50 titles and over 200 publications (including journal entries, white papers, research reports, etc.) initially. The Combined Arms Research Library research staff in coordination with the author filtered false positives using the following criteria: applicability, relevance, and origin. The definitions of applicability and relevance are in nature subjective. The author and research staff filtered the data pool by limiting the scope (applicability) to the research question. This resulted in 18 titles and 31 publications. The author then categorized the references by type, resulting in four taxonomies: Army organization and doctrine, case studies, scholarly referents, and contemporary commentaries. As research progressed, additional sources became apparent, particularly when framing information and decision theories and contemporary thought on Web 2.0 systems. The author's overall guiding precept was to gather as complete, unbiased, holistic, and relevant data sources as possible.

Analysis

Given the research question, rendering a quantitative, definitive analysis of it is implausible. After reviewing the literature, revising the research question, framing the problem, and then defining it, the author determined a quantitative analysis was ineffectual and elected to pursue a qualitative analysis for several reasons. First, the research question deals mostly with social (organizational) patterns and concepts of how to best leverage the disparate inputs into an amalgamative whole for a centralized result. The author's position is that this is not a suitable topic for quantitative processes. Second, qualitative analysis makes best use of the available data set when aligned with the intent of the research question. Other models would unnecessarily eliminate many of the data sources given their structure, content, and presentation. Third, the author is self aware of

his personal bias: given a social science background—and therefore an inherent predisposition towards qualitative thought—in an environment overwhelmingly structured around rote metrics, screening criteria, and formulaic action methodologies, a fresh perspective fills an apparent gap in the scholarly literature.

Summary

In summary, this chapter outlined the methodology, objectives, and organization of the opus *in toto*. While advocating a methodology of qualitative analysis over quantitative, this work acknowledges its limitations in scope, data sets, and relevance with respect to maintaining intellectual honesty. In the descriptions of chapter organization, the reader is equipped with a guide to the forthcoming analysis and can understand with context the intent of this work.

CHAPTER 4

ANALYSIS

Where is the life we have lost in living?
Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?

— T.S. Eliot, *The Rock*

Overview

Obviously, Eliot is referencing the one of the most common temporal lamentations, the *ubi sunt* motif. From Villon's "où sont les neiges d'antan" of *La Ballade des Dames du Temps Jadis*, to the narrator of the Anglo-Saxon *Wanderer*, the works of Thomas Nashe and Sir Philip Sidney, the message resonates throughout cultures, peoples, and time. Arguably, the importance of the lamentation is not the superficial commentary on the passage of time and by extension youth, happiness, health, joy, and the human condition, but rather recognizing the loss of perception of the distal to the proximate, the awareness of one's myopic world view in the here and now. One realizes one's perception is not dissimilar to that of Bede's sparrow winging through the hall.

So what? Surely a commentary on poetic motifs is a pointless tangent and has no relevance to how commanders and staffs incorporate IS suites to facilitate mission command in execution of Unified Land Operations. However, consider this: just as the message of the above writers underpins a shared experiential and numenistic awareness of the human condition's ephemerality, so too does it parallel information meta-cognition. The message (or better put, one of them) is a warning against the loss of one's

perception in the surrounding environment, the proverbial not seeing the forest for the trees, and is just as applicable to information studies as to humanism. Too commonly does the Army culture attempt to infer greater profundity and insight from information, only to become derailed more in the endeavor, the systems, and the technology in themselves than what the original purpose was all about—creating shared understanding and knowledge. In the author’s experience, it is the very uncommon reader who could not relate firsthand to the above cultural truism. Like Gatsby chasing the green light, Army culture chases technological platforms under the paradigm that more information equates to better decisions, saved lives, decisive advantage, and ultimately, tactical wins. The three figures below illustrate the development of network centric warfare as a cultural phenomenon.⁶²

⁶² Cammons, Tisserand, and Williams, 14-15.

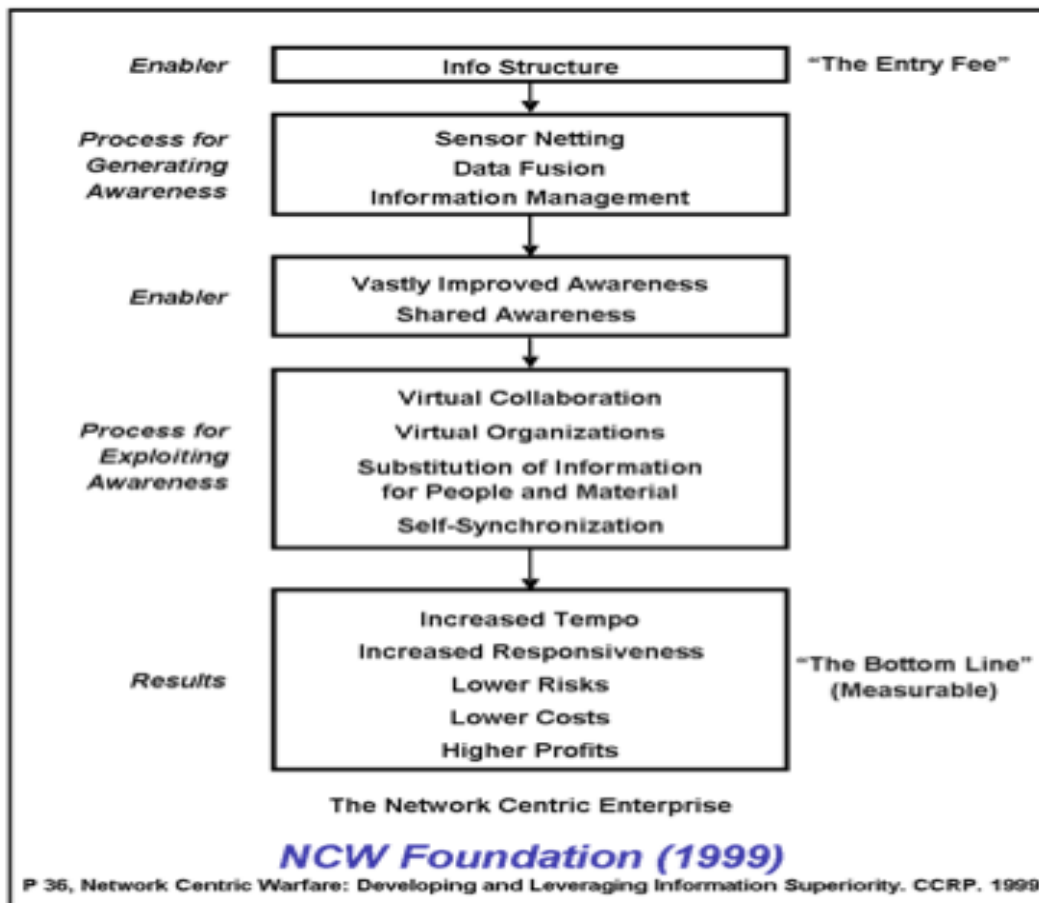


Figure 6. Original Tenets of Network Centric Warfare

Source: Dave Cammons, John B. Tisserand, and Duane E. Williams, *Network Centric Warfare Case Study: U.S. V Corps and Third Infantry Division during Operation Iraqi Freedom Combat Operations*, Volume I (United States: Createspace, 2013), 14-15.

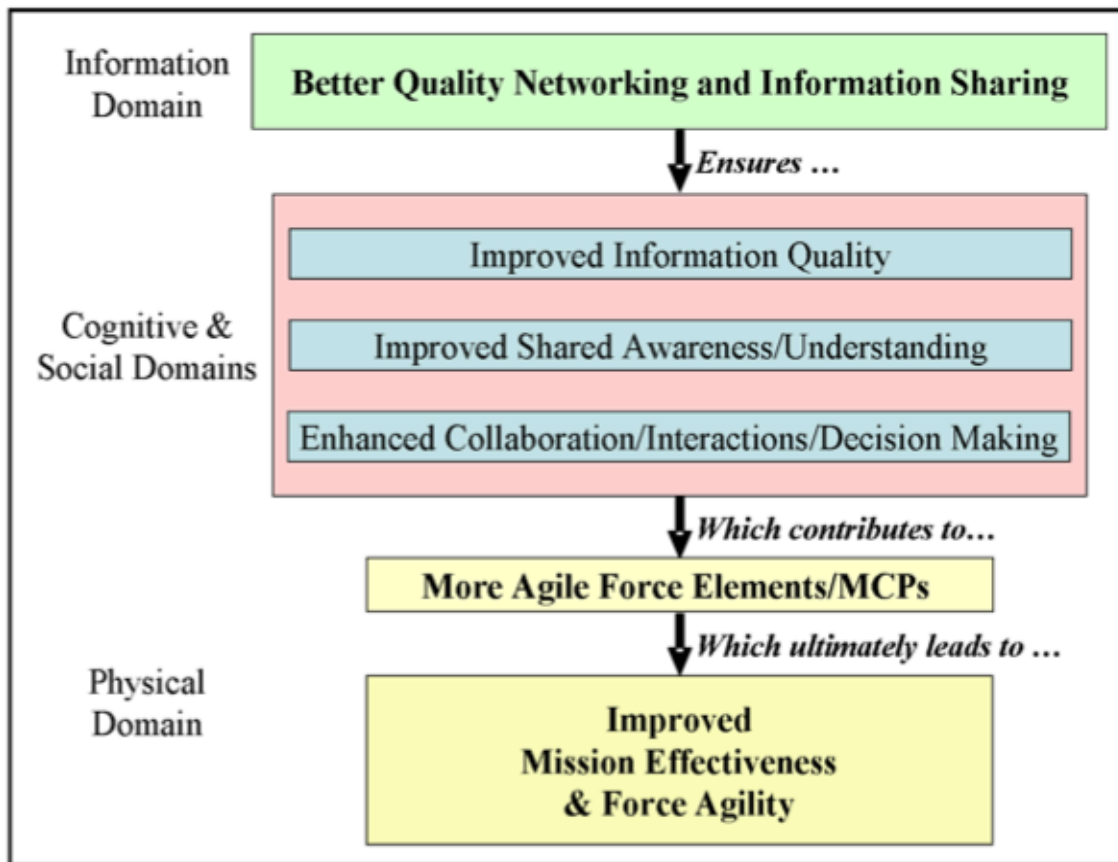


Figure 7. Network Centric Warfare Tenets Explained

Source: Dave Cammons, John B. Tisserand, and Duane E. Williams, *Network Centric Warfare Case Study: U.S. V Corps and Third Infantry Division during Operation Iraqi Freedom Combat Operations*, Volume I (United States: Createspace, 2013), 14-15.

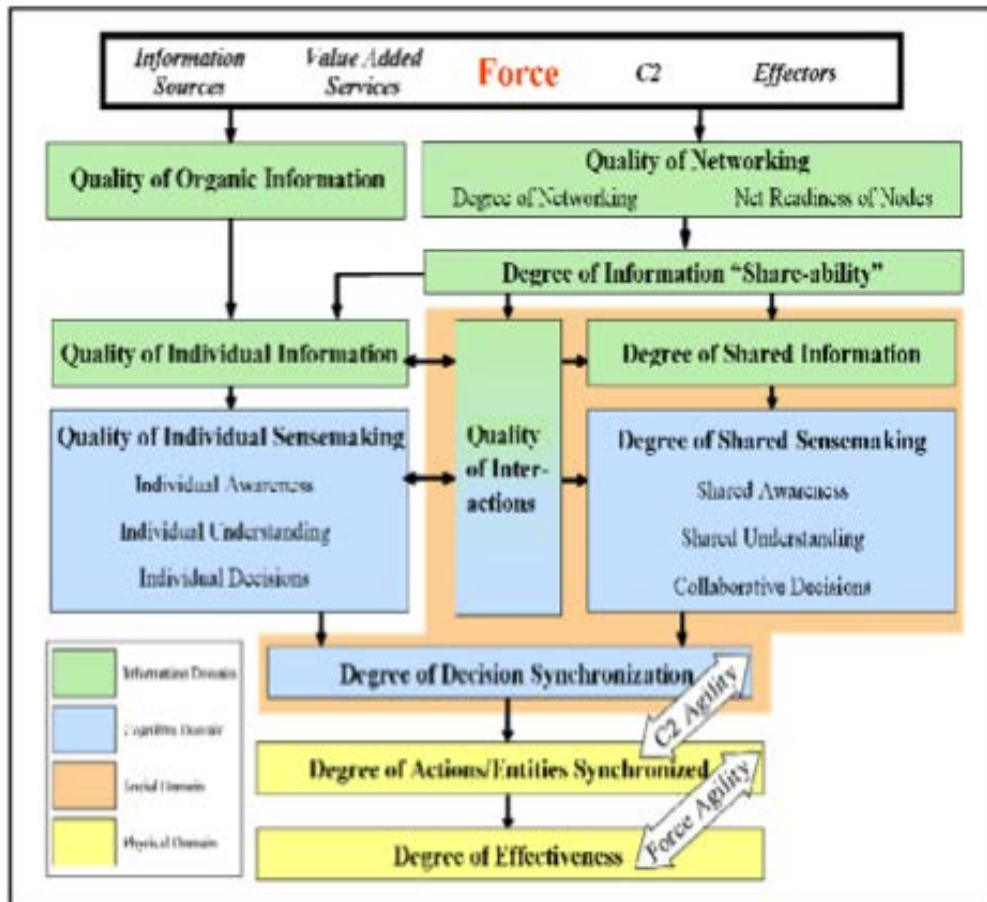


Figure 8. Network-Centric Operations Conceptual Framework

Source: Dave Cammons, John B. Tisserand, and Duane E. Williams, *Network Centric Warfare Case Study: U.S. V Corps and Third Infantry Division during Operation Iraqi Freedom Combat Operations*, Volume I (United States: Createspace, 2013), 14-15.

However, at a certain point, the organization experiences the law of diminishing returns: perhaps there is too much of a good thing when it comes to information and IS suites.⁶³ Revisiting Gray's argument from the previous chapters, technology enables the

⁶³ James Gleick, *What Just Happened: A Chronicle from the Information Frontier* (New York: Pantheon Books, 2002), 8-15.

tactical level of war and enhances very significantly the other two, but in itself is still only a means and not an end despite what the culture advocates.

Components Model: People

People clearly are the central agents to the information process, not only as participants but as an incumbent catalysts of its very existence. ATP 6-01.1 discusses people with the following:

People are important to successful knowledge management. Knowledge has meaning only in a human context. It includes individual experience, expertise, or insight. Leaders use tacit knowledge to solve problems and make decisions. Leaders engage subordinates' tacit knowledge to improve organizational learning and enhance the unit's innovation and performance. . . . Knowledge managers connect people and build formal and informal networks to transfer knowledge. Knowledge transfer is moving knowledge, including knowledge based on expertise or skilled judgment, from one person to another. Knowledge managers find sources of knowledge, capture that knowledge, and facilitate its transfer to those who need it.⁶⁴

The ATP further continues with an exploration of knowledge as an enabler of the decision cycle and how the balance of top-down—bottom-up organizational and interpersonal systems all converge into shared understanding which yields the intangible vibe of mission command.⁶⁵ Granted, the ATP's perspective is limited to furthering KM, but much the same applies to this thesis' scope. In the ATP's framework, people are the facilitators, consumers, and conveyers of knowledge by, with, and through their own environs. While this position has much merit, it describes the theoretical "best practice" functioning of an organization and bypasses the constituent parts that influence the situation, and rightfully so as the digression is outside ATP's scope. However, for this

⁶⁴ Department of the Army, ATP 6.01-1, 1-4.

⁶⁵ Ibid., 1-4 - 1-6.

thesis' intent of surveying the system of systems that is IS integration, a discussion of how people are influenced, what some of the dynamics are, and what the observer can infer from it is warranted. As such, salient to this thesis is an exploration of the networked individual, how users influence and are influenced by the information environment, and the interplay of the organization leadership on the information environment.

However, before exploring the innumerable rabbit holes of the topic, a disclaimer is in order. Tautologously, this thesis cannot approach a comprehensive survey of all the pertinent factors that affect people, processes, organizations, and tools, the myriad of dynamics in the case studies, or the diverse scholastic disciplines that influence all aspects of the topic. Rather, it seeks to distill seminal discussion points in support of its central argument. Self-admittedly, this work is incomplete by design and does not assert a holistic perspective.

The overall message of this thesis is to advocate information meta-cognition, whereby the reader might recognize the parallels with what history offers; it proves little, but greatest lesson is in the illumination of the interplay of systems, time, place, and causality.⁶⁶ In this logic, people are one of the critical agents of the IS system. Rainie and Wellman's work, *Networked*, illustrates well the concept of the networked individual.⁶⁷ IS suites are systems of systems, and their human users are no different.⁶⁸ Contemporary

⁶⁶ Marlin R. Pierce, "History 300" (Lectures, Command and General Staff College, April 2016).

⁶⁷ Lee Rainie and Barry Wellman, *Networked: The New Social Operating System* (Cambridge, MA: MIT Press, 2012), 6-20.

⁶⁸ Ibid.

perception casts networks as merely automation and telecommunication systems, however humanity's social intercourse is in reality another form of networking.⁶⁹ Like tiered router networks, people organize their social lives into expanding circles of affiliation, trust, and utility.⁷⁰ Arguing more that social media is an extension of organic human social structures through technical means—i.e. Web 2.0 suites like Facebook, MySpace, etc. facilitate parallel social patterns as conventional mean—the authors place the social media phenomenon as the third wave of social network revolutions. Initially, society moved away from small communities to disparate, more fluid, mutable, and diverse social networks enabled by early telecommunication and transportation developments.⁷¹ Second in the evolution is the development of user generated and broadcasted content, which empowered users to become more than mere consumers of the internet; they became participants in it as a medium itself. Third, the mobile revolution allows users to create data—and ultimately culture and the expansion of the social fabric—from anywhere they receive telecommunication service.⁷²

From this position, one sees several salient points. First, a main reason such networks function successfully is that the definition of social interaction has evolved to include the change. Secondly, as younger users increasingly become digital natives, the social fabric experiences a paradigm shift in the hierarchical structure that for so long

⁶⁹ Ibid.

⁷⁰ The author is referencing tiered router (layer 3) networks of Cisco Systems design. He acknowledges that the term and technology is proprietary.

⁷¹ Rainie and Wellman, 6-20.

⁷² Ibid.

prevailed in the workplace. Social media culture retains a distinctly flattening effect on the surrounding social environs. Fostering collaboration, ownerless data, and simultaneously divergent and convergent thinking (to be discussed in the forthcoming section), social media suites increasingly blur the previously defined lines of supervisor—subordinate, patron—client relationships.⁷³ Ori Brafman and Rod Beckstrom explore this theme from an organizational perspective in their 2006 work *The Starfish and the Spider*, which is explored in greater detail in the subsequent subsection.⁷⁴ However, an organization formulates its internal systems and cultures, among other factors, based on the members within it and the influence of the surrounding environment.⁷⁵ As such, an important realization when examining Web 2.0 meta-systems is that as information drives newer social norms of interaction, individuals change in the new social operating system, so too does the organization, and the organization finds itself increasingly decentralized and mutable.⁷⁶ This fits the mantra the Army Operating Concept's advocates, particularly the desire for agile and adaptive leaders in similar organizations as well as the spirit of mission command. From this light, the leveling nature of user-generated media would appear a benefice to the Army of 2025. However, as is typical in history, the greatest challenge is the culture's predilection to retain the *status quo*.

⁷³ Ibid.

⁷⁴ Ori Braufman and Rod A. Beckstrom, *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations* (New York: Penguin Group, 2006), 37-46.

⁷⁵ Ibid.

⁷⁶ Ibid.

Indubitably, the long-term ramifications of Web 2.0 media are still unknown. Debates volley as to the particulars of interpersonal value, the nature of interpersonal relationships and their meaning in an age of apparent diminished interpersonal connection, digital superficiality, digital excess in place of “quality relationships”, the micro-societal implications of “unfriending”, and the diminishing of social values from the incipient ease of technology, but these arguments are outside this work’s scope. What is pertinent, however, is the awareness of the impact of the current social operating environment that commanders and staffs will face incorporating IS suites into their organizations. Users and their IS suites cannot be separated, nor is an IS suite discontiguous from the users and consumers who interface with it. Indeed, it is a microcosm of culture within itself; they are inherently interdependent. Common Army wisdom conceptualizes IS assets as mere third party objects and highly modular in nature; one can unplug and manipulate the systems to do whatever is needed. However, many successful leaders who leverage IS suites with notable adroitness understand the human dynamic that people, as users, consumers, audiences, and facilitators exist in a continuum of dynamic of synergy bounded by an indescribable social operating environment, through which one conceives its presence in the lens of technology. Returning to the opening vignette of the discordant couple, one observes just how powerful the respective party’s frame of societal paradigm and appraisal of meaning derived from the information environment is to inferring causality and predication and eventually deriving conclusions. While outside observers easily observe they lacked the perspective of self-awareness, one only needs to look inwards to the Army culture to see parallels in how our culture approaches the cognitive hierarchy.

Turning to the case studies, from a personnel perspective, one sees the gambit of organizations that found the balance of effective IS management—the correct tool, in the needed quantity, at the right time and place, employed correctly with the appropriate expectation management—with organizations that did not. The 2006 RAND study lead by David Gonzales et al. discusses the effective employment of personnel networks and facilitating a successful culture of understanding and adaptation.⁷⁷ For the 1/25 and 3/2 SBCTs, the study authors report unit members crediting various Web 2.0 suites, such as Force XXI Battle Command Brigade and Below, military internet relay chat, and the units' standard operating procedures for their ability for rapid engagement against high value targets.⁷⁸ When compared to elements of the 101st Airborne Division which were still equipped with analog command and control communications and few Web 2.0 suites, the SBCTs planning—decision—execution cycle was faster by over 30 percent to which members attributed the synergy of information, planning, and organizational members and leadership the ability to achieve decisive action.⁷⁹

Tunnell reports similar observations with Task Force Stryker. They leveraged Stryker ASCOPE Decision Maker, Battle Command Visualization Suite, and Land Warrior systems along with several other platforms for facilitated much improved reaction time, command situational awareness, decreased time in preparation of intelligence products for task force elements.⁸⁰ In this manifestation, Tunnell describes

⁷⁷ Gonzales, Hollywood, and Sollinger, 68-70.

⁷⁸ Ibid.

⁷⁹ Ibid.

⁸⁰ Tunnel, 13-17.

the synergy of training, personnel, technology, and leadership through the lens of network-centric operations as “as a form of mass . . . (which) allows units to have an overwhelming, cascading effect on an adversary that causes his collapse and subsequent defeat.”⁸¹ Furthermore, information, “when properly databased, is more readily obtainable and hence usable by a networked force than by an enemy.”⁸² From this perspective, one can assert that the Task Force achieved the harmonization of people, processes, organization, and tools and the information triad, which is explored later in this chapter.

The next case study is Cammons et al. While most of the findings in this study apply to the other components of the information model—i.e. processes, organizations, and tools—and play an integral part in the forthcoming analysis, regarding personnel analysis, the authors provide one of the most salient points in all of the case studies: “information systems are not a substitute for leadership; they help good leaders make better decisions ‘quicker.’”⁸³ Commons et al.’s figure 9 represents the survey respondents’ disposition towards the information environment affecting the speed and confidence of decisions.⁸⁴

⁸¹ Ibid., 16-17.

⁸² Ibid.

⁸³ Cammons, Tisserand, and Williams, 30-32.

⁸⁴ Ibid.

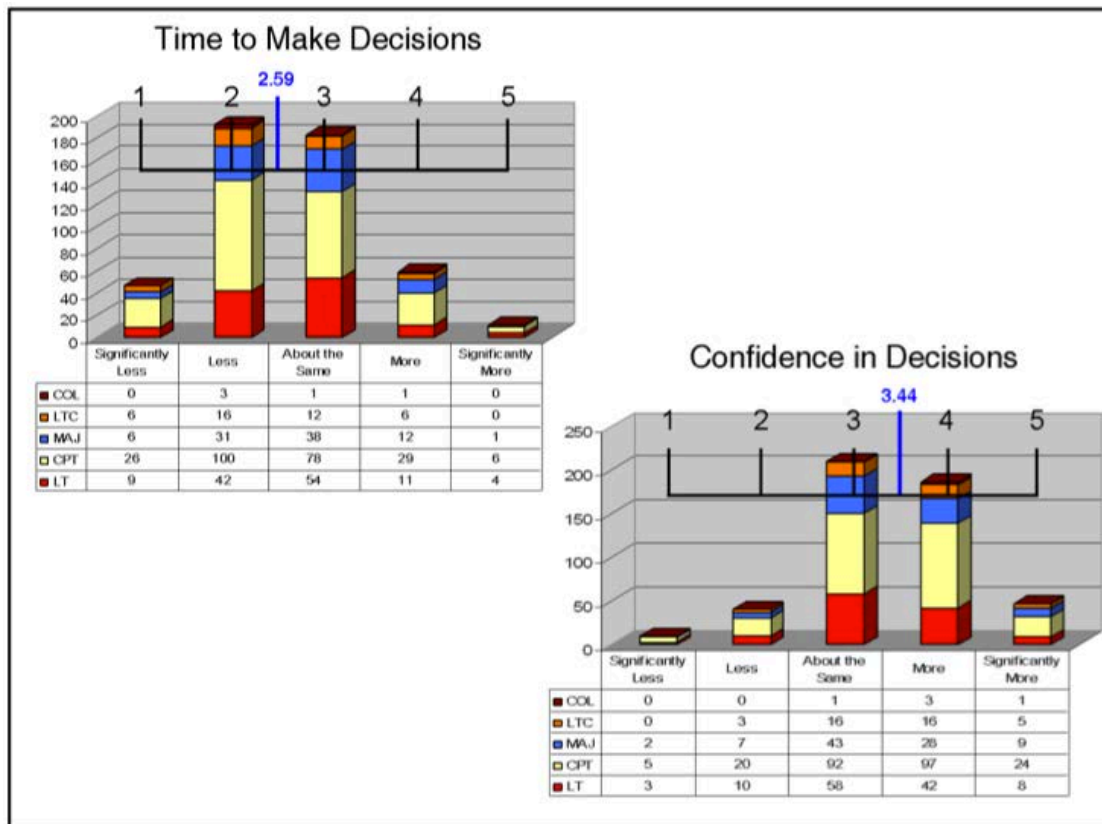


Figure 9. Speed and Confidence of Decisions

Source: Dave Cammons, John B. Tisserand, and Duane E. Williams, *Network Centric Warfare Case Study: U.S. V Corps and Third Infantry Division during Operation Iraqi Freedom Combat Operations*, Volume I (United States: Createspace, 2013), 31.

Following from the aforementioned figure, the respondents surveyed in V Corps, 3d Infantry Division, and 3d BCT render an interesting statistical pool. Taken *in toto*, commanders and staffs indicated that they made better and timelier decisions with greater technological assets, however, contrary to network-centric theory theorists such as Alberts, Garstka, et al., there is still an abundance of friction and fog of war affecting the operational environment.⁸⁵ Moreover, the hierarchal nature of the military organization

⁸⁵ Ibid.

seemed not to become flattened, thereby rendering information dissemination gaps from higher echelons to lower.⁸⁶

Finally, turning to the research questions, the analysis of the components model indicates that the human aspect of the information environment is obviously central to the problem set. In the case studies, there were no reported examples of disharmony within the internal dynamics of the personal-technological intercourse. However, the mere lack of a presence does not conclude that such difficulties occur. Rather, the author cautions that this is merely representative of the data set at hand. For the primary research question, the analysis demonstrates that commanders and staffs do indeed benefit from the overabundance of information. The issue herein lies with not what leaders do with the data, but what systems, procedures, and techniques the organization has evolved to appropriately filter the deluge. While not to the degree as some of the NCW theorists discussed previously, there is a distinct qualitative benefit that Web 2.0 systems contribute to mission command. While there is the natural corollary that as more information becomes available, the more individuals tend to select only data that supports their position, however, the case studies provide no indication of such data selection. Yet again, *de non apparentibus et de non existentibus eadem ratio*. For the secondary question, there is the potential that excessive content impedes decisions, particularly when there is limited or impaired dissemination and stove piping of information. Again, the theme that successful organizations exhibit is not only information management, but more importantly the awareness of what the best means of employing the system for the most beneficial purpose is. Lastly, the amount of information does affect the decision

⁸⁶ Ibid.

cycle, both positively and negatively. Again, the key consideration is what systems, procedures, and techniques the organization has evolved as a filter. Table 1 provides a graphical representation of the above discussion.

Table 1. Components Model Analysis, 1

Research Question	1: Do commanders and staffs benefit from the overabundance of available data and information as tools to improve the quality of decisions?	2: Does excessive user content impede decisions?	3: Does the abundance of information affect the decision cycle?
People	Yes	Potentially	Yes, both positively and negatively
Processes			
Organizations			
Tools			

Source: Created by author.

Components Model: Processes

Processes form the second element of the component model and are equally critical as the previous element in understanding information discourse within context of the research questions. This subsection explores the decision system and methods the case studies employed. Within this thesis, “process” denotes the mechanism for how information is synthesized and used more than merely describing the system by which information is conveyed along the cognitive hierarchy. How this work examines process is different than how ATP 6-01.1 renders the topic:

The five-step knowledge management process aligns people, processes, and tools in the organization and culture to create shared understanding. Knowledge management and its associated activities are integrated into operations and all

other staff and organizational processes. This integration enables the transfer of knowledge between and among individuals and organizations. Knowledge transfer occurs formally through established processes and procedures and informally through collaboration and dialogue.⁸⁷

For this work's intent, process is a deciding component as it is through the mechanism of whatever system an organization uses to process its information that frames how the decision process will progress and in turn influence the nature of the decision.

Tautologously, Army decision methodology is focused on providing as accurate and complete decisions as is possible given the environment. Conditioning its leaders for the uncertainty of war, Army institutions inculcate linear and non-linear problem solving methodologies. Following over fifteen years of major operations in Iraq and Afghanistan, the Army introspectively reexamined how it approached problem solving.⁸⁸ An initial attempt in the Army was to acknowledge that the dominant decision model, the Military Decision Making Process (MDMP), itself a vestigial incarnation of the *Generalstab* paradigm and recast after DePuy's reforms, was poorly suited for complicated, multi-faceted problems.⁸⁹ The School for Advanced Military Studies ushered in a new model for campaign planning, *The Art of Design*, in 2010 that attempted to capture the strategic variables and operational characteristics of ambiguous environments.⁹⁰ From *The Art of Design*'s logic came Army Design Methodology, canonized in Army Doctrinal

⁸⁷ Department of the Army, ATP 6-01.1, 1-4.

⁸⁸ COL C. R. Paparone, "US Army Decision-making, Past, Present, and Future," *Military Review* (July-August 2001): 45-53.

⁸⁹ Ibid.

⁹⁰ School of Advanced Military Studies, Student Text, *Art of Design*, v. 2.0 (Fort Leavenworth, KS: United States Army Command and General Staff College, 2010), 1-11.

Publication 5-0. Army Design Methodology is intended to form the framing and visualization aspects of the staff's initial understanding of the problem set. As defined in 5-0.1:

Army design methodology is a methodology for applying critical and creative thinking to understand, visualize, and describe unfamiliar problems and approaches to solving them (ADP 5-0). ADM includes interconnected thinking activities that aid in conceptual planning and decision-making. By first framing an operational environment and associated problems, ADM enables commanders and staffs to think about the situation in depth. From this understanding, commanders and staffs develop a more informed approach to solve or manage identified problems. During operations, ADM supports organizational learning through reframing—a maturing of understanding that leads to a new perspective on problems or their resolution.⁹¹

Intended to be the conceptualization phase in problem solving, Army Design Methodology is layered over MDMP in the planning process inferring that once the problem and its variables are sufficiently understood, application of known problem solving methods are suitable.

The Army decision framework acknowledges that leaders make choices in uncertain environments with imperfect data and conflicting situational factors; this is the friction Clausewitz describes and the lesson that falls on so many deaf ears.⁹² The ubiquitously present fog of war is asymptotically irreducible, for any Jominian attempt to eliminate the friction and uncertainty of war to a mathematical balancing of troops and equipment, logical inferences, or other mechanisms is doomed to fail.⁹³ In his 2007 work

⁹¹ Department of the Army, Army Training Publication (ATP) 5-0.1, *Army Design Methodology* (Washington, DC: US Government Printing Office, July 2015), 1-14.

⁹² Carl von Clausewitz, Bernard Brodie, and Rosalie West, *On War*, eds. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1989), 119-120.

⁹³ Vincent Desportes, *Décider Dans l'Incertitude*. 2e ed. (Paris: Economica, 2007), 15-23.

Décider Dans l'Incertitude advocating an awareness of the ambiguous nature of war and a mission command style theoretical approach, Desportes accurately argues “for the commander, the only solution is therefore to learn how to operate in an environment of chaos, uncertainty, increasing chance, uncertainty, disorder and friction.”⁹⁴ Returning to McMaster’s comment discussed earlier, there are no technological silver bullets, and technology will not lift the fog of war. The uncertainty and combat friction commanders face today is little different than what those of earlier armies faced; only the uniforms and peripheral environs are.

Yet, irrespective of war’s friction and uncertainty, decisions are still required, choices must be made. While Army doctrine and culture spills much ink on examining the effectiveness of various decision-making systems, less time is spent on how and why leaders come to conclusions and why it is important. This is where an understanding of decision theory is important; when applied to understanding IS suites and their limits and benefices of employment, it can be very illuminative.

Decision theory effectively distills into two frames of thought: analytical and heuristical.⁹⁵ Israeli psychologists Amos Tversky and Daniel Kahneman are recognized as the initial heuristic theorists. They expounded on Herbert A. Simon’s 1957 sociopsychological work, *Models and Man*, itself considered a discourse in bounded rationality, by constructing a paradigm of physiological interplay with perceptions of

⁹⁴ Ibid., 23. Translation by author.

⁹⁵ As an intellectual aside, indeed, there are a multitude of sub divisions to decision theory—normative, descriptive, temporal, etc.—but for perspicuity the author distills the vast subject into two workable areas, and as such for this work’s purpose only these two are explored.

causality, effect, and chance.⁹⁶ One critical component to emerge from the amalgamation of works is the concept of “satisficing,” whereby an individual seeks an amiable solution to a problem set that is sufficient for their immediate or proximal purposes, but acknowledges that it is incomplete and able to be improved upon.

This model is common in Army decision processes, particularly MDMP. Many commanders and staffs recognize that there is not one exclusive solution to a problem set, and the decision cycle becomes more of finding what is suitable for the mission and endstate *in toto* than examining the constituent parts of the problem. Apologists might argue that such an examination is the point of mission analysis, whereby the operational variables and mission factors are explored to better define the problem set and situational understanding. Such a position is cogent: the point of the above statement is that MDMP as a formulaic process does not render the only objective and quantifiable exclusive solution to a given scenario. It provides an output from the rote processes, inputs, and parameters, whereby the model can be adjusted, as in reallocating screening criteria weight, to favor a given outcome. As with many other processes, MDMP can be easily modified to produce a predetermined result. In this conception MDMP is both heuristic and analytical as it layers quantitative processes with intuitive reasoning.

Heuristic systems are grounded in the experience set on the individual and amplified in the presence of the group.⁹⁷ In part, groupthink stems from the synergy of

⁹⁶ Daniel Kahneman, Amos Tversky, and Paul Slovic, eds. *Judgment under Uncertainty: Heuristics and Biases* (Cambridge, UK: Cambridge University Press, 1982), 3-20.

⁹⁷ Paul 't Hart, Eric K. Stern, and Bengt Sundelius, *Beyond Groupthink: Political Group Dynamics and Foreign Policy-Making* (Ann Arbor: The University of Michigan Press, 1997), 5-16.

group size, arrangement, social and economic factors, length of time available, and, most importantly, the collective experiences and inherent biases that all members enter into the group with from their respective life experiences.⁹⁸ In most circumstances, intuitive heuristics are very beneficial to formulating judgments; at some point individuals learned from sensory inputs of pain that certain actions caused them and should be avoided. This type of heuristic is not what is under examination, rather, it is the system when it is overly applied and therein leads to systemic biases of thought.⁹⁹ While there are innumerable permutations of biases, some common staples of military thought include representativeness, misconceptions of chance, availability, and adjustment and anchoring.¹⁰⁰ Typical probability questions that plague military leaders can be “what is the likelihood of x occurring?” Many leaders would attempt a quantifiable measurement—because the organizational culture encourages numerical justification, possibly to its own detriment— by approaching the issue with some statistical modeling of available or presumed influencing data, perhaps a trend analysis or similar instrument. Some possible formal representations of the problem could be an elementary Bayesian model, as:

1. Sum rule: $P(M | N) + P(M' | N) = 1$

2. Product rule: $P(M N | S) = P(M | S) P(N | MS)$

⁹⁸ Ibid.

⁹⁹ Scott Plous, *The Psychology of Judgment and Decision Making* (New York: McGraw Hill Higher Education, 1993), 109-112.

¹⁰⁰ Kahneman, Tversky, and Slovic, 3-20.

Where $P(M | N)$ denotes the probability of occurrence of event M when event N has already taken place.¹⁰¹

Following Kahneman et al.'s 1973 experiment that asked participants to calculate the probability of an event occurring with two study groups, one with supported background data, and one without, whereby the results demonstrated overwhelmingly that the participants (who were educated and presumably understood some probability theory) defied the Bayesian predictability by observing much higher rate of inaccuracy when given supporting data versus blind inference.¹⁰² In spite of the analytical or heuristic methods individuals approach decision making, all must be aware of the inherent biases and errors in their thinking.

Insofar this subsection has established that process is greater than the sum of its parts. So, what is the impact of this component model to the case studies and ultimately the three research questions? Interestingly, none of the case studies address in detail the processes the respective organizations utilized to synthesize information. The information available discusses the technical capabilities, the command and control structure, the placement of the unit in the higher mission and operation, etc., but little as to the actual process systems they used to synthesize data and information. As such, what follows is the author's analysis of the case studies with the available information.

¹⁰¹ Probability Formula, "Bayesian Probability," accessed May 15, 2016, <http://www.probabilityformula.org/bayesian-probability.html>; James V. Stone, *Bayes' Rule: A Tutorial Introduction to Bayesian Analysis* (United Kingdom: James V. Stone, 2013), 141-144.

¹⁰² Kahneman, Tversky, and Slovic, 5.

An analysis of Gonzales et al. indicates that units with more robust Web 2.0 systems enabled better quality of information for the warfighter than units that were equipped mostly with analog or command and control networks. Figures 10 and 12 from the RAND study, illustrate the perception of information quality.¹⁰³

¹⁰³ Gonzales, Hollywood, and Sollinger, 52.

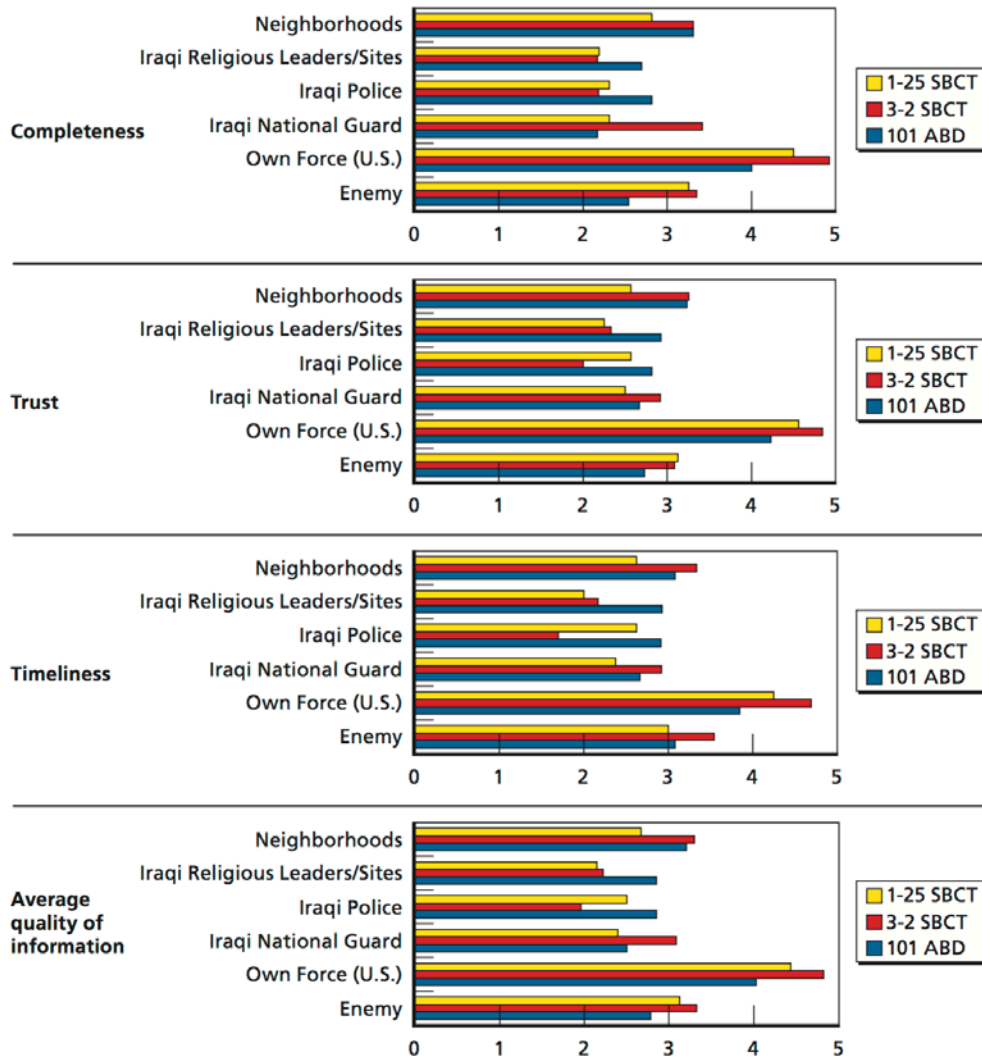


Figure 10. Quality of Information for Cordon-and-Search and Knock-and-Raid Missions

Source: Daniel Gonzales, John Hollywood, and Jerry M. Sollinger, *Networked Forces in Stability Operations: 101st Airborne Division, 3/2 and 1/25 Stryker Brigades in Northern Iraq* (Santa Monica, CA: Rand Corp., 2007), 52.

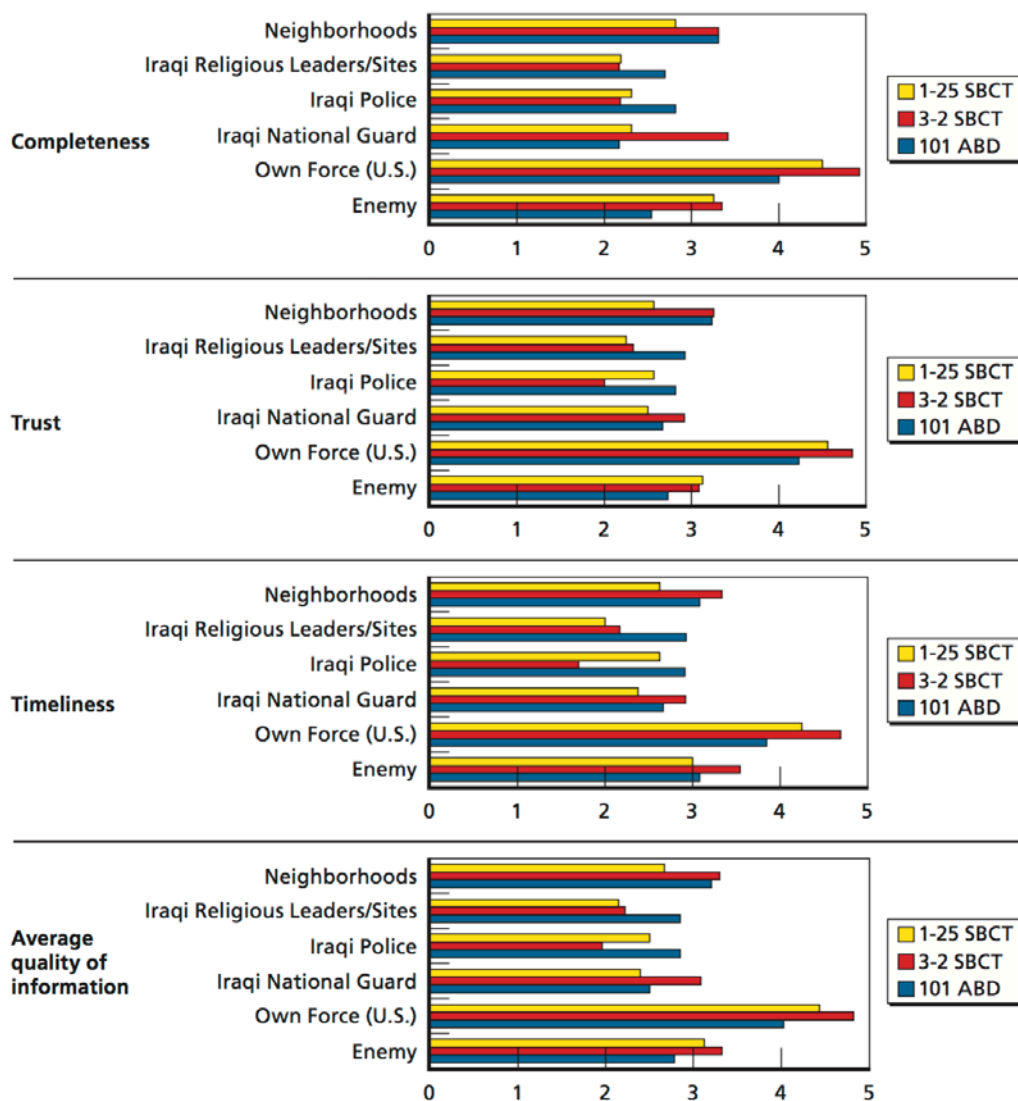


Figure 11. Quality of Information for Convoy Missions

Source: Daniel Gonzales, John Hollywood, and Jerry M. Sollinger, *Networked Forces in Stability Operations: 101st Airborne Division, 3/2 and 1/25 Stryker Brigades in Northern Iraq* (Santa Monica, CA: Rand Corp., 2007), 53.

As such, the graphics suggest that the units surveyed had a higher quality of information available for their own forces as opposed to other information types. The SBCTs demonstrated some of the greatest improvements in quality of information for

their forces presumably from the combination of people, processes, organization and utilized tools.¹⁰⁴ Interestingly, 101st Airborne Division indicated a higher quality of information for knowledge of Iraqi leaders and security forces which is congruent given the survey reports the unit having greater local national engagements and interaction with their Iraqi counterparts on a regular basis.¹⁰⁵ Conversely, the results also suggest that the SBCTs' Web 2.0 suites and processes did not provide the same level of capability for sharing information about the local population as for own forces information.¹⁰⁶ Finally, figure 12 suggests that user generated content suites enabled an improvement in information dissemination across echelons when contrasted with analog suites.

¹⁰⁴ Ibid., 54.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

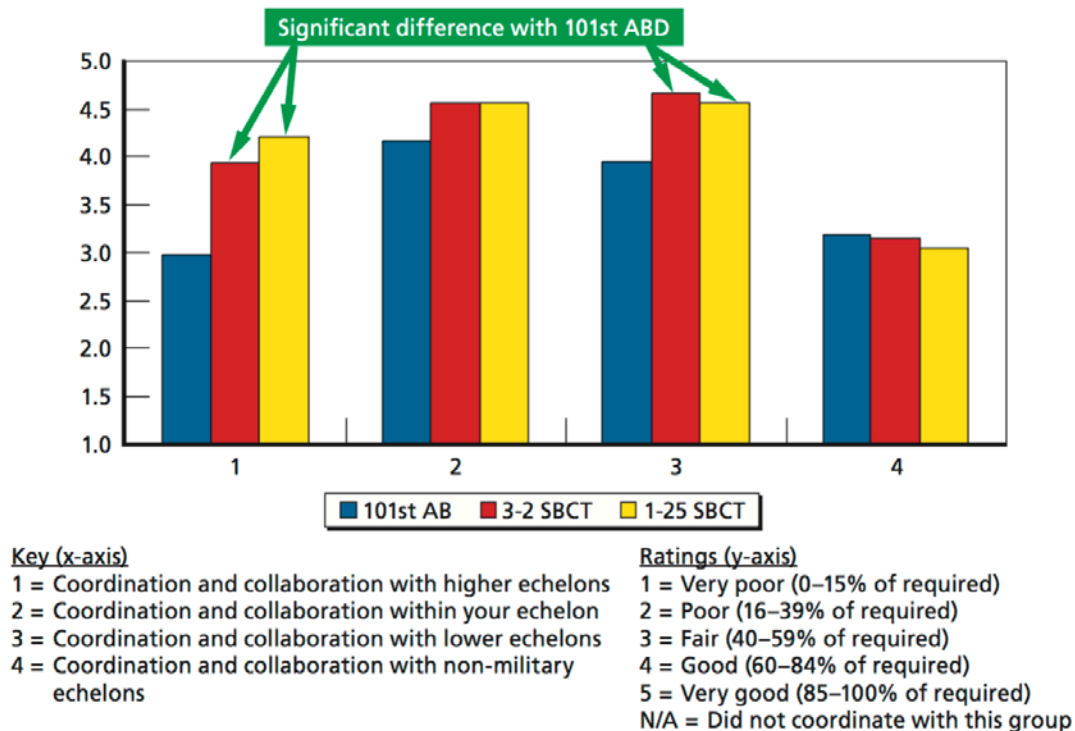


Figure 12. Quality of Information Collaboration

Source: Daniel Gonzales, John Hollywood, and Jerry M. Sollinger, *Networked Forces in Stability Operations: 101st Airborne Division, 3/2 and 1/25 Stryker Brigades in Northern Iraq* (Santa Monica, CA: Rand Corp., 2007), 57.

Many of the same indications are apparent with Task Force Stryker. While Tunnell does not describe the internal processes the respective units employed, inferentially the same dynamic and synergy is at play.¹⁰⁷ Finally, turning to Cammons et al., the following is the case study's direct analysis as to the benefice of increased technological assets:

How does networking affect the deployment process? While a COP of most in-theater maneuver theater forces was available during OIF, responding to changes in the deployment process was impaired by the lack of a common visibility of deploying forces. Joint Forces Command (JFCOM)—the force provider—noted

¹⁰⁷ Tunnell, 1-17.

that the joint deployment planning and execution process was not sufficiently flexible, transparent, user-friendly, or disciplined to accommodate the conditions experienced in OIF. The ability to manage changes and alterations in the flow of forces proved difficult. Simply put, what was achieved [was done so] by brute force and inefficient workarounds. A system that provides deploying force COP would significantly help alleviate problems. As the joint force becomes more networked, the impacts will even be greater than those experienced during the initial phase of OIF. The development of collaborative planning and visualization tools applicable to the deployment process, as recommended by JFCOM, would have significant impact on the strategic deployment process. A deployment COP or “D-COP” would allow for timely warning of changes in the deployment flow at the national strategic level, enable the theater strategic onward movement and integration of deploying forces, and more accurately estimate closure times of the deploying forces. The D-COP would also provide flexibility to the supporting commands, such as U.S. Transportation Command (USTRANSCOM), in reallocating scarce transportation resources or in shifting the flow of forces as requirements in theater change.¹⁰⁸

In total, V Corps recognized that the model of NCW it embraced was both a benefice and hindrance. The availability of information, plethora of data, myriad sub-networks, and conflicting real time COP visibility in some places contrasted with delayed awareness while in others it created a spectrum of efficiency.

In summary, processes are critical contributors to the successful integration of any technological suite, let alone Web 2.0 systems. More than simply the method by which an organization ingests and synthesizes information, processes predicate an understanding of more only the system itself, but the people and their decision paradigm that they leverage to achieve the desired state. Applying the research questions to this component model, the analysis shows that as with people, many of the same indicators are seen. For the primary research question, the analysis demonstrates that commanders and staffs do indeed benefit from the overabundance of information. For the secondary question, there is the potential that excessive content impedes decisions, particularly when there is

¹⁰⁸ Cammons, Tisserand, and Williams, 17.

limited or impaired dissemination and stove piping of information. Again, the theme that successful organizations exhibit is not only prudence of information management, but more importantly the awareness of what the best means of employing the system for the most beneficial purpose is. Lastly, the amount of information does affect the decision cycle, both positively and negatively. Again, the key consideration is what systems, procedures, and techniques the organization has evolved as a filter mechanism.

Table 2. Components Model Analysis, 2

Research Question	1: Do commanders and staffs benefit from the overabundance of available data and information as tools to improve the quality of decisions?	2: Does excessive user content impede decisions?	3: Does the abundance of information affect the decision cycle?
People	Yes	Potentially	Yes, both positively and negatively
Processes	Yes	Potentially	Yes, both positively and negatively
Organizations			
Tools			

Source: Created by author.

Components Model: Organization

Organizations are the manifestation of people and their processes combined with the synergy of its members and their respective cultures. Taken in the totality, the organization becomes in effect a separate entity, greater than the sum of its constituents and processes. Understanding the organization is key to recognizing pitfalls of thinking,

IS design, and it being a hindrance as well as a catalyst to change. ATP 6-01.1 officially says the following about the nature of Army organizations:

An organization is a matrix where people, processes, and tools function to integrate individual and organizational knowledge and learning strategies. Individual knowledge includes acquired ideas, beliefs, values, and knowledge. Knowledge management capabilities contribute to a learning organization. Organizations such as staff, squads, and larger groups bring these attitudes, feelings, values, and behaviors together. This creates a process facilitated by tools that characterize that group. These factors are its organizational culture. Knowledge management practitioners know this dynamic and advise and help organizations regarding knowledge solutions. . . . The culture of an organization provides the perspective by which information, goals, and motivations are viewed. This allows rapport, knowledge sharing, and accurate interpretation to understand and acquire a broad view of a situation. The commander and primary staff understand the organization culture to affect organizational change.¹⁰⁹

The salient point of discussion regarding organization is the effect that Web 2.0 systems has on it. Previous organizational structures were traditionally hierarchical, with decision makers exerting their will down through the various levels of the organization with disparate gradients of effectiveness, intelligibility, and cultural meaning. Interestingly, the nature of an organizational construct is equally as telling of the members as they are themselves. Societies form patterns of organizational models suited for their needs and predilections. For example, Lieutenant Colonel R.L. Rife's treatise on Defense Department culture versus that of the State department is telling of organizational challenges of like-minded individuals of different governmental backgrounds.¹¹⁰ The challenges members of the respective departments face within in the interagency

¹⁰⁹ Department of the Army, ATP 6-01.1, 1-14-1-15.

¹¹⁰ Rickey Rife, "Defense Is from Mars, State Is from Venus: Improving Communications and Promoting National Security" (Research Project, Hoover Institution, Stanford University, June 1998): 1-7, accessed May 16, 2016, <http://www.dtic.mil/get-tr-doc/pdf?AD=ada351032>.

environment illustrate how much the organizational culture shapes the surrounding environment.¹¹¹ Furthermore, Cooley's 2005 organizational structure analysis *Logics of Hierarchy* discusses the implications of U-form organizations, which are the most centralized and integrated in form and function and has its roots in the industrial revolution (i.e. the prototypical assembly factory) contrasted with M-form firms, which are multidivisional and quasi-autonomous in form and function.¹¹² Yet, both U and M form hierarchies still are centrally organized. Returning to Ori Bronfman's *The Starfish and the Spider* paradigm, there is a correspondence in the rise of decentralized organizational hierarchy with the influx of user generated media.¹¹³ Not to assert that one predicates the other, but rather that one observes a cultural shift in the operating paradigm.

Returning to the points above, organizations are comprised of their members and, in spite of the larger culture being more than the sum of the individuals' beliefs; therein the organizational culture is in a constant state of evolution. One of the hindrances of hierarchical organizations is the filtering of information and data. For how the networked Army envisions operations, information and its accessibility must be readily available. Aligning the people to the mantra is easy, recasting the organization is more challenging, but restructuring the organization is a long term endeavor that is apt to change with the turn over of the leadership unless there is sufficient impetuous for the change. Major

¹¹¹ Ibid.

¹¹² Alexander Cooley, *Logics of Hierarchy: The Organization of Empires, States, and Military Occupations* (United States: Cornell University Press, 2005), 20-23.

¹¹³ Braufman and Beckstrom, 37-46.

General Abram’s commentary in “Flatten the Network” is telling of this exact point: the organizational culture needs to evolve into a more decentralized structure where there are no data owners (but there are data guardians) and members who need the necessary data can access it.¹¹⁴

Turning to the case studies, there is little to comment directly from them regarding the nature of Web 2.0 employment that has not already been explored. The studies do not address the implementation of Web 2.0 suites from an organizational perspective. As such, the inferences for the research questions are again that it is a recognition of how the systems are employed, the surrounding environment, and what such systems are intended for that drives their perceived usefulness. Table 3 below illustrates:

Table 3. Components Model Analysis, 3

Research Question	1: Do commanders and staffs benefit from the overabundance of available data and information as tools to improve the quality of decisions?	2: Does excessive user content impede decisions?	3: Does the abundance of information affect the decision cycle?
People	Yes	Potentially	Yes, both positively and negatively
Processes	Yes	Potentially	Yes, both positively and negatively
Organizations	Potentially	Potentially	Yes, both positively and negatively
Tools			

Source: Created by author.

¹¹⁴ Robert Abrams, “Flatten the Network” (17th International Command and Control Research and Technology Symposium, HQs, 3rd Infantry Division (Mechanized), 2012), accessed January 10, 2016, <https://www.dtic.mil/DTICOnline/downloadPdf.search?collectionId=tr&docId=ADA570518>.

Components Model: Tools

Tools are just as the term implies. Given the vast array of systems present in the case studies, ranging from Force XXI Battle Command Brigade and Below, enhanced position location reporting system, military internet relay chat, Wikis, to SharePoints, Milsuites, Stryker ASCOPE, StrykerNet, any permutation of file repositories, Mission Command Information Systems suites, BFT, MCS, and Distributed Common Ground System-Army, among others, the list is extensive. Further, its extensiveness inhibits a systematic analysis due to its breadth, lack of detailed information in the case studies, and scope of this work. ATP 6-01.1 formally renders an expansive description of tools:

Digital knowledge management tools take many forms. Some examples of digital knowledge management tools are:

Mission command information systems (MCIS). MCIS and their software, storage, inputs, processing, outputs, formats, content, software, and capabilities provide tools knowledge managers employ to manage knowledge. Knowledge management helps guide the use of MCIS to fuse information to support a more effective and relevant common operational picture.

Collaboration tools: These tools are information systems including online capabilities that make team development and collaboration possible. Examples include chat, white-boarding, professional forums, communities of interest, communities of purpose and practice, and virtual teaming.

Data-analysis tools: These tools support data synthesis that identifies patterns and establishes relationships among data elements - knowledge management's data-analysis tools support data synthesis that identifies patterns and establishes relationships among data elements. Data analysis tools can be used to perform data mining (sometimes called data or knowledge discovery) to discover previously unknown, valid patterns and relationships in large data sets. Data mining analyzes data from different perspectives and summarizes it into useful information. It finds correlations or patterns among multiple fields in other large relational databases. Data mining consists of more than collecting and managing data; it also includes analysis and prediction. Data analysis tools can include:

- Statistical models.
- Mathematical algorithms.

- Machine learning methods (algorithms that improve their performance automatically through experience, such as neural networks or decision trees).
- Search-and-discover tools: These tools include search engines that look for topics, recommend similar topics or authors, and show relationships to other topics (metadata).
- Expertise-development tools: These tools use simulations and experiential learning to support developing experience, expertise, and judgment. These tools use simulations and experiential learning to support developing experience, expertise, and judgment. Examples of expertise development tools include computer generated constructive simulations such as One Semi-Automated Force and the Call-For-Fire Trainer; military gaming, such as Virtual Battle Space, and other three-dimensional experiential knowledge-based unit tactical scenarios. Expertise development tools enable units to:
 - Design and develop playable scenarios based on what was experienced and learned.
 - Disseminate playable scenarios to friendly forces throughout operational area to rapidly and effectively transfer the knowledge of the engaged unit.
 - Expertise-location tools support finding subject matter experts. Expertise location tools are often directories or databases of people listing their areas of expertise. Expertise location refers to a group of techniques and tools that help knowledge seekers find those with relevant knowledge. It emphasizes the importance of putting people in contact with one another.¹¹⁵
- Interview or debrief small tactical units that have experienced tactical events worth replicating in sufficient detail to provide a military gaming scenario.

The key insight into how the case studies successfully employed (or not) Web 2.0 systems resides in a harmonization of the other component models in conjunction with the balance of finding the correct IS suite for the right purpose. Seemingly this is counter intuitive. Like any tool, surely an organization could find a way for a given system to be useful. This is not so. Like the Clausewitzian trinity, the author observed a similar triad

¹¹⁵ Department of the Army, ATP 6-01, 1-4

with IS suites and the trend in the case studies that indicated successful employment. Returning to John K. Hawley’s “Human Systems Integration (HSI) and the Network Integration Evaluations (NIEs), Part 2: A Deeper Dive into Mission Command Complexity and Cognitive Load” graphic below, the interplay of the user, the system, and the suitability of it is paramount.¹¹⁶

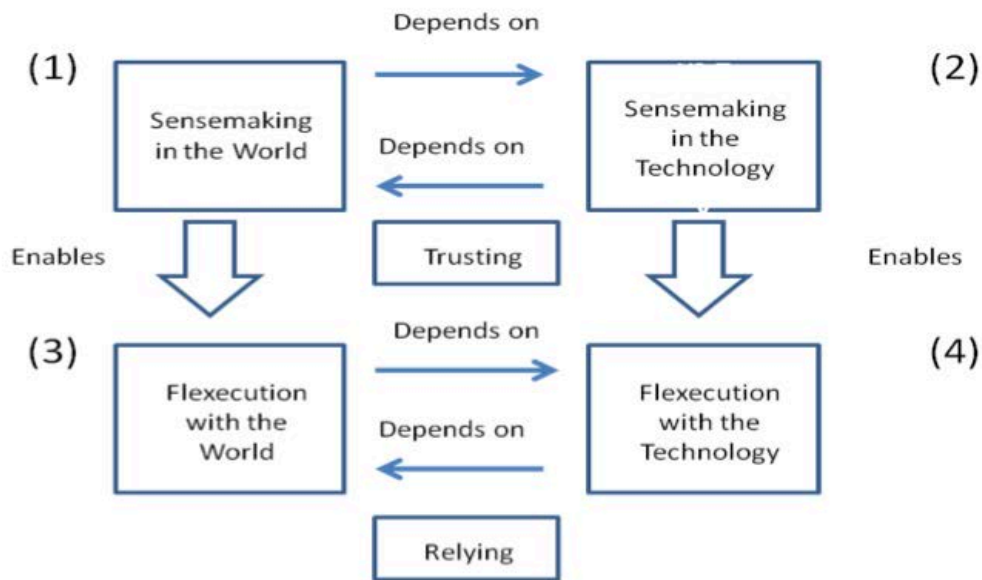


Figure 13. Systems Integration

Source: John K. Hawley, *Human Systems Integration (HSI) and the Network Integration Evaluations (NIEs), Part 2: A Deeper Dive into Mission Command Complexity and Cognitive Load* (Aberdeen Proving Ground, MD: US Army Research Laboratory, 2015), 8, accessed January 16, 2016, <https://www.dtic.mil/DTICOnline/downloadPdf.search?collectionId=tr&docId=ADA621983>.

As such, the author recast the concept observed in the case studies to produce the illustration below.

¹¹⁶ Hawley, 8.

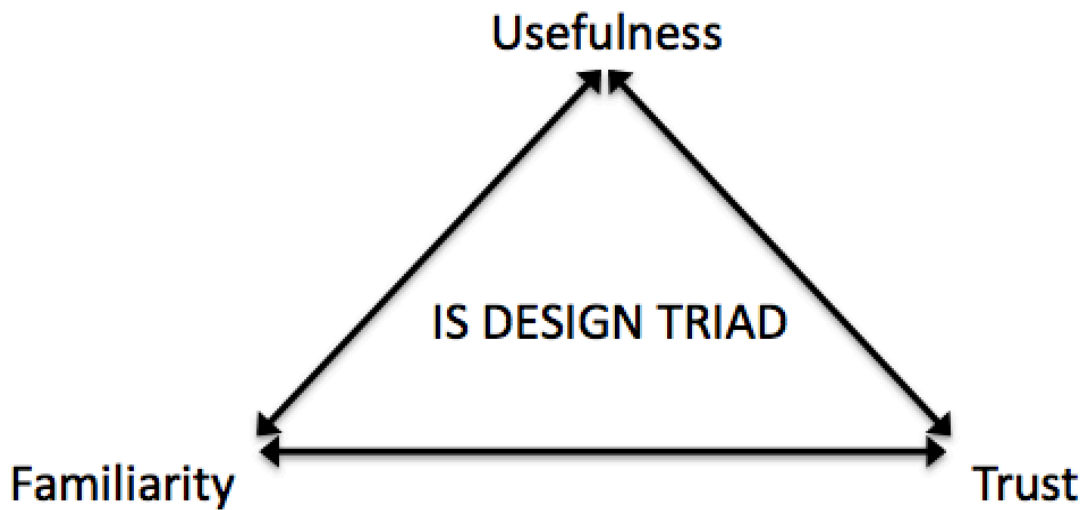


Figure 14. IS Design Triad

Source: Created by author.

So, in organizations (i.e. Task Force Stryker, 3/2 and 1/25 SBCTs) that reported high usefulness and credulity in their Web 2.0 systems, one can assert that there was a harmonization of the suites' utility and applicability to the mission set, the users' training and ease with the systems (familiarity) and the organization's faith in the accuracy of the information (trust). Such credulity is in reality meta-discursive, for the trust in the user-generated content is actually trust in the people correctly leveraging the system for its uses. Perhaps an argument is for the user's trust in the system operating capacity, i.e., some systems are infamously prone to software failure, so likely this aspect does contribute. Finally, the illustration depicts the research questions' application.

Table 4. Components Model Analysis, 4

Research Question	1: Do commanders and staffs benefit from the overabundance of available data and information as tools to improve the quality of decisions?	2: Does excessive user content impede decisions?	3: Does the abundance of information affect the decision cycle?
People	Yes	Potentially	Yes, both positively and negatively
Processes	Yes	Potentially	Yes, both positively and negatively
Organizations	Potentially	Potentially	Yes, both positively and negatively
Tools	Potentially	Potentially	Yes, both positively and negatively

Source: Created by Author.

Implications

In all, there are five key points leading to the main point of this work, which is information meta-cognition: awareness management, IS expectation management, recognition of users as part of the IS system, recognition that technology is a means, not an end, and McMaster’s comment of “no technological silver bullets”. Awareness and IS expectation management are necessary for the commander and staff to understand the limitations of the system, its best means of employment, what it is designed for vice what they expect it to do, and comprehending what the inputs are (internet protocol, full motion video, RF signals, etc.) and what the system is designed to produce as an output. Knowing these aspects can mitigate poor IS design from the initial stages, particularly in joint, interagency, or special operations environments where the array of potential incompatible systems is daunting and lack of system interoperability can pose both risk to force and risk to mission.

Secondly, there is a cultural undercurrent that organizations are reluctant to train their members on their assigned IS suites. In the author's experience, this is a parochialism caused by the senior leaders not knowing (or not wanting to know) the necessity for trained operators. Part of the cultural change that the author advocates is to treat IS systems as crew-served weapon systems: train early, train extensively, train realistically, and enforce the personnel allotment not be the only ones left unassigned on the unit manning roster.

Thirdly, McMaster's Promethean slogan that there are "no technological silver bullets" is the needed *aux armes* summons. As discussed previously, the American way of war favors technological dependence. There is historical merit in this method; however, the past fifteen years have shown that technology alone does little for securing strategic victory let alone enabling legitimacy in foreign governments. It is a tool, not an end.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

To learn is no easy matter; to apply what one has learned is even harder.
— Mao Tse-Tung, *Selected Military Writings*

Overview

As stated in the first chapter, this thesis advocates cultural change through the guise of self-awareness and information meta-cognition. Given the nature of the topic, there are areas of research that can quantitatively contribute to the intellectual capital. However, this topic, despite its intangible research questions and pontificating, yielded itself to a qualitative analysis with the intent to promote critical thinking and awareness for current and future leaders who will leverage systems of systems utilized in large organizations. As stated previously, this work is not a complete analysis of all factors that influence the topic; it serves to educate the reader on some of the more salient points for further questioning, thought, and reflection. Military education institutions give much attention to auspices of leadership, organizational behavior, and culture—all with due necessity—yet there is an apparent lack of discourse in the cultural mantra for meta-cognition in the realm of information technology and its employment. The cultural assumption that all things technical fall to the few cyber-electromagnetic specialists is a dangerous one; this work attempted to illustrate the complex and pervasive nature of technology and dispel parochial attitudes. The modern Army is surrounded with technology; its members proclaim prowess in utilizing its software, enable operational endeavors through it, and select members troll in the recesses of the deep web, however

frequently the nature of how, why, and what makes it work—be it the cyber domain, information technology, knowledge management, or the systems and users themselves—becomes overlooked and marginalized. The author’s hope is that the reader gains some greater understanding of the complexity of incorporating the system of systems that is the domain of technology and realizes that the problem set facing communicators is far from simplistic. Likewise, the problem set facing commanders is more complex than some understand, and simplistic answers to complex (vice complicated) problems will seldom address the underlying issue. Clearly, this thesis neither provided the unknowable answer, nor did it ever intend to, but rather it sought to demonstrate to the reader the need for critical examination of the information environment as an extension of the command climate.

Finally, recasting Dietrich Dörner’s message from his 1989 work, *The Logic of Failure*, the perils of poor information systems design is much like those of other design failures that organization, people, and institutions inflict upon themselves, often unwittingly.¹¹⁷ The organization can see that failure develops gradually from its own systemic thought and organizational culture.¹¹⁸ A culture of zero defect and failure intolerance can exacerbate thought processes that lead to failure.¹¹⁹ Furthermore, infrequently organizations attempt to design a flawed system or failing methodology.¹²⁰

¹¹⁷ Dietrich Dörner and Robert Kimber, *The Logic of Failure: Why Things Go Wrong and What We Can Do to Make Them Right* (Reading, MA: Addison-Wesley Pub., 1997), 5-30.

¹¹⁸ Ibid.

¹¹⁹ Ibid.

¹²⁰ Ibid.

Often it is due to incremental oversight, lack of understanding, cultural permissiveness or rigidity to flawed systems of thought, and small mistakes cumulate into larger organizational habits that beget further problems.¹²¹ Organizations, people, and institutions become trapped in the cycle of failure when they look towards certitude in lieu of hypotheses, are quick to ascribe blame and not question themselves, stop asking why, overlook mutual interrelations and influences, and, most importantly, their systems of thinking become outstripped by the environmental requirements. Dörner's statement that in the panoply of humanity's history, "it is far from clear whether good intentions plus stupidity or evil intentions plus intelligence have wrought more harm in the world" is promethean in its resonance and implications.

Conclusions

The three research questions explored in chapter 4 illustrate that Web 2.0 systems are best understood in terms of their utilization, modulated as the right tool for the unit, mission, venues of employment, etc., rather than attempting to assign linear values of benefice or hindrance. Indeed, chapter 4 argued that Web 2.0 systems were both beneficial and impeding, enabling and slowing the decision cycle, and could either be seen as a contributor to excessive buffer overflow or the critical piece of information at the right time. The best implementation of it rests in the harmonization of people, process, tools, and organization with the mission set and realistic expectation management. The true value of it is in what it suggests of the environment and the users it reflects. Returning to the concepts of Army Design Methodology, environmental and

¹²¹ Ibid.

situational factors should be understood as effect upon the situation as well as recipients of other influences and actions. The information operating environment is no different; like the operational variables of political, military, economic, social, information, infrastructure, physical environment, and time, the information operating environment impacts operations and how leaders adjust (or do not adjust) their organizations to maneuver in it will have resonating impacts. In the final conclusion, the message of this thesis can be distilled to one phrase: think and design one's information systems for the right purpose by asking the right questions for the right use.

Research Gaps

This work intentionally was perspicuous in scope. As such, the gaps in discussion and possibilities for additional research are extensive. At *prima facie*, joint and interagency information operations is a fecunditive one; just as within the Army alone there are enclaves of technological affinity, so too exists the parallel in the joint arena, let alone the even broader interagency environs. Moreover, further research is needed in the integration of nongovernmental and interagency organizations in a similar information operating environment paradigm. With the development of the Regionally Aligned Force structure, the manner in which telecommunications will be employed for mission specific scenarios as well as the mechanisms needed for building partner capacity and international interoperability are salient points for examination.

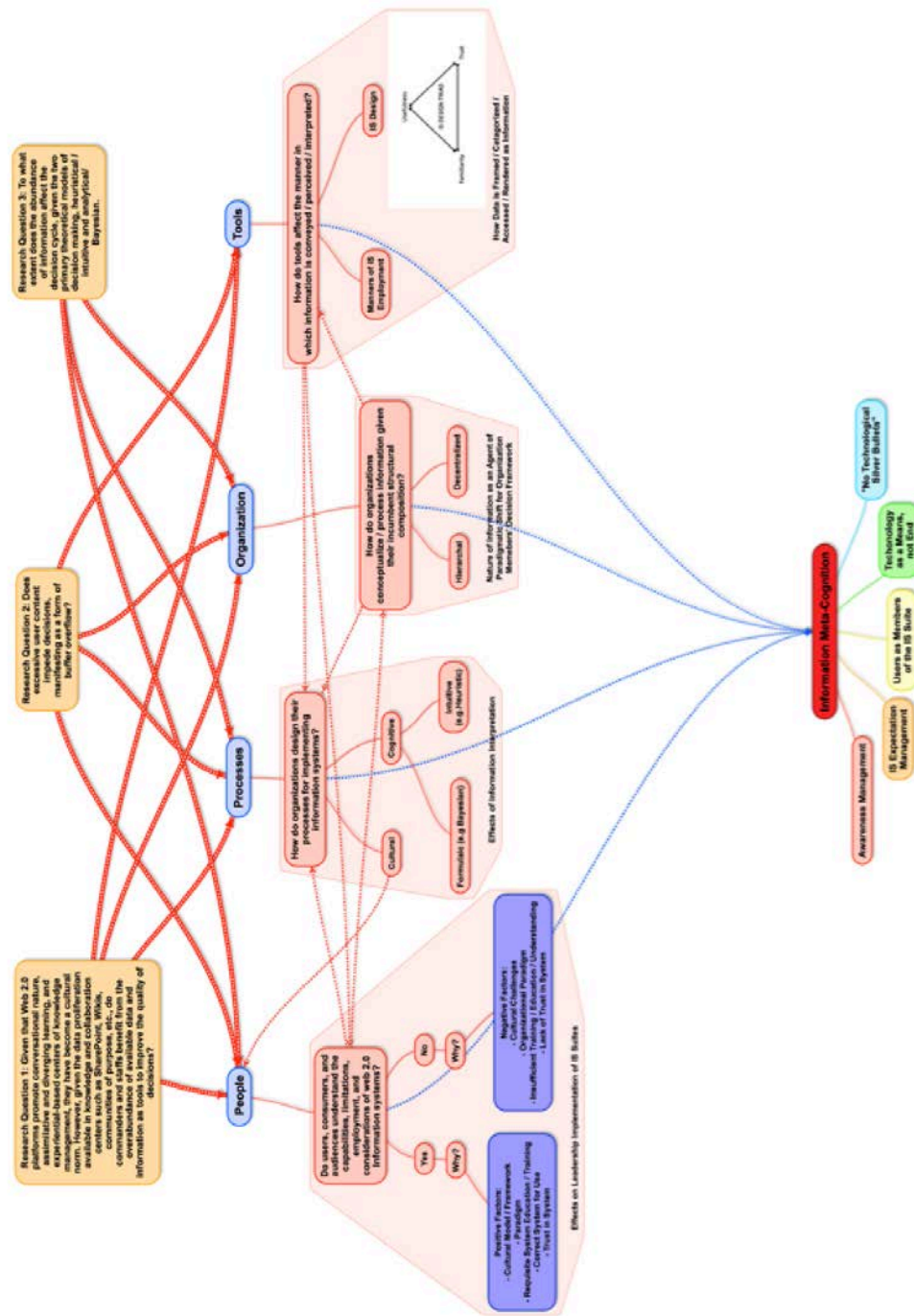
Recommendations

As the Army moves toward embracing the cyber domain in more of its operations, much of the organizational culture will reshape as it always has. Combined with the

yearly influx of millennials as digital natives, the culture will likewise grow to encompass the change. To what end it will develop into is the ephemeral question. In the interim, midgrade and senior leaders still must contend with a growing cultural gap in not only the environment but also the Soldiers they lead. Like the discordant couple discussed in the opening chapter, the search for understanding, the pitfalls of poor thinking, unexamined paradigms, and juxtaposition of cultural permissiveness and rigidly are seen recast throughout the human domain and are not exclusive to the information operating environment, the military, or cultural paradigm. Understanding the complicated and complex nature of the information environment, like everything else that humanity seeks to discern meaning from and ascribe value to, is a start, but certainty not the end, to finding the signal in the noise.

APPENDIX A

THESIS LOGICAL MIND MAP



Source: Created by author.

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