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Application of the Strategic Alignment Model and Information Technology Governance Concepts to Support Network Centric Warfare

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THESIS

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AFIT/GIR/ENG/06-01

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Jennifer R. Valentine

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Abstract

This thesis analyzes the fields of E-Business and Network Centric Warfare (NCW) in order to identify gaps and overlaps within the two bodies of knowledge. Successful implementation of E-business is more than simply applying a technology to an existing business model. It is about evolving business processes and structures in order for the organization to accommodate for this new dynamic environment. This thesis proposes that while the two areas' success fundamentally resides in the implementation and exploitation of technology, it is only through sound IT Governance policies and strategic alignment practices that success can be measured. Technology has the ability to bring increased capabilities to the warfigther. This work suggests the Air Force must analyze the implications of technology to its current structure, policies and processes prior to implementation on the enterprise. This thesis presents how the Strategic Alignment Model, as developed by Henderson and Venkatraman, can be applied to Air Force operations in order to better align its IT and mission objectives. Finally, this thesis proposes a model of the components necessary to execute an E-Business model within an organization and suggests the same components are necessary to execute NCW initiatives.

APPLICATION OF THE STRATEGIC ALIGNMENT MODEL AND INFORMATION TECHNOLOGY GOVERNANCE CONCEPTS TO SUPPORT NETWORK CENTRIC WARFARE

I. Introduction

1.1 Background

In the commercial sector, information technology (IT) is transcending its traditional back office role of supporting the overall business and is assuming a more strategic role in business planning. In the past, IT was viewed as a utility that supported, but was not critical to, the business operations. IT was often viewed as a sink of company revenues and/or possible detractor from the business.

Forward thinking businesses have realized IT actually enables new opportunities and business strategies, and they are working hard to better align their IT strategies and processes with those of the business side. The Department of Defense (DoD), specifically the Air Force, is realizing this phenomenon and how it affects the way the United States Military fights wars. As the Air Force moves towards a net-centric warfare framework of operations--and in order to truly embrace the business strategies facilitated by the Information Age--it is necessary to align our IT strategies with mission objectives in order to maximize the effectiveness of those technologies.

Similarly to business, the military has also been undergoing transformations in this area. The major premise behind *network centric warfare* (NCW) (and network enabled operations) is that the IT infrastructure does not merely support military operations, but is absolutely critical to conducting military operations. Alignment of

military IT missions and processes with operational capabilities (the business side) will be critical to the successful implementation of NCW.

To facilitate the alignment of IT and business, several models or frameworks strategic alignment model, IT Governance, IT service management, IT Infrastructure Library (ITIL), etc.) have been developed to facilitate this new way of thinking. These frameworks can be and have been applied to both the private and government sector of business. Each require senior-level IT leaders to make decisions based on mission and business objectives rather than technological capabilities.

1.2 Motivation for Research

The motivation for this research came from a 2001 report to Congress in which then Assistant Secretary of Defense for Command, Control, Communications and Intelligence, Mr. Arthur Money, stated that the terms "network centric operations" and "network centric warfare" are used to describe various types of military operations in the same way the terms "E-Business" and "e-commerce" are used to describe a broad class of business activities that are enabled by the internet [32]." The purpose of this research was to (1) provide an overview of the concepts of E-Business and with NCW and (2) to compare NCW and transformation efforts to determine if the Air Force has embraced the same aspects of transforming business operations into the Information Age as private organizations have been doing in terms of adopting E-Business strategies.

1.3 Problem Statement

Electronic Business and the shift to the Information Age is more than just an issue of implementing technologies within an organization. This research seeks to investigate

the United States Air Force efforts to transform the force into the Information Age, focusing on literature published on NCW and comparing that to E-Business literature to identify the key issues addressed in the literature in order to determine whether the DoD is truly embracing E-Business concepts in its adaptation of NCW. This research seeks to generate a new theory, not test an existing one. The model used in this study is indicated in Figure 1. This model hypothesizes the necessary components of implementing E-Business strategies and mirrors those components to the concept of NCW in order to illustrate the required components the military needs to truly exploit NCW capabilities and evolve each service into the Information Age. This model will be validated through exploratory research and the two bodies of knowledge will be compared.

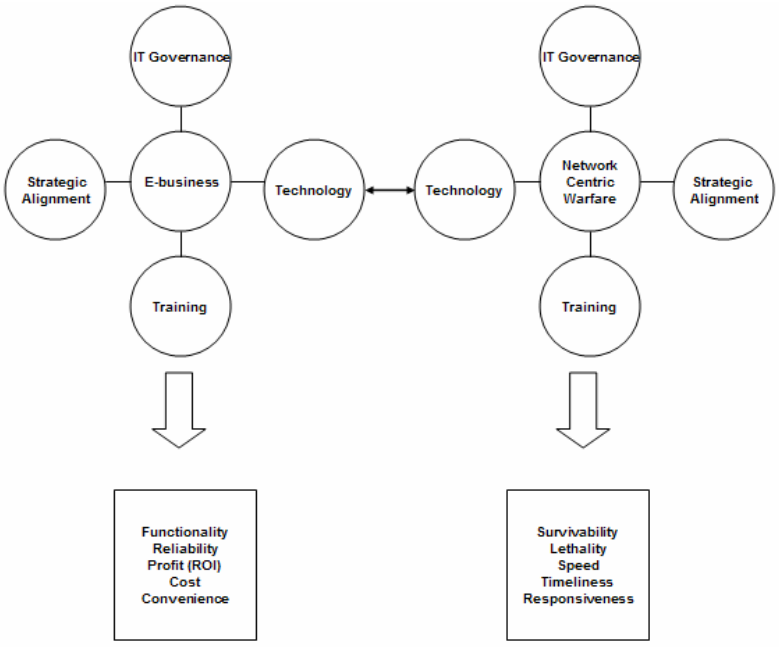

Figure 1: Proposed Model

Research Questions

1. What are the similarities and differences between E-Business and Network Centric Warfare?
2. Does the literature identify gaps and overlaps between the two bodies of knowledge; further, does the literature indicate whether the military has effectively embraced the required components to become a technology-based culture?

Investigative Questions

1. Can visualization software be used to determine a relationship between the two bodies of knowledge?
2. Based on the proposed model, how does the literature on E-Business address the concept of IT Governance? How does that compare with the literature on NCW?
3. Based on the proposed model, how does the literature on E-Business address the concept of strategic alignment? How does that compare with the literature on NCW?
4. Based on the proposed model, how does the literature on E-Business address the concept of training? How does that compare with the literature on NCW?
5. Based on the proposed model, how does the literature on E-Business address the concept of technology? How does that compare with the literature on NCW?

1.4 Scope/Methodology

The scope of this research effort explored bodies of knowledge pertaining to NCW and E-Business. These areas are important as the United States military continues to evolve into a Global Information Grid (GIG) IT infrastructure and as technology becomes increasingly essential to executing military operations. The target audience of this research was mid-level Captains, at all different AFSCs, since the cultural changes needed in this endeavor will take years to occur. Furthermore, the adoption of a Network Centric culture requires paradigm changes throughout the DoD enterprise; therefore the research was not focused specifically on the Communications and Information career fields.

This research was conducted in three phases. The first phase consisted of exploratory research, gathering information relating to the primary research areas of: IT Governance, NCW, IT management, strategic alignment and E-Business. The second phase consisted of an exploratory analysis using a visualization software tool in order to analyze the areas of E-Business and NCW. The third phase consisted of a content analysis of the literature pertaining to NCW and E-Business. Here, the proposed model was tested to see how the two areas compare and contrast. The research attempted to correlate the main concepts within the literature in order to identify gaps and overlaps within the research relating to these concepts.

1.5 Assumptions

This research was not intended to answer specific questions on how the military can completely implement E-Business strategies on the military IT enterprise. Rather, the

goal of the research was to identify the need for military leaders to focus more on the need to evolve doctrine and strategic alignment practices and not focus solely on implementing new technologies as a way to evolve the military into the Information Age.

Since there has already been extensive research conducted on the specific technologies that facilitate NCW in today's military, specific technologies were not addressed in this research. This research focused more on what was required to truly embrace E-Business strategies.

1.6 Limitations

As with any research; this research has some limitations imposed on it. First, lack of exposure to the private business sector by the researcher is a limitation to this research. Although the concept of E-Business strategies is a relatively new idea and a source of competitive advantage for many corporations, specific information on how these companies implemented these strategies is not readily available. In regards to the literature pertaining to NCW, there is limited information distributed by the DoD available. In order to add more validity to the analysis, the researcher chose to only include those pieces of literature written my DoD sanctioned offices, instead of including papers from Air University and its sister service complements. Third, the researcher does not have a background in private sector E-Business implementation or extensive knowledge or experience with NCW initiatives taken by the United States Military. Additionally, there is not an agreed upon definition of the term E-Business, which made gathering literature on its implementation was difficult. Finally, time is a limitation for

this research. However, this research will provide a basis for additional research in this area.

1.7 Research Outline

This chapter provides an overview of the research to include, the problem statement, purpose for the research, scope and assumptions. A literature review will be presented in Chapter Two. The scope is to introduce the key concepts introduced in the literature to include: Information Technology management, Information Technology Governance, and strategic alignment. Chapter Three extensively compares the concepts of E-Business and NCW. Chapter Four introduces the methodologies employed during this research. These methodologies identify the key topic areas specified in the proposed model. Chapter Five discusses the findings from the methodologies and tests the proposed model to identify any gaps and overlaps within the literature to determine whether the military is executing NCW with strategies that are aligned with private organizations. Finally, Chapter Six provides a summation of the research as it applies to NCW and its implications to the military, discusses implications of the research, and identifies any future areas of research.

II. Literature Review

2.1 Chapter Overview

The primary goal of this chapter is to provide a common frame of reference for the reader to understand the key literature relevant to establishing an E-Business model and strategy within an organization. Some of the common themes found throughout the E-Business literature are: Information Technology Management, Information Technology Governance and Strategic Alignment. The chapter begins by discussing a brief overview on the history of Information Technology Management, which is important because it shows the evolution of information technology from a support function to an enabling function, followed by a discussion of literature related to both Information Technology Governance and Strategic Alignment.

2.2 Overview of Information Technology Management

The use of Information Technology (IT) in organizations has increased exponentially over the past ten years. Since it was first introduced, IT has evolved from a support function into becoming the backbone or lifeblood to many organizations. In many organizations, IT is the single largest capital expense. In the United States, more than 50 percent of all capital spending goes into IT, accounting for more than one-third of the growth of the entire US economy. [49] The first step to managing an asset of this size and importance is to know how much is invested, where it is invested and the capabilities of the investment. Historically, management viewed IT as a way to support business operations and make employees more efficient and productive. Consequently, many new

technologies were implemented and adapted in various organizations. As the number of technologies introduced into an organization increased, management realized the necessity to build a framework as well as the necessity to introduce standards on management of these assets.

As the role of IT changed, IT became a success factor for survival and prosperity, as well as an opportunity to differentiate and to achieve competitive advantage. There have been several methodologies introduced to help organizations transition from IT as a support function to an enabler for business operations. Figure 2 depicts these methodologies.

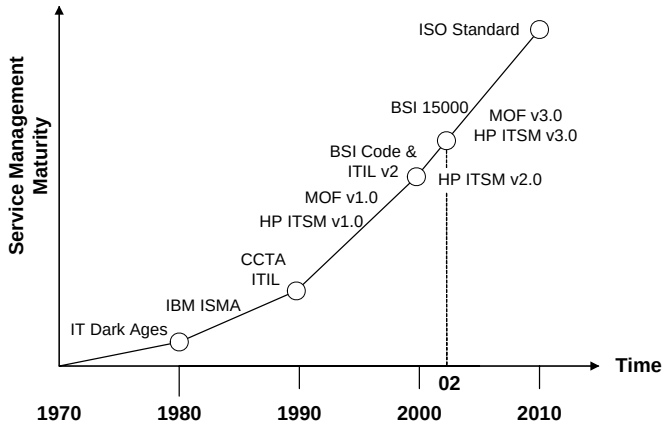

Figure 2: Evolution of IT Management Methodologies [43]

From 1970 through 1980, the concept of using technology to increase productivity in an organization was a new concept. Organizations were getting adjusted to the application of these technologies on their daily job responsibilities. Technologies were implemented within organizations with little planning and basic execution. This led to many technologies being implemented, but few were used to their maximum potential.

As organizations adjusted to using these technologies, management saw the need to make these systems interoperable. Salle provides a succinct and comprehensive history of IT Management:

> In the early 1980s, IBM documented the concepts of systems management in its Information Systems Management Architecture (ISMA). During the 1980s, disciplines such as Network Management, and Applications Management became the center of attention of the IT management community with the creations of standards such as Simple Network Management Protocol in 1988 (SNMP) for instance, by the end of the 1980s, it had become evident that a comprehensive management of the IT function was very much needed. The IT Infrastructure Library was created by the UK government Central Computer and Telecommunications Agency (CCTA) in the late 1980s. ITIL was introduced was introduced as a new approach to IT Service Management with the objective of ensuring better use of IT services and resources. As of today, the latest development in IT Service Management has been the release of British Standard's Institution's Standard for IT Service Management (BS15000) in 2002 that supports the best-practice processes promoted in ITIL. HP released in 2003 the version 3.0 of its ITSM reference model and Microsoft published the version v3.0 of MOF in 2005. Finally, experts in the field foresee that the end of the decade should see the standardization of ITSM processes under ISO. [43]

There are many reasons to implement new technologies into an organization. With these technologies also come decisions on how to manage these assets. Weill and Broadbent suggest organizations invest in IT to achieve four fundamentally different management objectives: informational, transactional, infrastructure, and strategic. These management objectives then lead to informational, transactional, infrastructure and strategic systems, which make up the IT investment portfolio. [49]

Additionally, Weill and Broadbent propose that infrastructure is the foundation of information technology capability and delivered as reliable services shared throughout the firm and coordinated centrally. The infrastructure capability includes both the technical and the managerial expertise required to provide reliable services. Having the

required infrastructure services in place significantly increases the speed with which new applications can be implemented to meet new strategies, thus increasing the firm's flexibility. [49]

The next level of the information technology portfolio is the transactional IT that processes and automates the basic, repetitive technologies of the organization. Transactional systems aim to cut costs by substituting capital for labor or to handle higher volumes of transactions with greater speed and less unit cost. They also depend and build upon on a reliable infrastructure capability to be in place [49].

In terms of the model, informational technology provides the information for managing and controlling the firm. The product of informational systems is a combination of data, information, and knowledge as an input to decision making and control. Strategic technologies are those investments intended to gain a competitive advantage or to position the organization in the marketplace. Organizations with successful strategic information technology initiatives have usually found a new use of information technology for an industry at a particular point in time.

Once management decides on the technologies to implement, management objectives should be determined to facilitate the integration of these technologies. The managerial processes put in place will help maximize the value as well as to minimize the risk associated with the technologies. While sound IT management practices are essential for any organization, it is also necessary for organizations to establish focused Information Technology Governance procedures.

2.3 Information Technology Governance

There has been extensive literature written on the concept of Information Technology Governance (IT Governance). However, a clear distinction should be made between IT management and IT Governance. According to Peterson, IT management is focused on the internal effective supply of IT services and products and the management of present IT operations. IT Governance in turn is much broader, and concentrates on performing and transforming IT to meet present and future demands of the business (internal focus) and the business' customers (external focus) [17]. This relationship is depicted in Figure 3.

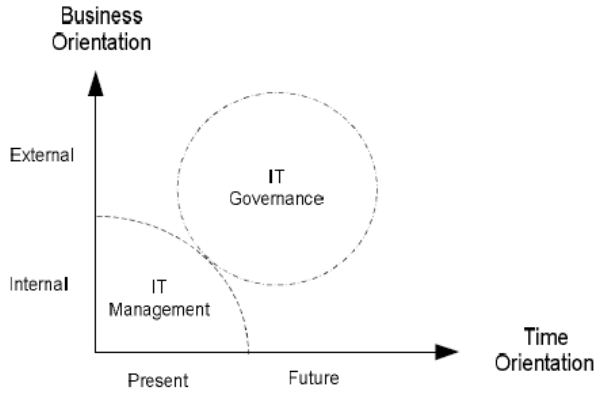

Figure 3: Relationship between IT Governance and IT Management (Salle)

IT Governance Compared to IT Management

To further delineate between IT management and IT Governance, LaBelle and Nyce suggest IT infrastructure management "consists of decisions that address the nature of hardware and software platforms, annual enhancements to these platforms, the nature of network and data architectures, and the corporate standards for procurement and deployment of IT assets." [24] They also suggest that IT management consists of

decisions that address prioritization and (both short and long term) planning, budgeting and the day to day delivery of operations and services [24]. Sohal and Fitzpatrick suggest that "Governance enables the creation of a setting in which others can manage their tasks effectively. Governance answers the question of what must be done. Applied to IT, IT Governance decides on what must be arranged in order for the organization to profit from IT synergy." [47] IT Governance is more than just configuration management standards on an organization's network and changing infrastructure standards once a new technology is introduced into an organization. It is the way senior management communicates with IT leaders to ensure an organization is maximizing the benefits of the current infrastructure while simultaneously making sure the decisions made on the technology investments are aligned with specific business objectives. Figure 4 depicts the relationship between Governance and management in organizations.

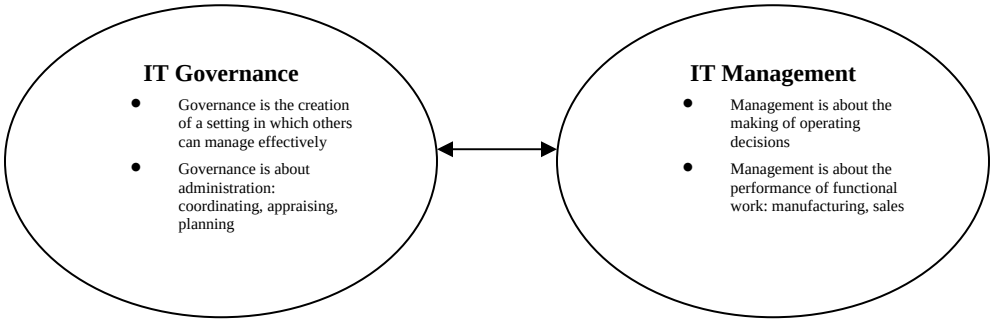

Figure 4: IT Governance Compared to IT Management (Sohol)

There has been extensive research on IT Governance in recent years, as more organizations have become more reliant on IT for success. Governance is the determination of roles and responsibilities that management exercises through the processes and procedures an organization uses to manage and carry out its functions. IT

Governance, then consists of the roles and responsibilities in applying information systems and associated resources to support the organization [21].

According to the IT Governance Institute (ITGI), IT Governance is, "the responsibility of the Board of Directors and Executive management. It is an integral part of enterprise Governance and consists of the leadership and organizational structures and processes that ensure the organization's IT sustains and extends the organization's strategy and objectives." [22] A similar definition is offered by Luftman: "IT Governance describes the selection and use of organizational processes to make decisions about how to obtain and deploy IT resources and competencies." [29]

2.3.1 Control Objectives for Information and related Technology (CobiT)

Control Objectives for Information and related Technology (CobiT) has become the de facto standard for IT Governance in many organizations. CobiT was originally designed as an IT process and control framework linking IT to business requirements [5]. "CobiT is designed to be an IT Governance aid to management in their understanding and managing of the risks and benefits associated with information and related technology." [43] It is designed to create links between an organization's business objectives and its specific IT management tasks via control objectives.

According to Salle [43], CobiT is designed to help three distinct audiences:

- Managers, who need to balance risk and control investment in an unpredictable IT environment
- Users, who need to obtain assurance on the security and controls of the IT services upon which they depend to deliver their products and services to internal and external customers
- Auditors, who can use it to substantiate their opinions and/or provide advice to management on internal controls

CobiT the preferred way to implement effective IT Governance and provides organizations with a framework to effectively manage risk and value assessment of IT assets.

In order to effectively institute an IT Governance structure into an organization, management and executives must understand each of the forces (internal and external) that effect business operations. Four critical domains should be carefully analyzed before implementation: IT principles, IT infrastructure, IT architecture, and investment and prioritization [51]. As the organization becomes more reliant on IT to support business functions, IT Governance procedures and structures must evolve with the organization. This will ensure a coherence of standards within an organization's IT infrastructure and prevent IT from becoming a constraint on any change within the organization.

IT Governance Organization

Effective IT Governance is determined by the way the IT function is organized and where the IT decision-making authority is located within the organization [9]. Equally important as the organizational structure, the IT Governance structure of an organization is an essential component to implementing an IT Governance framework into an organization. A successful IT Governance implementation consists of a mix of structures, processes and relational mechanisms, as visualized below [9]:

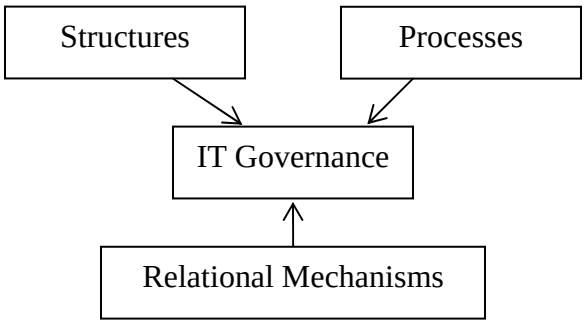

Figure 5: Components of Successful IT Governance Implementation (deHaes)

There are several types of IT Governance structures an organization can implement. Effective IT Governance depends on where the IT managers, the CIO, the executives, and the decision makers reside within the organization. Traditionally, there are three sets of forces—corporate Governance, economies of scope and absorptive capacity that are determinants of an organization's adoption of a particular structure [44]. Organizations tend to mimic their corporate Governance structure when adopting or developing an IT Governance structure. Economies of scope are benefits "accruing to an organization when it is able to share its resources across multiple products/services." [44] Absorptive capacity refers to the willingness or an ability of an employee to understand and process relevant internal and external information and make appropriate decisions based on that information. Understanding why an organization has decided to implement one specific structure is "important to advance knowledge about the effectiveness of alternative Governance arrangements for sustaining IT-based innovation." [44]

Hierarchical Design of IT Governance Strategies

Management must address all levels of an organization when assessing their IT Governance procedures, as IT Governance cannot simply be put in place at certain levels of an organization. Without formal IT Governance procedures in place, IT managers are left to resolve isolated issues as they arise [51], therefore decreasing both productivity and time for innovation within an organization. Effective IT Governance demands that senior management define enterprise performance objectives and actively design Governance to ensure outcomes are consistent with those objectives [51]. Once an IT Governance framework is introduced into an organization, some of the ambiguity associated with achieving value from IT will be alleviated, since the framework will involve "clarification of how the organization will operate, how its structure will support business operations and what Governance arrangements will elicit the desirable behaviors that structure cannot ensure." [51] IT Governance also allows for organizations to be more flexible in terms of IT infrastructure, as decision makers will be more educated on the needs and strategy of the business operations and how IT will facilitate the organization's objectives.

While there are several types of IT Governance strategies, it is important to note there is not a "one size fits all" approach to initiating an IT Governance structure in an organization. Each organization is different, and each has different forces acting upon it. An organization's IT Governance structure should be tailored made to meet an organization's specific goals and objectives. Senior executives need to take into account an organization's size, culture, and dependency on IT before deciding on the complexity of the IT Governance structure. In order to gain organizational commitment to this new

structure, a common vision, critical success factors, open communication throughout the organization as well as commitment through participation are going to be necessary. Since IT Governance requires a vast number of both IT and non-IT stakeholders to change processes, successful IT Governance initiatives require extensive involvement by relevant participants in design, planning and implementation [42]. If the need for IT Governance is not widely accepted within the organization, senior management must facilitate the acceptance of this cultural change to allow the adoption of these new practices. This will help better internalize the concepts and processes associated with the initiative.

IT Governance can be enforced at all levels of an organization; however, IT Governance policy should be first conceived at the highest level of an organization, then conveyed down through the hierarchy as necessary. This will ensure all levels within an organization are aligned together and have a common focus in terms of IT decisions and capabilities. The three roles of IT Governance—policy setting, management control and monitoring of results—can be expected to mature at differentiation and effectiveness over time [42]. Unlike infrastructure and configuration guidelines on network devices in many organizations, an IT Governance policy for an organization is a dynamic document and should be addressed by management frequently to ensure it continues to be aligned with an organization's current strategy and business objectives.

Primary Modes of IT Governance Structures

Traditionally, IT Governance literature suggests three primary modes of IT Governance structures: centralized, decentralized and federal. The mode implemented in

an organization is dependent on the organization's culture, environment, and business and IT strategies. This decision should be made by both IT executives and senior level management of an organization and should take into account the current structure of the organization. IT Governance is not intended to completely revamp an organization decision making hierarchy; rather it is intended to be incorporated into the organization as seamlessly as possible. Open communication, common language, common strategic objectives and flexibility are essential to the implementation process. IT Governance is less about who is in control of an organization, and more about the "complementary--business and IT--competencies an organization possesses, and how this can integrate these to develop the strategic flexibility required to sustain business value from their IT infrastructure." [37] This will become increasingly important, especially as IT becomes more ubiquitous in all organizations.

In centralized mode, corporate IT management has the control for all three of the spheres of IT activities [44] (IT infrastructure management, IT use management, and project management). This mode is most commonly found in an organization who has adopted a traditional centralized decision making hierarchy. Smaller firms tend to adopt a centralized IT Governance structure " in order to facilitate coordination of interdependencies among the activities of the individual subunits." [44]

Larger firms tend to incorporate a decentralized IT Governance structure in order to be more "responsive to individual subunit needs."[44] Organizations who adopt this structure are accustomed to "high growth and little enterprise wide standardization," [50] and welcome innovation within business functions. Employees are encouraged to think "outside the box" for the benefit of the organization as a whole. Divisional information

managers and line managers assume authority for all IT activities [44]. In federal IT Governance structure, "Governance rights are shared by some combination of senior executives, business unit leaders, business process owners, IT executives and end users." [51] In this mode, both corporate IT managers and the business units assume authority for specific spheres of IT activities [44].

One of the key challenges in IT Governance is how to meet the current demands of the business and its customers while transforming IT to meet their potential future demands [37]. The ultimate goal of IT Governance is achieving strategic alignment between business and IT to make sure money spent in IT is delivering value for the organization. [9]

2.4 Strategic Alignment

In a business world where flexibility and adaptability are critical, failure to leverage IT may seriously hamper the firm's performance and viability, especially in today's global, information-intensive world. Therefore, the need to integrate business and IT strategies is paramount. Information Technology is not any different from any other investment made by an organization—a sufficient return on investment must be achieved, or the organization will eventually fail. In an organization that relies on IT to achieve business objectives, each level of the management hierarchy has a different perspective on the value of IT. It is essential for senior management to provide a concise vision on how IT creates value at each level within the organization.

As technology has become more pervasive in organizations and began to play an increasing strategic role in corporate decision making, senior management realized the

necessity to link these technologies with the organization's internal and external infrastructures and processes, as well as to assess value to these technologies. Senior managers clearly cannot afford to delegate all IT decisions to technical personnel. All managers need well-developed skills to deal confidently and competently with IT issues so that these complex choices can take account of strategic, technical, competitive, financial, and organizational issues. [49] Many organizations realized early in their IT implementation the need to align their business objectives with their IT decisions, infrastructure and overall strategy. "Alignment grows in importance as companies strive to link technology in light of dynamic business strategies and continuously evolving technologies." [28] Literature on Strategic Alignment primarily deals with this issue.

Alignment can be defined as "applying IT in an appropriate and timely way and in harmony with business strategies." [28] Ultimately, strategic IT-business alignment refers to the extent an organization's IT mission is aligned with the business mission, plans and objectives. According to Sledgianowski and Luftman, "for an organization to successfully align its IT strategies with its business strategies, specific management practices and strategic IT choices should be considered that help facilitate integration."[46] These factors should be considered and standardized throughout each level of the organization in order for mid-level managers to execute business objectives which are aligned with the overall business strategy. While this is not an easy task for any organization, executives realize its necessity and have been willing to invest millions of dollars to achieving this goal.

There is little debate among the private sector that IT can enable more business operations than ever before. In fact, over the past 40 years, "most companies have used

computing technology to improve operations. Now and in the future, technology will be used to innovate businesses, products, and services." [27] The problem most organizations face is how to harness the power and opportunity of IT in order to use it as a source of strategic advantage over their competition. Understanding strategic alignment of IT is the first step in achieving this goal. Few companies have found ways of capitalizing on IT since traditionally "IT was viewed as a "cost center" or viewed as an "expense" rather than an enabler or driver of business value." [28] Strategic alignment practices call for a deeper look into IT and how it can be integrated into an organization's business functions and aligned with an organization's business strategy.

In order to implement a strategic alignment model, an organization must have a need for a new technology. Organizations must get away from simply implementing technology for the sake of doing a task faster or for more memory. Before an organization can implement a new technology, IT executives must be able to delineate the strengths and weaknesses of the technologies and understand the organization-wide implications this new technology will have. Organizations should strive to develop an "alignment behavior" in which all levels of the organization understand the benefits derived from IT. This will facilitate the "potential for complete alignment and improve their ability to gain business value from investments in IT." [28]

2.4.1 Strategic Alignment Framework

Several frameworks have been introduced for organizations to apply to their strategic alignment initiatives, but Venkatraman and Henderson were the first to describe a clear way of the relationship and interdependencies between business strategies and IT

strategies in their Strategic Alignment Model (SAM) (Figure 6). The SAM is one of the more robust frameworks introduced to organizations seeking strategic alignment of their business processes and IT infrastructure. Fundamentally, the SAM suggests that business success depends on the harmony of business strategy, information technology strategy, organizational infrastructure and processes, and IT infrastructure and processes [30]. It also demonstrates to organizations the need to consider both the internal and external business domains when developing an IT strategy. The SAM does not provide specific objectives and processes for an organization to implement in order to achieve and sustain alignment, but suggests to management to look at alignment as a highly dynamic process. The SAM suggests to management that alignment can only be achieved if the business processes and operations continue to evolve concurrently with the IT within an organization. Organizations should not strive for adapting their business processes to adjust for changes in, or new technologies, rather adopt technologies that can be seamlessly integrated into the overall functions that are both internal and external to business operations, since it is possible for an organization to be operating at different perspectives simultaneously.

Strategic Fit

The SAM is based on two building blocks: strategic fit and functional integration. Strategic fit recognizes the need to consider both the internal and external domains when executing an IT strategy. The internal domain consists of the organizational and IT infrastructure and process, whereas the external domain is the market in which the organization competes. It is also “the extent to which strategic choices that position a

firm in a market are aligned with those choices that determine the organizational infrastructure and processes."[19]

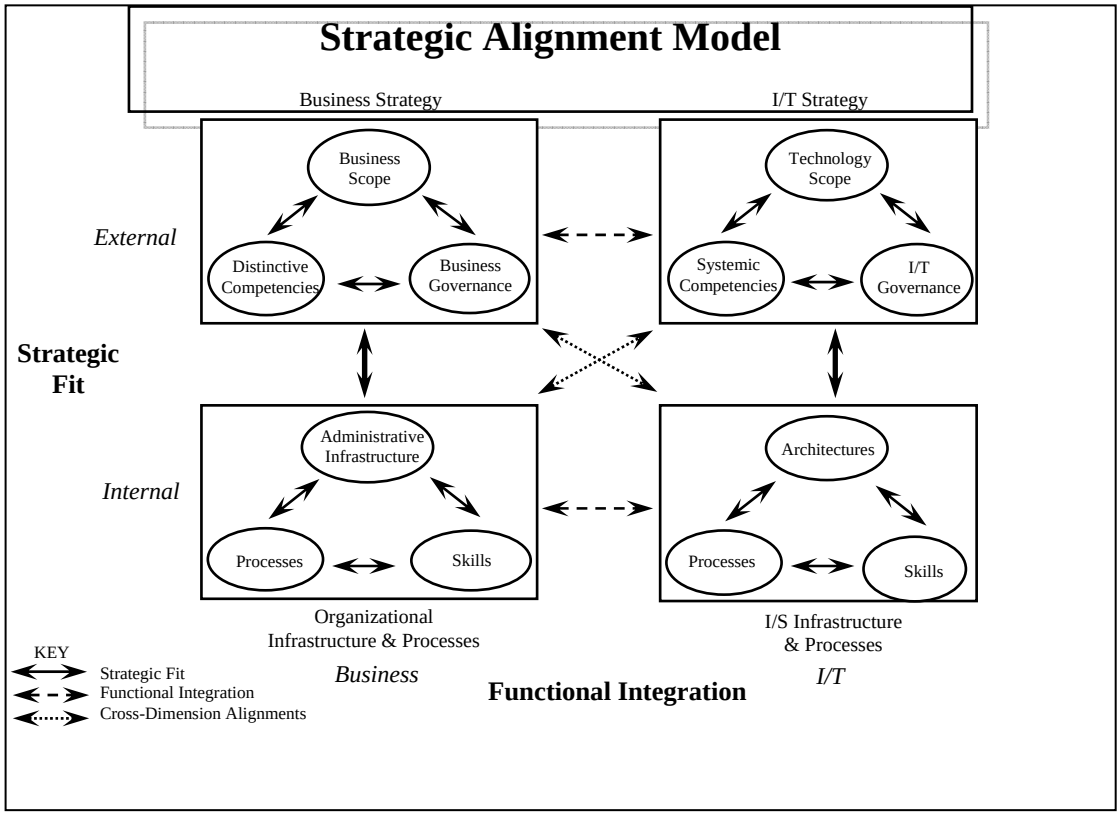

Figure 6: The Strategic Alignment Framework [20]

Functional Integration

Functional integration is concerned with how the business strategy and IT strategy are related. It concerns the "extent to which the strategic choices made in the business domain are aligned with those choices made in the technology domain."[19] There are also two specific types of integration between business and IT domains: strategic integration and operational integration. Strategic integration deals with how well the IT supports the overall objectives and strategy of an organization and vice versa.

Operational integration deals with how well the structure of the organization complements the IT structure and vice versa.

There are three facets to each part of the SAM. Table 1 depicts the definition of each component of the model.

Table 1: Components of the SAM (adapted from [20])

Business Strategy **Business Scope**	How an organization distinguishes itself from the competition. The overall goals of the organization.
Distinctive Competencies	The strategies used to deliver a product to the customers. What gives the organization an advantage and differentiates it from competition.
Business Governance	Business processes that are in place to execute a strategy.
Organizational Infrastructure and Processes **Operational Infrastructure**	The internal hierarchy that is in place that supports the execution of a business strategy, policy writing and decision making.
Skills	Identifies the key skills of staff members who need to carry our business processes and business strategies
Processes	The processes in place to support the execution of a business strategy. Those choices that define how key business processes will operate.
IT Strategy **Technology Scope**	Addresses the available technology that can be used to support the business strategy and which IT systems are critical to the organization. (i.e. LANs, expert systems)
Systemic Competencies	The specific attributes IT needs to have to support the business strategy. Those attributes of IT strategy that could contribute to the creation of new business strategies. (i.e. value of IT)
IT Governance	Strategies for creating and providing the overall IT strategy that supports IT. What the ultimate goal of the IT infrastructure is.
IT Infrastructure and Processes **IT Infrastructure**	The policies that define the overall software and hardware infrastructures. (Configuration management)
Processes	Key Information security policies and procedures that govern the daily operations of the IT organization.
Skills	The technical skills needed by personnel in the IT organization

Alignment Perspectives

The SAM presents four perspectives to managers seeking alignment: strategy execution alignment perspective, technology transformation alignment perspective, competitive potential alignment perspective and service level alignment perspective. The *strategy executive alignment perspective* details the fact that business strategy influences overall organizational strategy which then determines the IT infrastructure within an organization. This perspective is "the most common and widely understood perspective as it corresponds to the classic, hierarchical view of strategic management." [20] The *technology transformation alignment perspective* involves executing the chosen business strategy through an IT strategy that facilitates those business objectives, then arranging the IT infrastructure to ensure it supports these objectives. The role of management in this perspective is to provide the "technological vision that would best support that chosen business strategy." [20] The third perspective, *competitive potential alignment perspective*, involves using IT to drive business strategy and objectives. Additionally, it involves changing business strategy to account for changes in technology which consequently changes the overall organizational infrastructure. It is a management process "that explicitly considers how information technology may be applied to enhance the business strategy and that ultimately results in the transformation of the organizational infrastructure."[30] The key for management in this perspective is to stay on top of changing and emerging technologies to evaluate the overall impact to the organization. The fourth perspective, the *service level alignment perspective*, focuses on how to build an organization that is completely reliant on technologies to execute its business objectives. This perspective focuses on the ability to deliver information

technology products and services to an organization, while continually prioritizing these projects to serve the overall needs of the customers.

Flexibility

The SAM depicts a holistic approach to strategic alignment in that each of the four fundamental constructs: business strategy, business structure, IT strategy and IT structure have a direct impact in the overall business performance. Successful organizations understand the need to remain flexible in order to continue to respond to their customer's needs as well as to keep their IT infrastructure as flexible as their business objectives. This has become increasingly important as more organizations begin to rely on technology to expand their business operations. "A flexible IT infrastructure can respond rapidly and easily to changing business conditions."[7] Similar to IT Governance, strategic alignment practices should be viewed as dynamic business strategies that consistently change with an organization's business strategies. These practices should be implemented at each level of IT planning within an organization.

It is important to note that technology alone will not solve an organization's alignment problems or concerns. Organizations should continue to view technology as an enabler and select only those technologies that will help facilitate their internal processes while simultaneously creating more value for the organization. If an organization first selects a technology, then tries to adapt it to the specific needs of an organization, the implementation will not be successful and the chances for misalignment of IT and business objectives increases exponentially.

Just as in IT Governance, strategic alignment is a dynamic process which is different for each organization. Also, as with IT Governance, having sound alignment practices in place alone will not help achieve desired IT goals within an organization. Both are only parts of what is required, but together they will help organizations achieve the desired outcome and value from their IT infrastructure and business objectives. According to Luftman (2003), "setting priorities for IT projects (IT Governance) and effectively allocating resources to align IT and business strategies (Strategic Alignment) have become fundamental aspects of corporate success." [27] The need for strategic alignment is indicated by the research that shows organizations whose strategy and structure are aligned are less vulnerable to external change and internal inefficiencies and thus perform better than their competition [4].

2.5 Summary

This chapter summarizes three fundamental areas to understanding the essential issues organizations contend with when embarking on an E-Business model implementation. First, it began with an introduction to IT management and how IT evolved from a support function to an enabler function within organizations. While organizations recognize the potential benefits of IT for their organization, it is not technology alone that will derive more business value or provide a larger return on investment. Second, having sound IT Governance procedures communicated throughout the organization is only part of what is required in order for organizations to have technology successfully implemented within an organization. Organizations also must ensure these technologies and IT Governance procedures are aligned with business

practices and business objectives. In order to be successful, organizations must ensure newly implemented technologies are interoperable among all levels of an organization. Finally, organizations must prioritize business functions and projects and ensure that the technology chosen to facilitate these projects will create more value for the organization as a whole and not one individual department.

This chapter introduced the concepts important to introducing an E-Business model in an organization. Chapter Three will provide an introduction to the concepts of E-Business and Network Centric Warfare. Chapter Four will follow with an introduction to the methodology used throughout this research. Chapter Five will present the results of both the exploratory analysis and content analysis. Finally, Chapter Six will conclude the research with recommended actions as well as introduce any future research opportunities.

III. Analysis of Electronic Business and Network Centric Warfare

3.1 Chapter Overview

In 2001, then Assistant Secretary of Defense for Command, Control, Communications and Intelligence, Mr. Arthur Money, in a report to Congress, stated that the terms “network centric operations” and “network centric warfare” are used to describe various types of military operations in the same way the terms “E-Business” and “e-commerce” are used to describe a broad class of business activities that are enabled by the internet.”[32] The purpose of this chapter is to provide an overview of the concepts of Electronic-business and Network Centric Warfare (NCW). This chapter discusses the concept of Electronic business, details why it is important and what actions organizations have taken to exploit these new capabilities. There has been a considerable amount of research conducted on NCW since its introduction in 1998 by Vice Admiral Arthur K. Cebrowski. The purpose of this research is not to give a complete analysis of the components of NCW, but to provide the reader with an overall general understanding of the topic. The chapter will conclude with the introduction of the methodology chosen for this research.

3.2 Electronic Business

Organizations have exponentially grown from the lessons learned through the Industrial Revolution into the Information Age of today. New developments in technology call for new ways of performing traditional business transactions, organizing organizational infrastructures and process, as well as the decision making hierarchy. Information Technology has enabled organizations to expand both the richness and reach

of their IT infrastructures. Organizations that have decided to capitalize on new technologies gain a significant competitive advantage over their competition. This new paradox in business strategy is referred to as Electronic Business (E-Business). Similar to its traditional business model counterparts, E-Business focuses on internal processes such as "production, inventory management, product development, risk management, finance, knowledge management, and human resources." [8] However, an E-Business strategy integrates the internal and external reach of information technology within an organization.

E-Business has become more wide-spread as the Internet and technology has begun to be used more commercially throughout the globe. E-Business has the potential to have a positive impact on existing business processes, including improved speed and reduced costs [31]. As with many terminologies in today's IT sector, there is not one agreed-upon definition of E-Business. The literature covers areas from "buying and selling goods over the internet" and "using technologies to enable business processes" to "redefining old business models, with the aid of technology to maximize value and profits" [31]. The main commonality in these definitions is the use of technology in order to adapt to the rapid, highly competitive global environment. Fundamentally, E-Business "entails the strategic use of information and communication technology" [45] and enables organizations to derive maximum value from their IT investments to continuously improve the customer experience through alignment of their IT and business objectives.

According to Dearstyne, E-Business denotes "one in which strategic options have been transformed-and significantly broadened-by the use of digital technologies." [10]

Also, “a 2003 IBM study found 80% of the nearly 33,000 organizations surveyed were at some stage of E-Business adoption- four out of every five companies.” [36] The reasons businesses have chosen to adopt an E-Business strategy include: to improve employee productivity, to increase revenue, and to maximize customer satisfaction, thereby increasing customer loyalty, retention, and profitability [45].

The foundation for all electronic business is information technology infrastructure [49]. Therefore, it is necessary for organizations to have clear, concise and standardized processes and goals relating the infrastructure to strategic practices throughout the organization. In fact, companies such as Intel developed their E-Business architecture by first standardizing their IT infrastructure and processes world-wide [39]. Organizations who adopt E-Business models recognize the need to remain adaptable and flexible in order to respond to technological changes and advancements. These same companies equate information to money and realize the necessity of creating an electronic environment that creates value to both the organization and its customers. This is evident throughout IBM who contends “E-Business success rests on giving customers seamless access-not only to products and services, but to intelligent information, counsel, research, and comparative analysis. Long-term prosperity will depend on where you begin and how you scale to meet their ever-evolving expectations.” [10]

There has been extensive debate as to which E-Business model is the most effective for organizations that chose to capitalize on new technologies. In fact, strategists tend to argue about what it is that makes organizations successful; whether it’s the internal processes, Governance procedures, resources available, or a well-executed strategy [18]. In order to maintain a competitive advantage over competition and

adversaries in today's global environment, organizations are going to have to learn to take full advantage of new technologies while simultaneously evolving their business strategies, creating differentiation and compiling the information created into something of value for the entire organization. As "E-Business becomes more common, it also increasingly becomes a competitive necessity." [31]

3.3 E-Business and IT Governance

E-Business is more than just capitalizing on existing technologies and using technology to support current business operations; it requires a shift in business process and Governance procedures throughout an organization. Furthermore, because technology evolves at such an accelerated rate, management needs to constantly ensure these technologies are aligned with organizational goals objectives. This point is made evident by Hwang who writes:

> 'Support' in this sense also includes enhancing the organization's ability to pursue new strategies and business, which means that Governance extends beyond information systems and services to business management. If IT enables the organization to transform its business processes to offer E-Business, for example, the organization is not only introducing new technology, but also instituting corporate-wide changes. [21]

As E-Business has become more pervasive in the business world, management have recognized--especially after the "dot com" craze--getting IT right this time will not be about technology, rather "about developing and deploying the appropriate leadership capabilities for governing IT effectively. The focus is no longer on the fixed structures and processes, but on agile leadership capabilities for governing IT under dynamic conditions." [38] In order to be truly effective in an E-Business transformation,

managers need to embrace the dynamic conditions of the new business environment as well as recognize the challenges and opportunities afforded by E-Business initiatives.

In a study to identify which leadership characteristics are critical in ensuring a successful E-Business transformation in an organization, Peterson and Fairchild proposed "high E-Business readiness is associated with high relationship and change leadership capabilities, and low task leadership capabilities." [38] They concluded these critical leadership capabilities include: shared E-Business vision, strategic E-Business alignment, collaborative business-IT relationships and customer relationships.

Patel writes "in E-Business, IT Governance is the ability to manage IT, develop strategies, and create systems that are relevant to business operations and customers who interface with an organization." [17] As organizations begin to leverage E-Business strategies as a source of strategic advantage, their IT Governance procedures and structures could also help build this capability. These procedures could help organizations develop an IT strategy and facilitate the definition of best practices, ensure IT projects are completed on-time and on-budget, and ensure IT alignment. In an E-Business environment, IT Governance moves from its traditional role of management of the IT tool, to "ensuring the very economic viability of a company."[17]

In today's era of globalization, many organizations are realizing the ability to exploit new technologies in order to reach more customers and expand their boundaries more than ever before. Also, organizations have realized that new IT capabilities represent new opportunities for increased growth and efficiencies within their internal processes. With the advent of E-Business and e-commerce, the use of technology is becoming an expected way of doing business. Consequently, commercial organizations

are increasingly looking towards new technologies to gain a source of strategic advantage. This change in frame of reference is even being seen in the public sector, as e-government initiatives also continue to evolve. It is important to note however, with this new way of conducting standard business operations, comes new business opportunities and risks. Organizations need to mitigate these risks prior to implementation.

There has been significant research to show that many organizations tend to be resistant to change. Prior to applying an E-Business initiative, organizations need to do a careful assessment of the technologies already implemented, as well as the organization's ability to produce a return on investment. The focus of an E-Business model is do things better, cheaper and faster, while simultaneously managing risk. According to Andrew Jordan, "emphasis should be placed on technologies that are critical to executing the business model and enabling the business processes that will truly differentiate the organization."[23] The "business value derived from IT investments only emerges through business changes and innovations, whether they are product/service innovation, new business models, or process change. Organizations must be able to assimilate this change if value is to be ultimately realized." [35]

Deciding to implement an E-Business model should be viewed as comparable to any other new business venture. Large scale efforts need to be made to ensure the technology's interoperability with the organization's current infrastructure. Therefore, in order to succeed in E-Business implementation, organizations must "evaluate innovative strategies that capitalize on both the power of the Internet and changes in consumer demands from both traditional and electronic markets." [39] Implementing an E-

Business structure will require extensive training for personnel and should empower employees to be innovative in their duties. Consequently, management is required to ensure the current organizational structure will support these new business initiatives.

3.4 Electronic Government

Private sector organizations are not the only organizations capitalizing on new technologies to increase the effectiveness and efficiencies of their business operations. Rapid changes in technologies and innovation are giving the government unprecedented opportunities for using IT to improve operational performance, reduce costs, and enhance service responsibilities to the public [26]. Additionally, "in the public sector, government agencies are feeling the pressure from citizens, lawmakers, and other stakeholders to deliver better service. Hence, these agencies are beginning to view their constituents as customers, which is stimulating a growing interest in e-government."[45] This has led the United States government to migrate towards E-Business initiatives and use technology as a means to to stay abreast with the private sector.

President Bush introduced the concept of Electronic Government (e-government) in his 2002 budget submission to Congress, where he outlined initiatives for making the government more focused on its citizens and results. Its goal is to eliminate redundancies in government and to maximize the benefits for the citizens of the United States of America. E-government uses improved Internet-based technology to make it easy for citizens and businesses to interact with the government, save taxpayer dollars, and streamline citizen-to-government communications [1]. E-government does not only mean putting scores of government forms on the Internet. E-government is about using

technology to its fullest to provide services and information that are centered on citizen groups.

The E-Government Act of 2002 was passed in December of 2002. Among its requirements, the Act requires agencies to do the following [1]:

- Develop performance measures that demonstrate how E-Government enables progress toward agency objectives, strategic goals, and statutory mandates
- Rely on existing data collections in measuring performance under this section
- Link performance goals to key groups including citizens, businesses, other governments and to internal Government operations
- Work collectively in linking performance goals to such groups and to use IT in delivery Government information and services to those groups

3.5 Clinger-Cohen Act

The Clinger-Cohen Act is one of the predecessors to the E-Government Act of 2002. Originally passed in 1996, the act brought the strategic use of information technology to the forefront of the United States government. It was originally intended to reform acquisition laws and information technology management in the federal government as well as to provide a framework for the use of IT in order to increase efficiency in the government. It was the first of its kind, not only to define the terms Information Technology for the federal government, but also to create a position of authority, the Chief Information Officer, who is ultimately responsible and accountable for the IT within a federal organization. The Clinger-Cohen Act also mandated executive agencies design and implement capital planning and investment controls, implement specified IT-related actions to enhance performance and results-based management. The

Act was welcomed by the government, since the government was becoming increasingly dependent on IT, spending billions of dollars annually on implementation.

3.6 Network Centric Warfare

As the world evolved from the Industrial Age into the Information Age, organizations realized the necessity to change the way they conduct business operations in order to stay current and capitalize on the new technologies of the era. Just as technology is transforming business operations, the military also recognized the need to change the way we fight wars and execute technology in order to retain information superiority over our enemies. This is especially important as the battle space involving traditional tactics and environments evolves into cyberspace. Now, the primary concern in battle is no longer only who has the most lethal weapons, but also who holds the most accurate information and who can disseminate it faster to the troops on the ground in order to make better decisions.

Traditionally, changes on the battlefield have evolved slowly, and the military could evolve both doctrine and organization in response to these changes. This is not the case in the Information Age. New technologies have forced all organizations: private, public and military to become more dynamic in their response and capabilities.

In response to the changes in both the private sector and the Information Age, the military is embracing a new culture centered on the concept called Network Centric Warfare. Alberts defines Network Centric Warfare (NCW) as:

> An information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of

> operations, greater lethality, increased survivability, and a degree of self-synchronization. [2]

Fundamentally, NCW is about "employing Information Age concepts to increase combat power in war and mission effectiveness in operations other than war." [11] This concept of using the network to further military initiatives is imperative since technology is becoming more ubiquitous in the public and private sector, and is becoming increasingly available to our enemies. The military realizes the necessity to harness the power of the technologies available in order to gain a strategic advantage over our enemies.

Essentially, NCW is about providing the warfighter with increased combat power. It also seeks to create better awareness of the battlefield and battle space. By the use of the networking capabilities generated from network-centric platforms, it increases the amount of information available to decision makers. Alberts et al. put the need to change succinctly when they wrote:

> The Information Age has created an environment where collaborative decision making can be employed to increase combat power, partly because of the emergence of coalition operations, partly because of the distribution of awareness and knowledge in the battle space, and partly because of the compression of decision timelines. [2]

There are four tenets of NCW [11]:

- A robustly networked force improves information sharing
- Information sharing enhances the quality of information and shared situational awareness
- Shared situational awareness enables collaboration and self-synchronization; and enhances sustainability and speed of command
- These, in turn, dramatically increase mission effectiveness

By enabling these tenets within the military organization, NCW has the potential to increase the amount of knowledge both produced and shared within the military. NCW

can provide superior decision making capabilities as well as "empower people to make faster and better decisions." [2] NCW is about transforming the way the military views technology and the organization of the forces to support these initiatives. While still in its infancy, each service has developed its own concept of operations in order to execute these strategies. The underlying goals for each service are to remain flexible, remain responsive and to give fast, reliable support to the warfighter.

Information superiority has always been a determining factor in winning wars. NCW has the potential to increase mission effectiveness and operational capabilities as well as to ensure information superiority. Achieving and maintaining information superiority is more important on the battlefield of today, as more information is available to both enemy and friendly forces, as well as to non-combatants. The ability to exploit the available information is becoming increasingly important as the amount of information available increases. The military hopes to capitalize on this fact by transforming the way we fight wars and leverage existing technologies as well as integrating new technologies throughout the battlefield.

Three Domains of Network Centric Warfare

In order to understand the source of increased combat power associated with NCW, one has to simultaneously focus on the three domains of warfare: the physical domain, the information domain and the cognitive domain. The physical domain is the domain where strike, protect, and maneuver operations take place across the environments of ground, sea, air and space. It is the domain where physical platforms and the communication networks that connect them reside [11]. The information domain

is the domain where information is created, manipulated, and shared. It is the domain in which the command and control of modern military forces is communicated, and where the commander's intent is conveyed [11]. Finally, the cognitive domain resides in the minds of the participants. It is the place where perceptions, awareness, understanding, beliefs, and values reside and where decisions are made [11].

Figure 7 depicts how the three domains are interrelated. The point at which the three domains overlap is where Network Centric Operations take place. Based upon NCW, the model expands on the original tenets and hypothesizes that robust networking, information sharing, and collaboration will enhance the performance of organizations across the range of military and non-military operations [2]. From this figure, one can interpolate that each domain has a dependency on the other domains. Activities that affect the overall battle space cannot be successfully executed in one domain exclusively.

NCW has often been viewed as a way to transform the military from a platform-centric force to a network-centric force. As the network becomes the backbone of the military organization, more information will become available to both the warfighter and decision makers. A key concept underlying the concept of NCW is the use of information as capital and using that information to achieve a competitive advantage over our enemies. Competitive advantages accrue within organizations that successfully master the art of creating and leveraging an information advantage [2]. Through the use new technologies, organizations can utilize NCW concepts to work on moving information, not people, conducting distributed operations, and substituting information for mass. The key to implementing NCW concepts is to find the right balance in which information-related capabilities are matched with the right CONOPS, organization,

approach to command and control, the capabilities of the people and the weapons systems. [11]

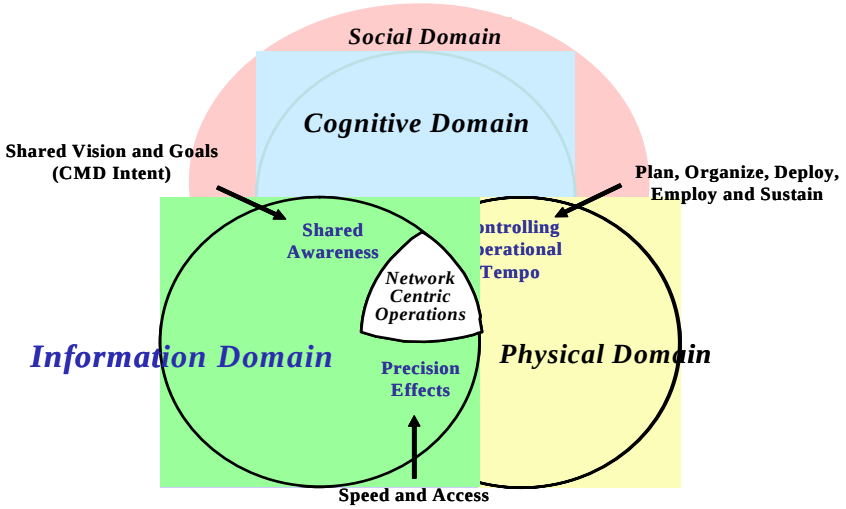

Figure 7: Network Centric Warfare [2]

In the private sector, organizations strive to have a positive return on investment for their technological endeavors. The military strives to achieve value from their IT infrastructure as it relates to speed of command. NCW enables forces to provide critical, tactical information to decision makers in order for them to make better, more robust decisions on key battle elements. Commonly referred to as the speed of command, has three parts [6]:

- The force achieves information superiority, having dramatically better awareness or understanding of the battle space.
- Forces acting with speed, precision, and reach achieve the massing of effects versus the massing of forces.
- The results that follow are the rapid foreclosure of enemy courses of action and the shock of closely coupled events.

The ability to enhance the military's Command and Control (C2) capabilities composes the heart of NCW. As military operations rely more on technology, the ability to disseminate the information rapidly and efficiency needs to be the number one priority. With NCW, new technologies could be integrated into existing platforms and extend the effective ranges of their sensors and weapons. This point needs to be considered when attempting to develop a common operating procedure (COP). NCW has the potential to improve both C2 and execution at each echelon of decision making in the context of specific mission and tasks. This is because decision entities or C2 elements and warfighters will become more knowledgeable, warfighters and decision makers will become better connected, sensor entities will be more responsive, and the footprint of technologies will be much smaller [2].

3.7 Global Information Grid (GIG)

NCW is enabled by the concept of the Global Information Grid (GIG). Joint Vision 2020 defines the GIG as "the globally interconnected, end to end set of information capabilities, associated processes, and people to manage and provide information on demand to war fighters, policy makers, and support personnel." It is an information environment comprised of interoperable computing and communication components. The success of this endeavor relies on the interoperability of newly-implemented technologies across the United States Military as well as the ability of the new technologies to enable force-wide information sharing. Improved information sharing will dramatically improve commander's capabilities for formulating and disseminating intent based upon the most up to date knowledge of the situation that exists

in the battle space [11]. The GIG is ultimately the base of the info structure required to truly implement a network centric environment on the battlefield, as depicted in Figure 8.

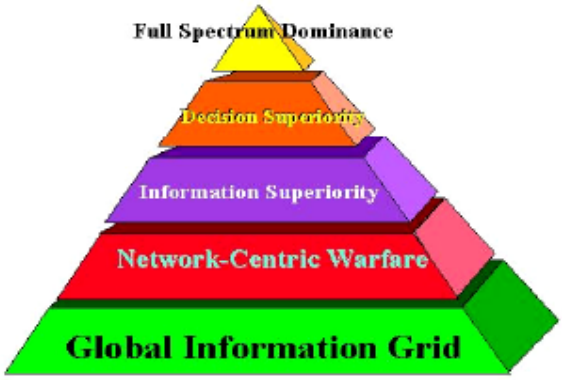

Figure 8: The GIG as the Enabler [11]

3.8 Summary

This chapter discussed the concepts of E-Business and the evolution of the DoD utilization of IT to facilitate a transformation into the Information Age. What began in the private sector as E-Business has evolved into the United States Military's transformation into the concept of NCW. Chapter Four will discuss the overall methodology used for this research. Chapter Five will discuss the overall analysis of the methodology and will test the proposed model in Chapter One. Finally, Chapter Six will conclude the research.

IV. Methodology

4.1 Chapter Overview

The purpose of this research is to identify and compare the key issues regarding implementation of E-Business within a private organization and the implementation of Network Centric Warfare (NCW) in the United States Military. The previous chapters outlined the concepts of the history of IT management, IT Governance, strategic alignment as well as literature pertaining to both E-Business and NCW. The researcher began with a literature review in order to develop a mental model on the required elements of implementing an E-Business strategy on an organization (Figure 1). The initial step gathered literature pertaining to E-Business and cross referenced those documents in order to gain a better understanding of the resulting key topic areas of: IT Governance and strategic alignment. Despite research, the researcher was unable to locate a model in the literature that organizations could use to illustrate the required elements necessary to execute an E-Business strategy. This could be caused by many different reasons. Many organizations use successful implementation and evolution to an E-Business model as a source of competitive advantage, and are reluctant to divulge how they accomplished this task to their competition.

Since NCW seeks to utilize technologies for the military as E-Business seeks to use technologies for private organizations, research was conducted using literature pertaining to NCW to determine if the same key topic areas were being discussed. The researcher hypothesized an E-Business is not necessarily just a business that has implemented a new platform of technology in order to enable business functions. It is an

organization that has aligned their business functions with their IT functions and objectives. This has been accomplished through adopting new technologies, as well as through the following: cultural changes within the organizations, IT Governance practices, changes to business processes and adoption of a strategic alignment framework, enterprise-wide. Consequently, this research will study whether available literature supports the hypothesis.

The researcher decided to utilize a qualitative research approach, due to the fact that an attempt was being made to develop new insight or perspective or phenomenon [13]. In the case of this research, the phenomenon is the application and transformation of the United States Military into utilizing the concept of NCW as their primary means of executing its mission.

This chapter will focus on the methodology employed for this research. The research was conducted by using two methodologies: exploratory analysis and content analysis. The mixed methodology approach, or triangulation, reflects an attempt to secure an in-depth understanding of the phenomenon in question. According to Flick, "the combination of multiple methodological practices, empirical materials, perspectives, and observers in a single study is best understood, then, as a strategy that adds rigor, breadth, complexity, richness and depth to any inquiry."[14] This chapter outlines the methodology used to conduct exploratory analysis as well as a content analysis on the data set.

This research intended to answer the following questions:

Research Questions

1. What are the similarities and differences between E-Business and Network Centric Warfare?
2. Does the literature identify gaps and overlaps between the two bodies of knowledge; further, does the literature indicate whether the military has effectively embraced the required components to become a technology-based culture?

Investigative Questions

1. Can visualization software be used to determine a relationship between the two bodies of knowledge?
2. Based on the proposed model, how does the literature on E-Business address the concept of IT Governance? How does that compare with the literature on NCW?
3. Based on the proposed model, how does the literature on E-Business address the concept of strategic alignment? How does that compare with the literature on NCW?
4. Based on the proposed model, how does the literature on E-Business address the concept of training? How does that compare with the literature on NCW?
5. Based on the proposed model, how does the literature on E-Business address the concept of technology? How does that compare with the literature on NCW?

The first phase consisted of exploratory research to gather articles written that identified not only literature on E-Business and NCW, but also the actions the organizations took in order to maximize effectiveness and efficiency of the information systems and technologies implemented within their organization. The second phase consisted of conducting an exploratory analysis by loading the literature into a visualization software tool to further identify any correlations within the literature. The final step in the research phase was conducting a content analysis of the literature to identify correlations in the literature of the two areas.

4.2 Exploratory Research

Exploratory analysis searches the data for structure or trends and attempts to arrive at a hypothesis. [13] This chapter includes a description of the dataset, the selection process for the data, how the data was prepared to be compatible with the software tool, and an introduction to the data analysis tool itself. The technique used to analyze the dataset will also be explained. This chapter will conclude with a description of the second methodology used: content analysis.

Data mining has been successfully used in several research areas to find correlation in the information and data sets for a specific topic. This research intends on using data mining to find trends within E-Business and NCW literature. The proposed theory is that data mining, coupled with visualization software will uncover trends within the literature that are undetected by the human eye. The intent is that using the software will identify new knowledge and information on topics that have been extensively

covered in the literature. Since these trends are represented graphically, it gives more credence to the strength of the relationships that exist within these topic areas. Instead of starting with a specific hypothesis, using visualization software seeks to discover hypothesis within the dataset in hopes of adding to future research areas. This chapter will explain how this will be done.

4.3 Dataset

The dataset was obtained through exploratory research. The researcher collected articles pertaining to the topic areas of E-Business and NCW. The E-Business articles were found entirely through research using the Air Force Institute of Technology's library databases. The literature on NCW was found through a combination of the library's databases and World Wide Web searches.

4.3.1 Data Characteristics

Each of the E-Business documents was in Adobe Acrobat © form. The NCW literature was in both Adobe Acrobat © and Microsoft Word © form. For this analysis, the researcher used a total of 41 E-Business literature documents and 22 NCW documents, for a total of 63 reviewed. The documents were selected if they contained the key words: E-Business or NCW.

The researcher manually reviewed each of the documents for content. The content was then used to write an overview of each of the topics found in Chapter Two. If the documents contained the keywords indicated above, but did not add to this specific research, the document was not included in the overall dataset. The review of the literature on these can be found in Chapters Three and Four.

4.3.2 Data Preparation

In order to use the documents with the analysis software, the documents first had to be converted to a compatible format. First, each of the .pdf documents on E-Business were converted into text (.txt) files. Then, each of the documents pertaining to NCW was also converted to .txt files. This was a necessary step to ensure the software could correctly analyze the data set. With this software tool, the researcher has the option of loading each of the .txt files into one large document, delineating each specific document by a single row of dashes, or an analyst can load each of the .txt files into one large file without delineation. Both methods would produce the same results. For this research, the researcher loaded each of the .txt files into one large file for processing (without delineating between each separate document).

4.4 Visualization Tool

Spatial Paradigm for Information Retrieval and Exploration (SPIRE)™ was originally designed for use with Unix systems, SPIRE™ provides the user with a macro-level view of thematic changes in a collection of documents and is designed to help with the identification of trends, patterns or unexpected occurrences of themes or topics within large datasets [16]. SPIRE™ aids analysts in (1) identifying the fundamental nature of the dataset without having to read the entire collection of documents and (2) allowing the user to interactively guide the exploration of the dataset solely by what (s)he sees or does not see in the data [41]. The goal in the creation of this software is to allow analysts to spend more time analyzing the data, rather than processing it.

In response to the large amount of information being created by the Information Age, IN-SPIRE™ was created to be able to be run with a Windows-based operating system. IN-SPIRE™ is the visualization tool chosen for this research. IN-SPIRE™ creates mathematical representation of documents, which are then organized into clusters and visualized into “maps” that can be then be analyzed. IN-SPIRE™ performs the following steps:

1. The text engine scans through the document collection and automatically determines the distinguishing words or "topics" within the collection, based upon statistical measurements of word distribution, frequency, and co-occurrence with other words. Distinguishing words are those that help describe how each document in the dataset is different from any other document. For example, the word "and" would not be considered a distinguishing word, because it is expected to occur frequently in every document. In a dataset where every document mentions "Iraq", "Iraq" wouldn't be a distinguishing word.

2. The text engine uses these distinguishing words to create a mathematical signature for each document in the collection. Then it does a rough similarity comparison of all the signatures to create cluster groupings.

3. IN-SPIRE™ compares the clusters against each other for similarity, and arranges them in high-dimensional space (about 200 axes) so that similar clusters are located close together. The clusters can be thought of as a mass of bubbles, but in 200-dimensional space instead of just 3.

4. That high-dimensional arrangement of clusters is then flattened down to a comprehensible 2-dimensions—trying to preserve a picture where similar clusters are located close to each other, and dissimilar clusters are located far apart. Finally, the documents are added to the picture by arranging each within the invisible “bubble” of their respective cluster. All of this information is then mapped onto the Galaxy and ThemeView visualizations that convey the document and topical relationships of your information [25].

There are two primary views within the IN-SPIRE™ software, Galaxy and ThemeView. In the Galaxy view, documents are represented as gray dots. The closer the dots appear, the more similar the documents are related. Dots located away from

the main data sets are determined to be outliers and are removed later in the analysis of the data. Figure 10 provides a visual representation of the Galaxy view.

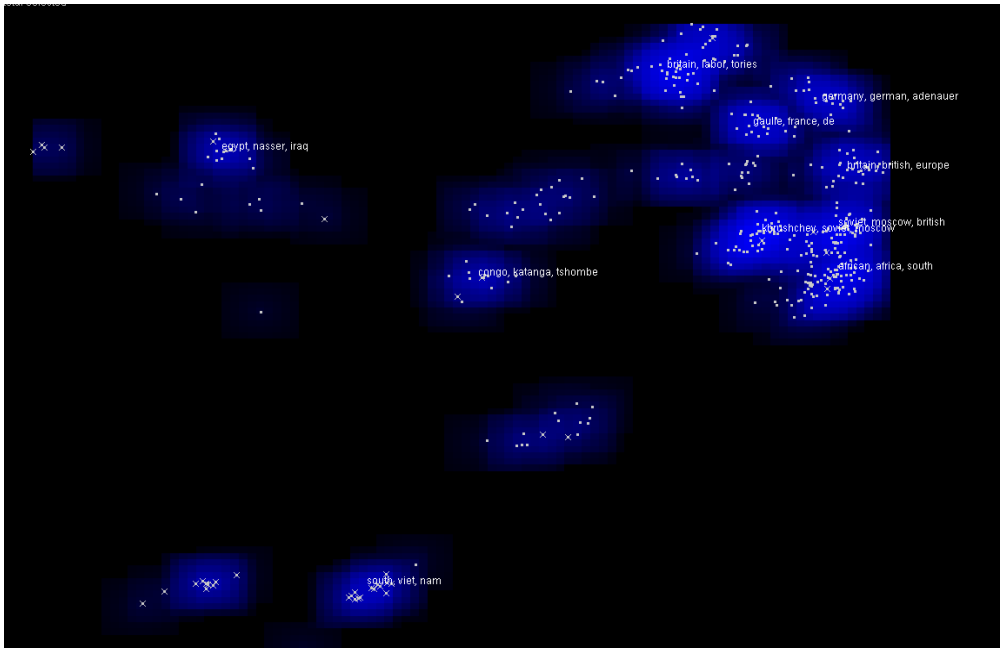

Figure 9: IN-SPIRE™ Galaxy View

The other view within IN-SPIRE™ is the ThemeView. In this view, for every major term in the dataset, each document having content related to that theme will add a little height to that layer. The higher the peak, the more the content is related in the documents. This view can be changed to get different view perspectives on the dataset in order to see the peaks more effectively. Figure 11 illustrates the ThemeView.

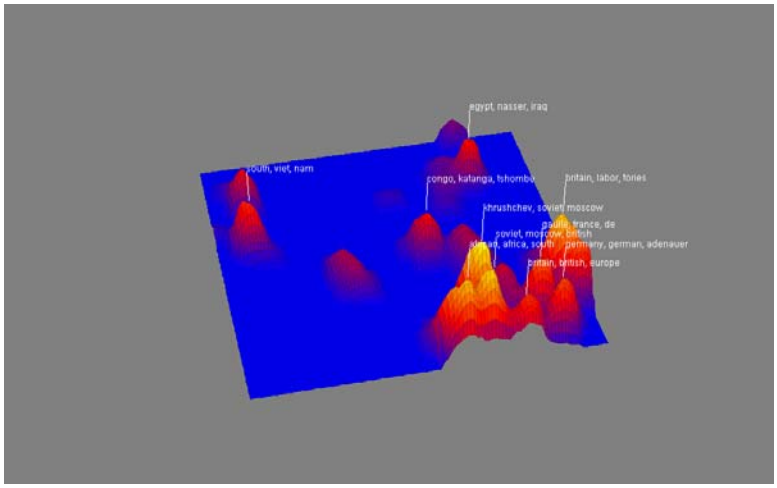

Figure 10: IN-SPIRE™ ThemeView

In addition to providing content analysis on the documents in a dataset, the visualization software has the capability of identifying more thorough relationships that exist within the dataset. The documents in the dataset can be gisted, grouped, time sliced and queried. Gist provides the keywords for each dataset as well as the amount of documents the keywords were found in. The grouping capability allows the researcher to group documents into a user-defined collection. The time slice option gives a chronological breakdown of the dataset. The researcher can then break down the dataset daily, monthly, or by year. In IN-SPIRE™, there are three types of queries available: by word, phrase and by example. Each of these adds more validity to the relationship of documents within a dataset.

4.5 Analysis Process

In order to get a feel on how to use the visualization software, the researcher first had the opportunity to meet with Captain Amy Rammel, who used the software on a previous research project [41]. Captain Rammel walked the researcher through the basic

operations of the software and shared her knowledge on how to capitalize on the software capabilities. Next, the researcher conducted a pilot study of the software to apply what Captain Rammel went over, as well as to get a feel for the intricacies of the software first-hand.

A default dataset of 425 Time magazine articles is already embedded within the IN-SPIRE™ software. The researcher used this data set to manipulate the data to get an understanding of the relationships that reside within this dataset. The researcher spent approximately a total of ten hours learning how to use the IN-SPIRE™ software, mainly through trial and error and the notes from the received training.

The researcher will load the .txt files into the visualization software and analyze the data using both the Galaxy and ThemeView options. The common themes will be examined to identify any trends within the dataset. Outlier terms will be examined and possibly removed. The researcher will also use the query, gist and probe tools within the software to further identify any relationships that may exist within the dataset. The full description of how the dataset was manipulated and analyzed for this specific research will be discussed in the following chapter, and thus will not be discussed at this time.

4.6 Content Analysis

The second methodology chosen for this research was content analysis. Content analysis refers to searching text for reoccurring words or themes [40]. More generally, "content analysis is used to refer to any qualitative data reduction and sense making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings." [40] The researcher chose to use content analysis as a way to complement

the results from the visualization software analysis and add more validity to the hypothesized model presented. According to Neuendorf, performing a content analysis is a nine-step process [33]:

1. Theory and Rationale
2. Conceptualization
3. Operationalizations
4. Coding Schemes
5. Sampling
6. Training and Pilot Reliability
7. Coding
8. Final Reliability
9. Tabulation and Reporting

Each of the steps will be described in the following sections.

4.6.1 Theory and Rationale

This initial step of content analysis involves asking the questions: what content will be examined and why [33]? Since the focus of this content analysis involved comparing the concepts of electronic business and NCW, the efforts focused on gathering literature on those subject areas. The reason for gathering literature pertaining to these two areas was to validate Mr. Money's claim that the DoD is embracing technology and the Information Age in regards to NCW the same way the private sector is embracing the concept of E-Business. The researcher's goal was to see if the two areas were indeed related.

4.6.2 Conceptualization

This step involves describing the variables used within the study. In this step, the researcher defines the variables being used in order for the reader to get a better understanding of the main concepts. For this research, the main areas were discussed in Chapter Two. For this research, E-Business is defined as an organization that has aligned their IT functions and objectives with their business objectives through culture change, IT Governance practices, strategic alignment framework adoption and a change in business functions. This process is facilitated through the use of technology. NCW is defined as "an information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization." [2]

There are several models depicting E-Business models, but the researcher was unable to locate a specific model that depicts the necessary components required to implement an E-Business strategy. Therefore, the researcher developed a model depicted in Chapter One.

4.6.3 Operationalizations

In this step, internal validity is discussed. The researcher determines the unit of data collection to be used, as well as whether to use human coding or computer-coding. For this research, the researcher identified 41 E-Business articles, and 22 writings on NCW.

4.6.4 Sampling

Since a complete census of the existing content is impossible [33], the researcher used articles which were available through various search engines through the Air Force Institute of Technology Library. These included, but were not limited to: ABI/INFORM, Proquest, DTIC. For the E-Business literature, articles were selected if they included the key word “E-Business” and the content discussed the nature of what E-Business is and mentioned how E-Business strategies were implemented within an organization. The NCW literature was selected based on the credibility to the author. To maintain integrity and credibility of the data, the researcher chose to include only those publications released by the Department of Defense.

4.6.5 Training and Pilot Reliability

Two coders were selected to analyze the articles selected for the content analysis. Each of the coders was fellow students at the Air Force Institute of Technology, pursing a Master’s Degree in Information Resource Management. Each of the coders was given the 63 articles to review. Their intent was to determine whether the articles pertained to the areas of E-Business and NCW. Each was provided the data set, and instructions on how to code the data. For the literature pertaining to E-Business, the coders were instructed to indicate the article pertained to that area if it: offered a definition of what e-business, discussed how an e-business can be implemented within an organization, why an e-business model is adopted. Similarly, the coders were to identify the literature as NCW if the article discussed the term "network centric warfare" or "net-centric operations" within the document, provided a definition of the term "NCW", or discussed

how the military is adapting to the Information Age by the use of evolving technologies. Once these articles were reviewed, the researcher used the literature to test the model proposed in Chapter One.

4.6.6 Coding

The primary researcher independently coded each of the articles to use for the research, but to add to the validity of the experiment, each of the documents was reviewed by two other people. The coder's intent was to determine whether the articles indeed pertained to the fields of NCW and E-Business. The coders were instructed to review each document and annotate their findings to the researcher. The researcher will be the primary coder for determining whether the individual articles and pieces of literature pertain to the five specific areas.

4.6.7 Final Reliability

After the coders examined the literature, the researcher was able to conduct the remainder of the experiment. If both coders agreed the literature pertained to the bodies of knowledge, the piece was used in the study. If there was disagreement between the coders, the issue was discussed further to see what factors influenced this decision. If both coders agreed the piece of literature did not pertain to the body of knowledge, the piece was not included in the overall analysis.

4.6.8 Tabulation and Reporting

The coder's findings were reported to the researcher through e-mail. Once the coders were finished with their analysis, the researcher was able to conduct the analysis of the two bodies of knowledge.

4.7 Researcher Strategy Limitations

As with any research methodology, there are some limitations associated with this research. This research only represents a small percentage of the articles available on the main topic areas, and the pieces of literature were randomly selected from what was available to the researcher. Researcher bias may also affect the overall results of the experiment.

4.8 Summary

The chapter described the methodology used to analyze the datasets including E-Business, and NCW literature. The dataset was discussed, and the visualization software that will be used for the analysis was described. Also, the secondary methodology of content analysis was discussed. The following chapter will provide a detailed description on the data analysis process and the results will be summarized. Chapter Six will provide overall conclusions, discuss implications of the research, and identify any future areas of research.

V. Analysis and Results

5.1 Chapter Overview

This chapter will analyze and discuss the data related to the research of the literature on E-Business and NCW. Using the data mining tool, IN-SPIRE™, the researcher attempted to break down the key concepts in the literature of each of these areas in order to identify and gaps and overlaps within the literature to determine if the United States Military is indeed focusing on all aspects of implementing an E-Business model across the entire enterprise, or only concentrating on the technological aspects of the business model.

The purpose of this chapter is to present the answers to the following research questions:

1. What are the similarities and differences between E-Business and Network Centric Warfare?
2. Does the literature identify gaps and overlaps between the two bodies of knowledge; further, does the literature indicate whether the military has effectively embraced the required components to become a technology-based culture?

As discussed in Chapter One, the investigated questions intended for this research are:

1. Can visualization software be used to determine a relationship between the two bodies of knowledge?

2. Based on the proposed model, how does the literature on E-Business address the concept of IT Governance? How does that compare with the literature on NCW?
3. Based on the proposed model, how does the literature on E-Business address the concept of strategic alignment? How does that compare with the literature on NCW?
4. Based on the proposed model, how does the literature on E-Business address the concept of training? How does that compare with the literature on NCW?
5. Based on the proposed model, how does the literature on E-Business address the concept of technology? How does that compare with the literature on NCW?

In order to answer each of these questions, the researcher will be comparing the content of the two bodies of knowledge to the proposed model in Chapter One.

5.2 Results of Exploratory Analysis

This section focuses on the first investigative question:

1. Can visualization software be used to determine a relationship between the two bodies of knowledge?

The researcher converted each of the 63 articles into .txt format and loaded the data into the software tool. There were two data sets: one for NCW literature and one for E-Business literature. The initial views of each of the E-Business and NCW data sets are displayed in Figures 11 and 12 respectively.

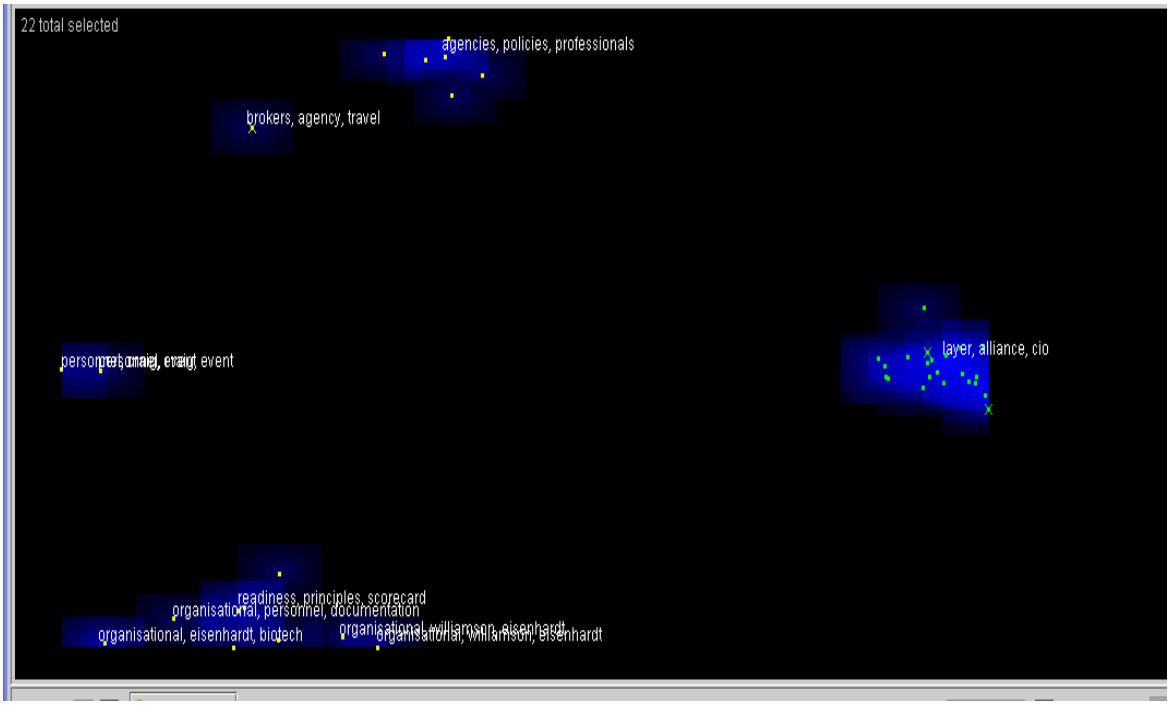

Figure 11: Initial View of E-Business literature

The initial view of the E-Business literature reveals five clusters of data:

- brokers, agency, travel agencies
- agencies, policies, professional
- layer, alliance, CIO
- organizations, principles, scorecard
- personnel, events

This indicates the relationships that reside within pieces of literature are strongest in these areas.

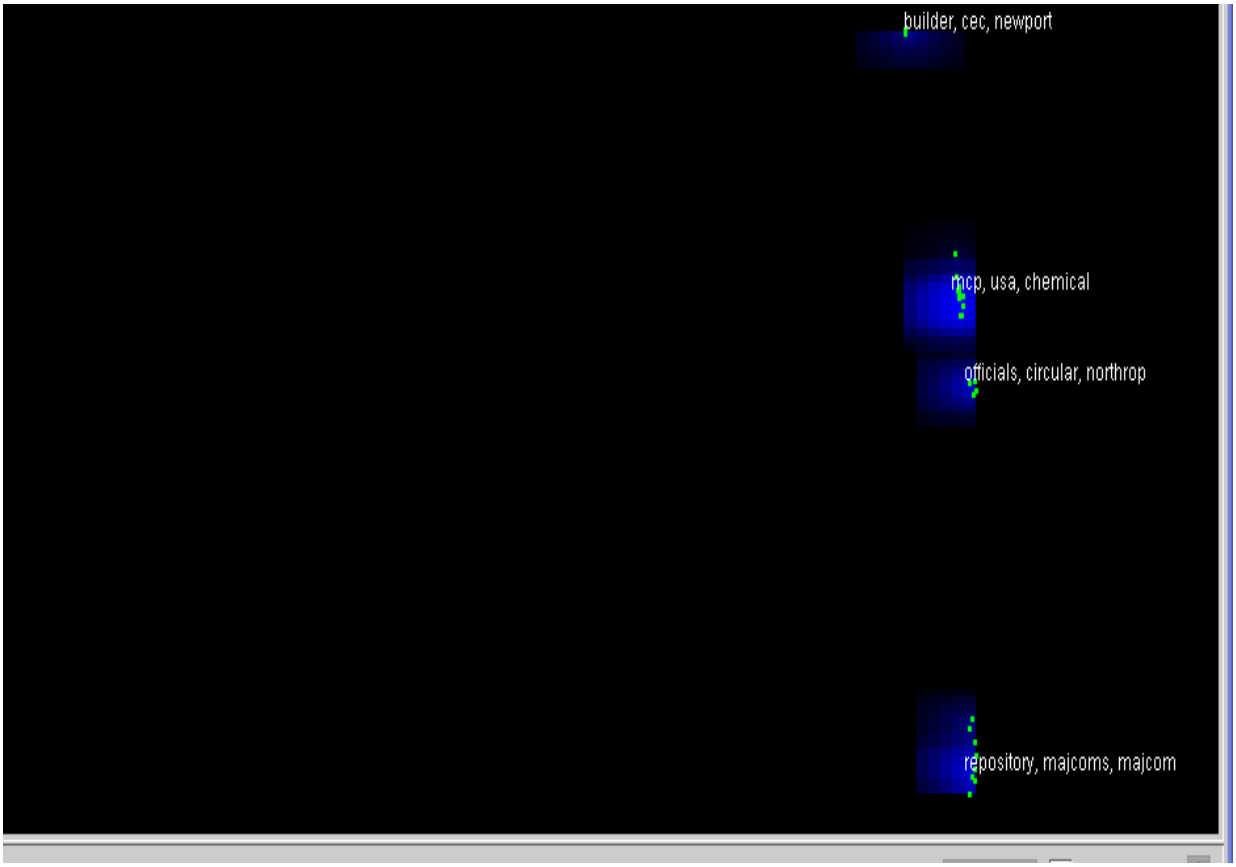

Figure 12: Initial View of NCW literature

The initial view of the E-Business literature reveals four clusters of data:

- builder, cec, Newport
- NCO, USA, chemical
- Officials, circular, Northrup
- Repository, MAJCOM, MAJCOMS

This indicates the strongest relationships within the NCW literature are within these four areas.

Since several of the data clusters had irrelevant terms, outlier terms were removed from each data set to further investigate whether the software could identify key related areas in each body of knowledge. The researcher removed several irrelevant terms from

each data set. However, removing outlier terms (which were determined by the researcher) did not reveal any significant relationship within the literature. Nor, did removing the outlier terms reveal the existence of any significant relationship between the two data sets (E-Business or NCW).

5.2.1 Conclusions from Exploratory Analysis

After extensively analyzing the data set, the researcher was unable to determine a relationship between the two bodies of literature using a visualization software tool, such as IN-SPIRE™. This could be a result of a variety of reasons. Initially, the bodies of knowledge do not have a common language from which to compare. It also possible that the number of articles loaded into the data set, limited the amount of data that can be analyzed, and which can ultimately be used to determine a relationship. Since E-Business strategy implementation can be a source of competitive advantage, many organizations are reluctant to divulge exactly what measures they enacted to implement these initiatives within their organization. In regards to NCW literature, there are not a large number of officially published documents, written by DoD-sanctioned offices on the concept of implementing NCW throughout the military. One reason for limited success in substantial findings could be the fact that the private sector and the military use different terminologies within their organizations, which make finding correlations difficult.

While IN-SPIRE™ is a data mining tool, designed to do specific tasks, it was not well-suited for the specific tasks in this experiment. Additionally, the data was pre-filtered prior to loading the data into the program, which limits the amount of true

relationships determined in the data set. It would have been more beneficial to do a generic search for "E-Business" and "NCW" in order to determine what relationships exist. Therefore, it is determined that a visualization software tool cannot be used to determine a relationship between the two bodies of knowledge at this time.

5.3 Results of Content Analysis

The goal of the content analysis was two fold. The first goal was to establish whether the articles loaded into the visualization software tool did indeed pertain to the areas of E-Business and NCW. After the coders reviewed the articles, it was determined that the literature the researcher used to compare the concepts of NCW and E-Business did indeed pertain to those specific areas. There was question on three of the articles by one of the coders on whether they pertained to NCW. However, after review of those articles, the researcher chose to keep those articles in the data set. There was one article in which the electronic file was corrupted, ("Impact of E-Business") and was not included in the research.

The second goal of the content analysis was to test the model through analysis of the E-Business, NCW and Air Force Transformation literature gathered by the researcher. The researcher used the articles gathered in the initial research phase to answer the investigative questions.

5.4 Testing the Model

This section will focus on testing the model presented in Chapter One, as well as answering the remainder of the investigative questions. The first research question:

1. What are the similarities and differences between E-Business and Network Centric Warfare?

The initial motivation for the research evolved from a speech given by Mr. Arthur Money in which he stated "the terms "network centric operations" and "network centric warfare" are used to describe various types of military operations in the same way the terms "E-Business" and "e-commerce" are used to describe a broad class of business activities that are enabled by the internet." [32] Since NCW has been described as the military equivalent of E-Business and e-commerce in the business world, the researcher's intent was to research the steps private businesses have taken to embrace technology and the Information Age, and compare those efforts to the ones taken by the Department of Defense. Through research, it was determined the private business world has recognized the necessity to capitalize on technology as well as the necessity to align their IT with their business strategy as well as to develop sound IT Governance structures and policies. The researcher concluded in order for the military to truly embrace the new business strategies offered by the Information Age and embrace the concept of NCW, the military will also have to embrace these same concepts. The researcher developed a model, shown in Figure 13, derived from the exploratory research conducted in the initial phase of the research.

5.5 Investigative Questions Answered

The remainder of this chapter will focus on validating the model by comparing the two bodies of literature in order to determine whether NCW and E-Business literature

address the same areas and using the information within the literature to answer the remainder of the investigative questions.

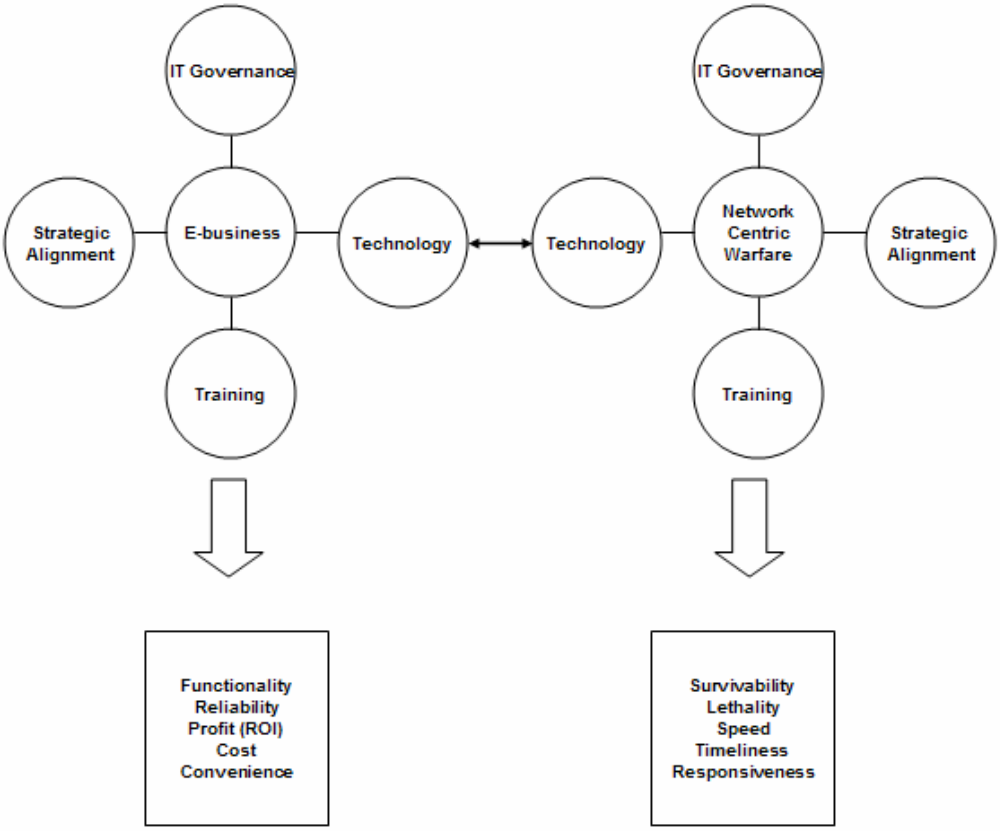

Figure 13: Proposed Model

5.5.1 Investigative Question Number Two

2. Based on the proposed model, how does the literature on E-Business address the concept of IT Governance? How does that compare with the literature on NCW?

The literature pertaining to E-Business specifically addresses the necessity of having sound IT Governance procedures prior to adopting an E-Business model or strategy within an organization. As discussed in Chapter Two, there are three primary

roles of IT Governance—policy setting, management control and monitoring of results. Each of these can be expected to mature at differentiation and effectiveness over time [42]. Unlike infrastructure and configuration guidelines on network devices in many organizations, an IT Governance policy for an organization is a dynamic document and should be addressed by management frequently to ensure it continues to be aligned with an organization's current strategy and business objectives. Because each business/organization is different, each is going to have IT Governance policies that are unique to its specific business objectives and strategic goals. With E-Business, flexibility is critical, and management needs to develop an IT Governance framework that accommodates for rapid changes which may occur within the organization.

In the literature, E-Business and IT Governance are key terms that are often discussed together. In E-Business, IT Governance is "the ability to manage IT, develop strategies, and create systems that are relevant to business operations and customers who interface with an organization."[17] Because most organizations expect a return on investment from their IT investments, applying IT Governance policies to an organization ensures there is a value contribution of those assets. In E-Business, the goal of IT is to meet the operating needs of a company as well as to focus on the customer. Most organizations do extensive research on all aspects of the organization—especially the effects to the overall culture of the organization—prior to implementing a new technology. Since an E-Business should be regarded as an "open-ended organizational network"[17], IT Governance procedures need to be developed prior to implementing an E-Business strategy in order to ensure an adequate fusing of technology and business processes.

The literature also points out the necessity to change senior level management's paradigms on IT. The growing infusion of E-Business technologies in and between organizations "has made executives recognize that getting IT right this time will not be about technology, but about developing and deploying appropriate leadership capabilities for governing IT effectively. The focus is thus no longer on the fixed structures and processes, but on agile leadership capabilities for governing IT under dynamic conditions."[38]

The literature on NCW does not specifically address the concept of IT Governance. The DoD Architectural Framework (DoDAF) is the only literature used in the research that discusses the need for IT Governance, but does not offer a formal definition nor ways to implement this concept on DoD networks. The reason could be different terminologies used between the private sector and the military. Consequently, the researcher set out to discover if the literature on NCW addresses the components of IT Governance, and how this concept will be applied to the military forces. Given the contextual definitions and discussions of the concept of IT Governance, the researcher analyzed the documents pertaining to NCW.

IT Governance directly challenges the current structure of the United States' military forces. As discussed above, IT Governance is geared toward flexibility and the evolution of policies and procedures to accommodate changes in the business environment. For the military, the business environment continues to be centered on the battlefield. The traditional concept of what constitutes a battlefield has evolved into a more asymmetric frame of reference. As technology becomes more pervasive, our enemies will have similar technological capabilities. Because of this, the military must

embrace a culture that encourages decentralized decision making as well as innovation at all levels. This is a direct challenge to the current structure of our forces. We, as a military, or more specifically, the Air Force, continue to implement new technologies into our infrastructure as well as govern and manage the new infrastructure with the same Air Force Instructions (AFI) that applied to the older systems.

The literature pertaining to NCW addresses the need to evolve doctrine, processes and information flows and there are AFIs that are in draft which address the new dynamic environment. This is in direct contradiction to what happens in the private sector, where policies and procedures are established prior to implementing new technologies. Personnel must know how to capitalize on and embrace new technologies in order for the organization to gain maximum return on investment. In a 2001 NCW report to Congress, a disconnect was documented between the "requirements and experimental processes"[11] as well as a disconnect "between experimental and acquisition processes.[11]" There is a need to evolve the organization and policy of the military, which are cornerstones to successful IT Governance procedures.

The need transform Air Force business processes to leverage information superiority is being addressed at strategic levels. The Air Force Information Strategy, published in 2002 states its purpose is to "bridge the gap between top-level vision and strategy documents, which include the Task Force CONOPS and the actual planning, decision-making and resourcing activities within the Air Force." [48] Initiatives such as the Commander's Integrated Product Team (CIPT) and Business Management Modernization Program (BMMP) focus on transforming business operations to improve warfighter support and creating flexible standards, but do not offer firm guidance on how

to transform business processes at all levels of the Air Force, or how that change will effect IT.

Therefore, it can be suggested that while the DoD has addressed the need of evolving policy and doctrine while implementing NCW at the strategic level, they have not developed specific IT Governance procedures that have been disseminated and embraced throughout each of the echelons of the military on how the military plans to execute these objectives combined with existing technologies in use. IT Governance procedures must be developed at the highest levels of command and disseminated throughout the forces. Military organizations of all kinds (support, operations, maintenance, logistics, etc) must then be held accountable to adhere to these policies, especially as the military as a whole evolves to a more Net-Centric force. This is a fundamental difference between E-Business and NCW. With E-Business, IT Governance procedures are either developed before or concurrent with an implementation of technology and are a cornerstone for a successful E-Business strategy to be implemented within an organization. With NCW, policies and changes to doctrine tend to be developed after the technologies are implemented, leading to different organizations using the technologies in different ways, limiting both the interoperability of the systems and how the information is used by both decision makers and the warfighter.

5.5.2 Investigative Question Number Three

3. Based on the proposed model, how does the literature on E-Business address the concept of strategic alignment? How does that compare with the literature on NCW?

As discussed in Chapter Two, strategic alignment addresses the need to align IT initiatives with business initiatives to ensure there is a common focus and direction throughout an organization. The literature on E-Business discusses the necessity for an organization to adopt a strategic alignment framework. Many organizations dedicated to transforming their business operations and adopting a more E-Business approach recognized the necessity to align their IT goals with their business goals, since technology is at the core of a E-Business strategy. Organizations realized early in their IT implementation the need to align their business objectives with their IT decisions, infrastructure and overall strategy. "Alignment grows in importance as companies strive to link technology in light of dynamic business strategies and continuously evolving technologies." [28] This is a cornerstone issue for businesses evolving towards implementing an E-Business strategy.

With E-Business, management articulates the value of IT to each level of an organization. As IT moves from a support to an enabler function, it also moves from solely being an infrastructure or technical work center problem to a concept addressed at all workcenters within an organization. Since the concept of E-Business relies on the successful implementation of a technology in an organization, it is a necessity to have structure and strategy aligned throughout the organization. In E-Business, IT is an enabler of business functions. Therefore, in order to succeed in E-Business implementation, organizations need to "evaluate innovative strategies that capitalize on both the power of the Internet and change in consumer demands from both traditional and electronic markets." [39] This becomes increasingly important as the Information Age progresses, and the environment becomes even more dynamic.

In order to fully take advantage of an E-Business strategy, management must align those initiatives with the overall goals of the business. As the business operations evolve, the IT goals must co-evolve with the business. This is essential to business seeking value from an IT investment. With businesses adopting E-Business strategies, the business value "derived from IT investments only emerges through business changes and innovations, whether they are new business models or process change, and organizations must be able to assimilate this change if value is to be ultimately realized." [35] This can be accomplished through successful alignment of IT and business strategies. The strategic alignment initiatives adopted by an organization should be embraced at all levels and can be used as a source of competitive advantage.

As discussed above, strategic alignment of the IT and business practices is an essential component to a successful implementation of E-Business within an organization. With businesses adopting E-Business strategies, management recognizes the need to align all business functions in order to have responsibility and accountability, not only of the new technologies, but also of the business processes it effects.

While the literature pertaining to NCW addresses the need for NCW to be the cornerstone for each of the service's transformation efforts and development of strategic plans, the military is lacking complete strategic alignment initiatives by its own admission. In a 2001 report to congress, several significant impediments to the progress of NCW were addressed, which included:

- Lack of strategic plan expressed in terms of network-centric hypothesis
- Lack of organizational focal points in OSD, the Services, Agencies and the Joint Community to promote and assist with the attainment of network-centric capabilities

- Lack of progress towards an info structure that achieves the levels of connectivity and interoperability needed to support Network Centric Operations [11]

Without a clear strategic plan and alignment of both IT and mission initiatives, it will be extremely difficult for the United States military to successfully execute NCW objectives. The report continues "with nothing but a general vision to guide them, each organization will develop its own sense of urgency and own set of priorities."[11]

However, there are some initiatives in place to implement strategic alignment within the federal government. For instance the Performance Reference Model (PRM), as depicted in the DoDAF, speaks to the need for alignment of IT within the DoD. The Performance Reference Model (PRM) identifies performance measures and will be enforced starting in 2005 and beyond [12]. The goal of the PRM is to provide a common and consistent framework for the DoD to use for IT performance measurements. To be compliant with OMB requirements, as well as the Clinger Cohen Act, an agency must identify performance information that pertains to any major IT investment.

The PRM is designed to serve three main purposes [12]:

– Help produce enhanced IT performance information to improve strategic and daily decision making
– Improve the alignment and better articulate the contribution of IT to business outputs and outcomes, thereby creating a clear "line of sight" to desired results
– Identify performance improvement opportunities that span traditional organizational structures and boundaries

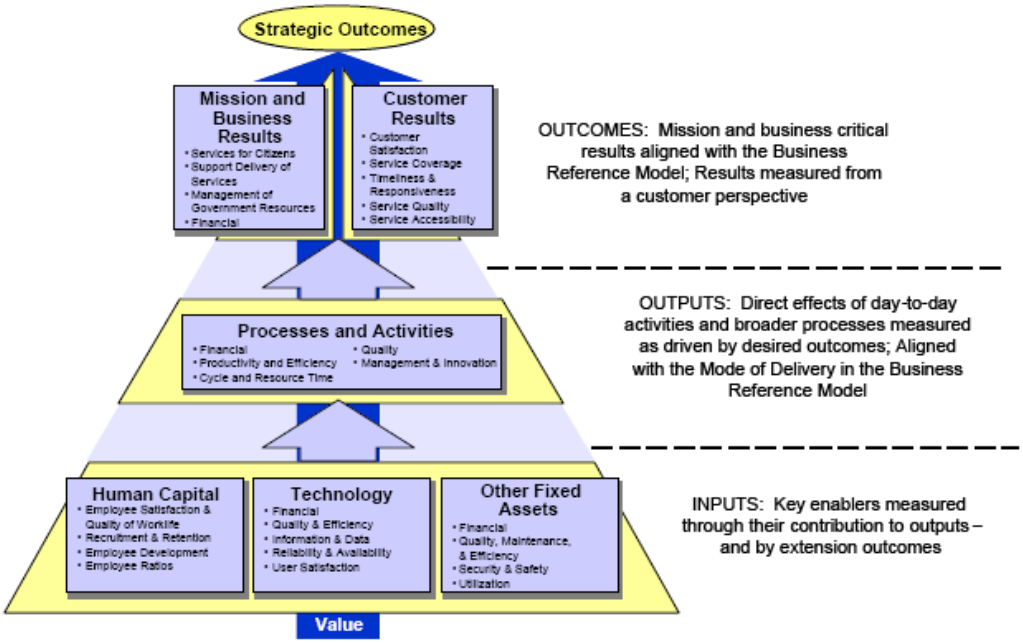

Figure 14: Performance Reference Model [48]

The problem with the PRM is it does not give any guidance on how changes to technology and internal processes will be implemented in the organization. It also does not show how IT is related to the business function and the effects IT has on the overall objectives of the organization.

In order to embrace the strategic alignment initiatives similar to what is being accomplished in the private sector, the military needs to align its IT priorities with its mission objectives. This is not going to be an easy task, as the Global War on Terrorism progresses and the battlefield continues to evolve. Long term IT strategic initiatives are going to need to be developed which complement the short-term mission and IT objectives facing today's forces. As strategic alignment becomes a more prevalent theme throughout the military, there will be a more tangible relationship between IT and mission objectives. Initiatives such as the PRM and compliance with Clinger-Cohen Act

will assist in the military's attempt to assess the operational impact of technology, but a more robust strategic alignment framework needs to be adopted in order for the entire force to understand how IT is an enabling function to fight wars.

The literature pertaining to NCW does address the need for strategic alignment of IT within the military, but it does not specifically address the need for an adoption of a strategic alignment framework. The literature does not address how the different agencies and services within the DoD and military are going to be held accountable to sustain any alignment initiatives as well as how they are going to understand and integrate alignment into their overall decision making process. In order to truly embrace this aspect of E-Business as a force multiplier, the military will have to eliminate the stovepipes associated with the different business units that execute mission objectives. This will help eliminate some of the problems with miscommunication that exists when difficulties arise from using technology to facilitate a mission execution. By adopting and embracing a strategic alignment framework, the military will have a common language and direction to use and reference when completing a task and more people will understand the necessity to implement technologies that are aligned with their long term mission strategies.

5.5.3 Research Question Number Four

4. Based on the proposed model, how does the literature on E-Business address the concept of training? How does that compare with the literature on NCW?

The E-Business literature addressed training as an essential component to

implementing a new business model within an organization and must be done prior to implementing change. The adoption of an E-Business model requires organization-wide change. Therefore, training is a necessity in order for personnel to understand how to maximize output using the efficiency of the new technology or business process. In E-Business, training is not limited to "how" to use a new technology, but the management also conveys to their personnel "why" the organization is changing and adopting a new business strategy, as well as how this is going to affect their role within the organization. This is very important because people must understand their current and future role in an organization that is evolving. Management must ensure their people are adaptable and flexible in this new environment. Once management trains their personnel on the cultural/organizational change, they can then focus their efforts on training the new technologies. This is accomplished in order to achieve a maximum return on investment. Organizations need to ensure everyone understands the capabilities and can adapt to these new ways of conducting business.

Training must be conducted at all levels in order to ensure a smooth cultural transition that is inevitable when adopting an E-Business strategy. A cultural acceptance to the change in business practices ensures a strategy change success. Personnel need to understand that they are still valued within the organization and essential to executing the new business strategies the organization has chosen to adopt. Management needs to allocate budgetary resources to account for training and make it as important as the new technologies themselves in order to facilitate a culture change. Training on the new technologies and business practices adopted by an organization is not only of value to the IT department, but the users as well. Adequate training helps facilitate the change and

understanding of how the different departments are interrelated. It also helps break down some of the barriers that exist between the different departments and IT department.

The NCW literature specifically addresses the issue of training, but the focus is training personnel on new technologies in their respective services or in a joint environment. The literature discusses the need to train personnel on how to adapt to the dynamically-changing battlefield, as well as with the inundation of information that is associated with Information Age technologies. However, more needs to be done in the area of training in order for the transformation into the Information Age to be successful. According to one government report there is a "lack of high quality, realistic training to help personnel at all levels understand and adapt to the increased flow of information, more centralized management, and other changes in the operating environment brought about by the strategic changes."[34] This lack of realistic training is making the adoption of new NCW strategies difficult throughout the military.

The Air Force Information Strategy cites nine goals needed to transform the force into the Information Age. Goal Eight addresses the need for a well-trained force that embraces new technologies. It also addresses the need to create career training which focuses on gaining IT skills as well as management experience. Specially, the plan addresses the importance of evolving "the Air Force culture, organizational norms and incentive and rewards systems to support incorporation of best practices in knowledge capture, and information assurance." [25]

The office of the Air Force CIO is responsible for tracking progress and results of the execution of the Air Force Information Strategy and the "MAJCOMs hold responsibility for implementing programs or projects in alignment with the Information

Strategy." [25] In order to achieve compliance with this goal, the Air Force needs to develop a program which holds MAJCOMs accountable for training their personnel on these new initiatives. The Information Strategy was designed to be "iterative in nature" and the gap analysis of the efforts underway across the Air Force was scheduled to be prioritized by Spring 2003. However, the researcher was unable documents which identified these initiatives.

In order to truly embrace the Information Age, the military has to focus on changing its entire culture. We cannot fight a war in the Information Age using an Industrial Age mindset. While training on new technologies is an essential component to adopting both E-Business and NCW strategies, the literature on NCW focuses predominately on the necessity to train on new technologies and the E-Business literature focuses on both the necessity for training personnel on the cultural changes, followed by the training on the technologies that will facilitate the strategy change. More effort needs to be focused on training the force to embrace these new NCW strategies across the military, since the success of NCW does not "depend upon our technical prowess, but on our ability to adapt and leverage the capabilities provided by the technology."[3]

5.5.4 Research Question Number Five

5. Based on the proposed model, how does the literature on E-Business address the concept of technology? How does that compare with the literature on NCW?

The essential element to both E-Business and NCW is technology. Both bodies of knowledge discuss technology as the enabler for the transformation into the Information Age. With both E-Business and NCW, business strategies revolve around a reliance on technology to execute mission or business objectives and technology provides new opportunities for an organization. The literature addresses the fact that many businesses who chose to adopt an E-Business strategy decide on an enterprise resource planning (ERP) software tool. ERP is an essential tool when an organization is embracing a concept of e-commerce and interaction with the customer to improve customer satisfaction. However, as discussed above, an E-Business is not just a business that relies on technology to conduct business (such as EBay or Amazon.com); it is a business that has embraced technology as a way of improving business operations and processes.

Organizations embracing E-Business initiatives recognize it is not just technology that transforms the organization. It is the combination of IT Governance and alignment policies which help the organization to remain flexible in a dynamic business environment. The literature supports the fact that businesses cannot solely rely on technology to change business strategies, since the available technologies rapidly change. With E-Business, there is an expected, tangible, monetary return on investment for any technology that is implemented within an organization. More organizations are developing an enterprise architecture approach, where the focus is on standardization of business processes and IT infrastructure. Also, with E-Business, there is a value assessed to each IT asset. In NCW, value is measured on an increase in the richness and reach of the information generated from the technology, not by any monetary measurement. This makes the ability to measure the impact of network outages on the mission difficult to

assess. With E-Business, business processes are improved through the combined use of IT Governance procedures, strategic alignment frameworks which are facilitated by the use of technology. With implementing E-Business strategies, as the technology evolves, more applications are developed, and amount of available information increases. The literature expects the framework and supporting methodologies for implementing these strategies to also evolve.

The NCW literature is centered on technology. The success of implementation of NCW is measured mainly on the success of the technologies on the battlefield. Technology has provided the military: increased accuracy on the battlefield, and allowed quality information to be transmitted to the decision makers faster than ever before. This is a main difference between E-Business and NCW initiatives: technology is a cornerstone for success in E-Business, but the main focus of effort in NCW. The military measures its successful transformation into the Information Age based on the success of the technologies on the battlefield.

5.6 Overall findings from analysis

In conclusion, "the strategic advantage of using information technology cannot be realized unless the organization goes beyond concerns of return on investment in technology to considering the value of information itself as an economic asset." [30] NCW is not a communications career-field specific initiative; it involves every Airman, Soldier, Sailor and Marine. The military cannot realize the benefits of NCW without a firm understanding of what IT Governance and strategic alignment is. Furthermore, these

concepts must be implemented at all levels of the military in order to be truly embraced by all personnel.

Through the analysis of the text, it can be suggested that a majority of the DoD efforts for transforming the military enterprise into the Information Age involves a heavy reliance on technology. As the literature suggests, "companies adopting E-Business strategies will have to develop deeper understandings of their products, customers, and partners through better information and knowledge creation, sharing and analysis in a shifting environment."[17] In order for the military to truly embrace the concept of E-Business strategies, focus will have to shift from achieving Information Superiority solely through the use of technology. Doctrine and policies need to also evolve concurrent with or prior to implementation of new technologies in order to sustain Information Superiority.

The Air Force recognizes the need to create a strategy that is "dynamic, flexible, and adaptive to new requirements and opportunities" [25], but continues to rely on technology to execute these objectives. The military will not sustain Information Superiority by technology alone. We will only sustain an advantage if we develop processes that transmit the right amount of information to the right person at the right time. For the military to continue to execute missions successfully, the quality and relevance of information is more important that quantity of information. The "Lines of Development" introduced by the Office of Force Transformation highlights the required elements for the military's transformation efforts:

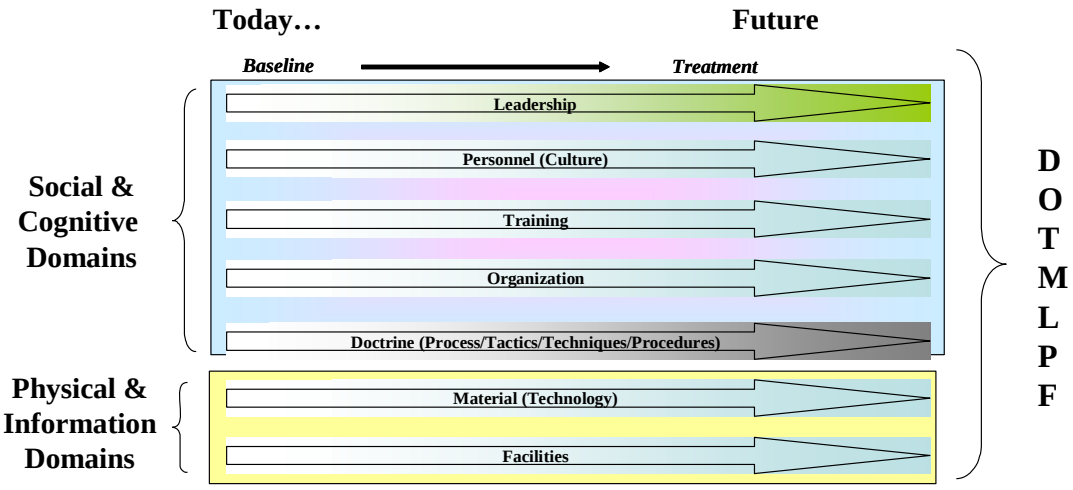

Figure 15: Office of Force Transformation's Lines of Development [15]

Three of the four main topic areas introduced in the researcher's proposed model are being addressed in some form within the United States military, as depicted in the above figure. The only facet of the proposed research model not specifically addressed by the United States' military transformation efforts and the above figure is the need to adopt strategic alignment initiatives which help align IT objectives with mission objectives.

Strategic Alignment is an essential element to any organization hoping to leverage the power of technology to sustain a competitive advantage in any business environment. The PRM addresses the need to consider alignment in terms of IT, as well as ensures compliance with the Clinger-Cohen Act. PRM does not offer a framework for the different functions within the military to understand how to leverage the IT and integrate that across the forces. In order for the PRM to be successful, personnel at all levels need to understand the PRM's role in strategic IT decisions. Without the adoption of sound strategic alignment practices, IT will continue to be perceived solely as a

communications community issue, and the business functions within the military will not be aligned from an IT perspective.

The significant difference between the two areas of E-Business and NCW shows organizations who have successfully implemented an E-Business strategy have adopted initiatives to ensure strategic alignment of their IT and business functions. The role of each business unit is conveyed to the other business units within the organization in order to understand how they are all aligned to execute the overall goals of the organization and how the IT infrastructure supports their strategies. The military has developed the PRM but lacks any formal guidance on how to properly and efficient align new technologies with mission objectives as well as to assess a value to the IT infrastructure to convey the benefits of these new technologies at an operational or tactical level.

In the Air Force, most of these efforts are concentrated at the strategic/HQAF levels. This is evident in the lack of interoperable systems which continue to be implemented within the GIG infrastructure at the tactical level. Strategic Alignment principles and adoption of the Strategic Alignment Model (SAM) will assist the Air Force in achieving NCW objectives, since the focus will be on leveraging the technology through doctrine and IT Governance, rather than on technology alone. The SAM could also be implemented within DoD agencies to facilitate NCW initiatives. The overall goal of the SAM is to "reflect the view that business (mission) success depends on the harmony of business strategy, information technology strategy, organizational infrastructure and processes and IT infrastructure and processes." [30]

As demonstrated through this research, the military places too much emphasis on technology to execute its mission as it transforms into the Information Age. The SAM

suggests there must be interdependence between business and IT functions to achieve alignment. The military must continue to evolve its business (operational) processes in order to harness the true potential of new technologies because "applying IT to old, ineffective, inefficient business processes will not create value."[30] It is the business processes and changes to policy and doctrine that will exploit technology.

Figure 16 represents a proposed solution to how the SAM could be applied to achieve NCW initiatives for the Air Force. Table 2 depicts an explanation of each component of the SAM, as it relates to the Air Force. The table presents the original components of the SAM, presented in Chapter Two as well as its Air Force complements, with an explanation of how the original components of the SAM can be adapted to Air Force operations. Through the research conducted, it can be suggested the Air Force has not established IT Governance procedures for its entire enterprise. In order to achieve alignment of mission and IT objectives, it is essential for leadership to develop IT Governance procedures, disseminate these throughout the force and train all personnel on their relevance. Adoption of the SAM for the Air Force could facilitate this endeavor.

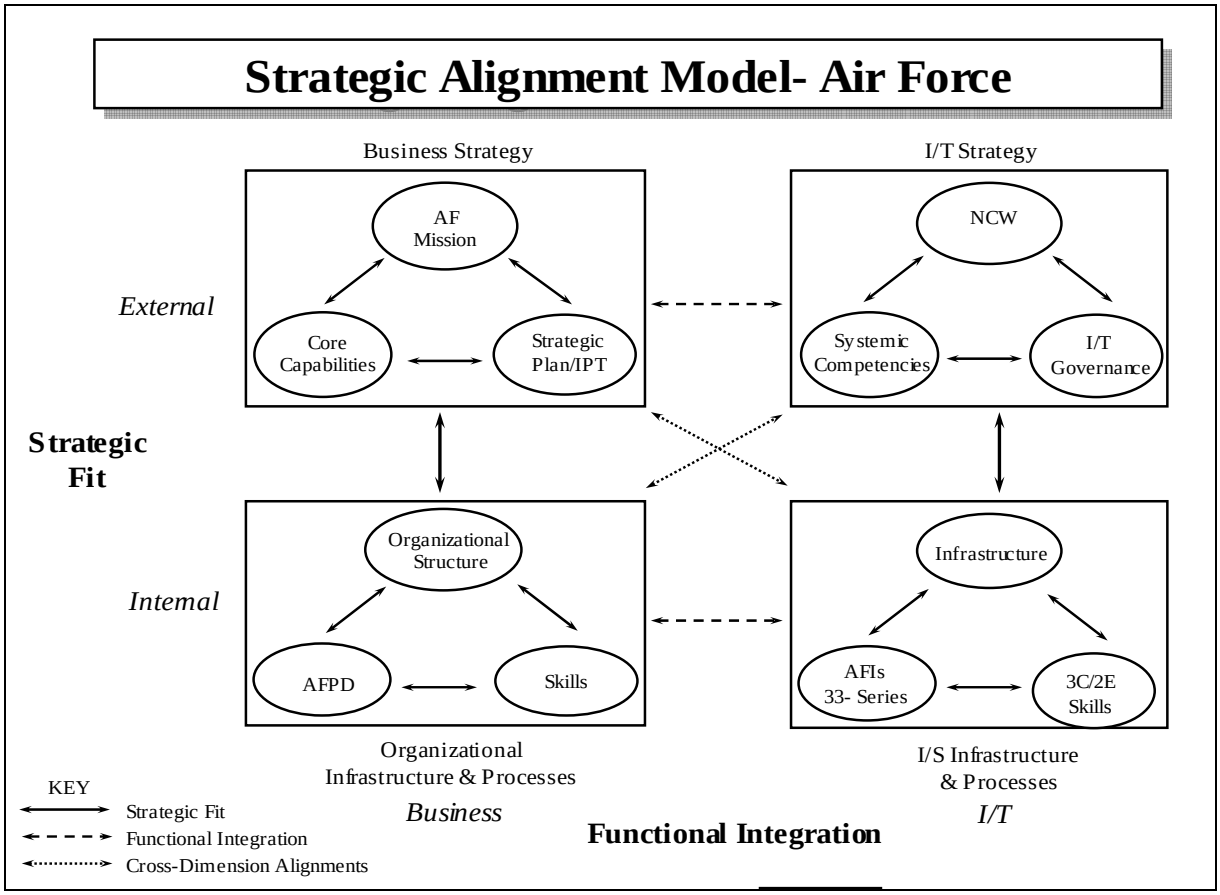

Figure 16: Adapted Strategic Alignment Model - Air Force

When a business adopts E-Business strategy, the effects of the strategy change are developed at the strategic level and conveyed throughout the organization's operational and tactical levels. Subsequent training ensures the entire organization understands and embraces the required changes. There is good reason for this. In the private sector, IT is assessed a monetary value and the organization's success often relies on the successful implementation of IT and how well the IT is aligned with the business processes of the organization. In private business organizations, management focuses on how a new way of conducting business will effect the daily operations of the business and assesses the need for a new business strategy based on its potential return on investment. The very

economic survival of an E-Business organization rests on the efficacy of IT and the successful integration of internal and external business processes. E-Business equals business plus technology, plus economics, as it brings about a new facet of the economy. [17] For the military, as well as the private sector, this new facet is the evolution of the Information Age.

Technology is going to continue to change faster than the organization. This is true for the military as well as organizations embracing E-Business strategies. The key to transforming an organization in the Information Age will be to remain adaptable and flexible. In order for the military to truly embrace operations in the Information Age, it must change the information culture to embrace these concepts. The military must adopt strategic alignment practices and educate the forces on the need for strategic planning at all levels. "Strategic planning sets the direction for an enterprise so that it over-comes potential threats that stand in its way while it take advantage of opportunities that present themselves."[30]

The focus of the military efforts can change if the military adopts a strategic alignment approach similar to the SAM. While traditionally conducted at the higher echelons of the military, strategic planning conducted at all levels will allow the importance of the change in culture to the Information Age to be conveyed to all military personnel. This will facilitate the dissemination of IT Governance policies, strategic alignment framework implementation and the integration of new technologies throughout the enterprise.

Table 2: Proposed Air Force Adaptation to SAM

Traditional SAM Components	Definition	Air Force Modification	Air Force Equivalent
Business Strategy **Business Scope**	How an organization distinguishes itself from the competition. [20] The overall goals of the organization.	**AF Mission**	The mission of the Air Force
Distinctive Competencies	The strategies used to deliver a product to the customers. What gives the organization an advantage and differentiates it from competition.	**Core Capabilities**	Air and Space Superiority Global Attack Precision Engagement Agile Combat Support Information Superiority
Business Governance	Business processes that are in place to execute a strategy.	**Strategic Planning**	IPTs, BMMP, OSMP
Organizational Infrastructure and Processes **Operational Infrastructure**	The internal hierarchy that is in place that supports the execution of a business strategy, policy writing and decision making.	**Organizational Structure**	HQ/USAF, DRUs, Agencies, Wings, Squadrons
Skills	Identifies the key skills of staff members who need to carry our business processes and business strategies	**Skills**	PME, IDE, SDE
Processes	The processes in place to support the execution of a business strategy. Those choices that define how key business processes will operate.	**AFIs/SOPs/ AFPDs**	Operations Series
IT Strategy **Technology Scope**	Addresses the available technology that can be used to support the business strategy and which IT systems are critical to the organization. [20] (i.e. LANs, expert systems)	**NCW**	LAN, GIG
Systemic Competencies	The specific attributes IT needs to have to support the business strategy. Those attributes of IT strategy that could contribute to the creation of new business strategies.[20] (i.e. value of IT)	**Systemic Competencies**	Lethality Speed Survivability Timeliness Responsiveness Richness/Reach
IT Governance	Strategies for creating and providing the overall IT strategy that supports IT. What the ultimate goal of the IT infrastructure is.	**IT Governance**	AF lacks IT Governance Procedures/Guidance
IT Infrastructure and Processes **IT Infrastructure**	The policies that define the overall software and hardware infrastructures. (Configuration management)	**IT Infrastructure**	CITS, AF Enterprise
Processes	Key Information security policies and procedures that govern the daily operations of the IT organization.	**AFIs**	33- series
Skills	The technical skills needed by personnel in the IT organization	**Technical Training**	2E/3C Skill sets

5.7 Summary

The basic premise to both E-Business and NCW is similar: to change business processes in response to advances in technology and to achieve a strategic advantage over the competition. The strategic advantage in E-Business and NCW does not come from the technology alone, it comes from the ability of an organization to exploit the capabilities from the technologies to evolve the business processes and procedures and adoption of a strategic alignment framework in order to seamless integrate those technologies into the organization. The military, not unlike the private sector, expects to accomplish a specific objective once a technology is implemented within the organization. The 2001 NCW Report to Congress, calls for co-evolution of "technology, organization, and process", however the literature gathered by the researcher does not support that these actions are occurring at all echelons of the military. Therefore, in order for the military to evolve in the Information Age, military planners must focus more on mission requirements coupled with strategic alignment and less on specific technology.

When the military relies on technology to help fight wars, execute its missions and transform the force, it needs to develop structures, doctrine and policies that are aligned to facilitate those initiatives. This must be done either before or during execution of these technologies on the battlefield. Personnel must embrace these new technologies and understand how they facilitate the mission objectives of the unit in order maximize the effectiveness of those technologies. Technology may make the forces faster and leaner, but it is only through IT Governance and strategic alignment that the military will maintain its success on the battlefield. Eventually the technology will become obsolete

and the enemy will develop capabilities that exploit the advantages of the technologies the military has come to rely on, especially with the onslaught of asymmetrical warfare.

The adoption of a strategic alignment framework, coupled with an enterprise architecture approach to integrating new technologies will help operationalize network outages. Together, they will give commanders a better understanding of the impact these outages have to the overall mission. Each system and mission will be aligned together and the relationship between the IT and business objectives will be clearly defined and the interoperability of the processes will be clearly articulated. The framework is going to look different at each level of the military. Fundamentally it will be the same since there will be continuity at each level. Each unit will be continuously thinking in terms of alignment. Each unit will know how their organization helps execute the overall military mission.

Adoption of a strategic alignment framework, such as the SAM, will assist both the communications and non-communications personnel alike manage the value of IT. Strategic alignment will help facilitate the mapping of IT objectives to each unit. It will help alleviate the misconception that an IT outage is primarily an IT problem, since with NCW, the success of mission will depend on the integration of IT and the unit's processes. A framework such as SAM could potentially help the military assess a tangible value to an IT investment and link an IT outage with a mission impact, something that is lacking in the current IT infrastructure on today's military networks and GIG concept.

Strategic alignment is a continual process. The military must continue to evaluate the internal and external forces which influence its standard operations. The constant evolution of technology is going to require a consistent re-evaluation of the

policies and doctrine from which the military operates. This will also directly challenge the current structure of the military, since it will require many of the traditional, static hierarchies and decision-making entities to evolve through a more dynamic process. The bottom line is that we cannot continue to fight a twenty-first century war in the Information Age with a twentieth century hierarchy and processes.

VI. Conclusions and Recommendations

6.1 Chapter Overview

The intent of this research is not to imply these E-Business initiatives presented in the proposed model are not taking place within the Air Force. There are offices within the Office of the Secretary of the Air Force Warfighting and Integration and the CIO (SAF/XC) which are devoted to the development of policies to establish NCW throughout the enterprise. However, despite rigorous research, the researcher was not able to obtain official policy or Air Force guidance on how to implement NCW strategies into an organization at the tactical or operational level. Decision makers are recognizing the need for the evolution of doctrine and polices but continue to deploy new technologies on the enterprise without developing these changes at the operational and tactical levels. The Office of Force Transformation's Line of Development, commonly referred to as DOTMLPF, specifically speaks to the areas of training, culture, doctrine and material (technology). These areas have been identified as the key components in order to succeed at transforming the force into the net-centric environment and each are interdependent. The DOTMLPF does not address how changes to these areas effect the overall organization, or how each are aligned to support the overall mission of the military. In order to truly embrace the concept of NCW, the Air Force must change its culture, focusing on and teaching the concepts of IT Governance and strategic alignment to all career fields, at all levels.

This research presents a model of required elements to implement an E-Business strategy within an organization. From the research conducted, it can be suggested the Air

Force has not adopted IT Governance procedures throughout the enterprise. Networks are still managed through guidance given under Air Force Instruction 33-115, which limits flexibility and innovation at the local level and hinders the ability for leaders to strategically plan at the Squadron level. While it is true each base network and supporting technologies support a different Wing mission, these technologies and objectives should be aligned together. As technologies continue to evolve, the Air Force is going to need to develop policies and processes that are just as dynamic as the technologies themselves and encourage flexibility as well as innovation.

In terms of training, there is little debate that training is being conducted on new technologies within the Air Force. Our personnel are indeed being trained on the newest, high-tech technologies that are used to support the warfighter. However, in the private sector, training is not only conducted on the technologies itself, but also throughout the organizations in order for leadership to fully understand the implications the technologies will have to the overall daily operations of the firm. Companies devote a significant amount of time to measuring the expected return of investment, developing metrics for amount of time saved and the expected increased in productivity. In the Air Force, especially at the Squadron level, training is focused on technology. Frequently, a unit sends personnel to receive training on a system, who then become the subject matter expert on that system. Consequently, because of the high operations tempo many units have, that person is the only person within the organization who is training on that system and has the sole responsibility of keeping that system operational. To succeed at NCW, the Air Force needs to develop a culture which fosters a more robust training environment to ensure there is redundancy of personnel trained on the systems used to

support the mission. Once this is accomplished, leaders will then be able to devote more time to the strategic planning of their units.

The final element of the proposed model is strategic alignment. This is the extent to which an organization's IT mission is aligned with its business mission, plans and objectives—at all levels. Organizations who have developed and implemented a strategic alignment framework, have not only ensured value was created from their IT, but have also successfully bridged the gap between IT and non-IT personnel. Alignment is an essential piece to achieving an E-Business strategy, and in order for the military to embrace the components of NCW, it needs to be the backbone of its efforts. In the literature, alignment is addressed in the DoD Architecture Framework (DoDAF) in regards to the Performance Reference Model (PRM), but this model does little to convey how the Air Force's warfighting strategy and IT strategy are aligned and support each other. This research proposes an adaptation of Henderson and Venkatraman's Strategic Alignment Model (SAM) to illustrate how these concepts from the private sector can be applied to military operations.

The military does focus on other essential elements required for implementing NCW, its measurement of success comes from the execution of technology on the battlefield. However, as our enemies learn to exploit those capabilities; our true competitive edge as it relates to NCW will come from the development of IT Governance procedures and strategic alignment of our IT and mission objectives. Becoming a truly agile force is the only way to contend with a rapidly changing environment and to exploit our enemy's vulnerabilities through information superiority.

Through the research conducted, it can also be suggested that the military needs to develop ways to quantifiably measure the success of implementing new technologies on the enterprise. In the civilian sector, profit is the driving force in implementing a new business model and spending large amounts of money on new technologies. Without a tangible return of investment, it will be difficult for the military to justify implementing new technologies on the enterprise to decision makers. Additionally, the Air Force continues to spend millions of dollars a year on IT, but the communications community stills has a difficult time determining the implication an outage might have to the mission. Assessing a value to new technologies as well as operationalizing network outages will help in efforts to align mission and IT objectives, since without assessing a value to a system, it will be difficult to convey to senior leadership the implications each system has to the mission.

Recommendations for Future Research

Application of the Strategic Alignment Model (SAM). Apply the SAM to each military service to determine if these areas are being addressed/how well they are being addressed throughout each respective service. Additionally, one could apply the SAM to current Air Force operations to identify gaps and overlaps in the model.

Balanced Scorecard. Research the Balanced Scorecard approach to managing IT networks and apply that to Air Force networks.

Clinger Cohen Act. Research the Clinger Cohen Act to determine whether United States Air Force has truly embraced each of its required elements. Also develop a

framework for the Air Force to assess the level of implementation of the required elements.

Transformation/Alignment Initiatives. Research the transformation efforts of each of the military services to determine if they are aligned with one another. Thoroughly examine 33-115 to determine what has to change to get Air Force networks focused on net-centric operations.

Model Validation. Test the proposed model through case studies on different technologies that have been implemented across the US military (for instance the Stryker Brigade for the Army)

Survey of Key IT Issues. Conduct a survey similar to Luftman and Brier's, surveying Field Grade Officers (Communications Squadron Commanders) and General officers (or Wing Commander equivalent) to see if the key IT issues for their respectively units are aligned both with each other as well as NCW initiatives.

Network Centric Warfare and Knowledge Management. Research whether NCW can truly be achieved without first establishing a sound knowledge management program. Case study of businesses who have gone through the process of attempting to effectively align their IT and business objectives and compare that to military systems that have been implemented

Conclusions and Significance of Research

Both E-Business and NCW are predicated upon the use of technology to evolve an organization into the Information Age. There are significant differences between the terms E-Business and NCW. It is difficult to compare the two concepts, since E-Business

strategies are a source of competitive advantage for many organizations. Consequently, many businesses are reluctant to divulge exactly how they implemented these strategies. The military and private sector use different languages to discuss their business operations, which make comparing these two concepts difficult. In the private sector, organizations cannot afford to simply apply money to technology without a tangible return on the investment and therefore assess a value to each IT capability within the organization, and know exactly how those assets correlate to the overall mission of the organization. Other than expanding its richness and reach, the military has not assigned a true value to its IT assets; and until we assign value to our IT as it correlates to our mission, it will be difficult to quantify the value of IT within the military organization.

This research presents a model in hopes of comparing the two initiatives of E-Business in the private sector to NCW in the military. The conclusions from this research are that the military cannot truly embrace the practices of business operations in the Information Age without changes to its doctrine, structure, and without adopting sound IT Governance procedures and a strategic alignment framework. An adoption of a strategic alignment framework will facilitate with short, medium and long term strategic IT and mission planning at levels.

Furthermore, if the military is going to rely on technology to help fight wars, and execute its mission, it is going to need to develop doctrine and policies that are aligned and complement those technologies, and since eventually those technologies will become obsolete. Additionally, technology will continue to change faster than the organization will. The Air Force needs to develop clear IT Governance procedures that are dynamic in nature and reflect the changes in the IT environment. The only way these efforts will be

successful is by fostering a cultural change at all levels, not just the strategic levels. Without developing these procedures, our technicians and management will continue to lack the mission perspective necessary to make strategically sound decisions. One suggestion would be to train personnel on the technology itself, then more importantly, focus training efforts on the effects the technology will have on the overall culture and mission objectives of the unit as well as the Air Force as a whole. This can be conducted at all levels of Professional Military Education, as well as within the technical schools with train our personnel on the technology.

In conclusion, the Global War on Terrorism has required the Air Force to be a more rapid response force. The required flexibility associated with this change challenges many of the traditional paradigms the military holds on executing war and peace time operations. The DoD wants to leverage new technologies similar to the private sector. In order to harness the power from technology and to truly capitalize on the opportunities presented by these new technologies, the military needs to draw upon the lessons learned from the private sector. There is little doubt that these technologies will enable the military to transform its operations into the Information Age, but it will take more than just technology to move the military from a platform-based to a capabilities-based force. As Donald Ryan suggested "even technologically backward societies have a nasty habit of devising strategies to offset America's high-tech superiority." NCW has the ability to provide commanders with unparalleled situational awareness of the battlefield. However, only when the IT objectives are aligned with the mission objectives can the IT infrastructure lift some of the "fog of war" associated with battle.

Vita

Captain Jennifer Valentine was born in Tonawanda, New York. After graduating Tonawanda High School, she attended Boston University. There, she completed graduate requirements for a Bachelor's Degree in Mathematics. Upon graduation, she was commissioned as a Second Lieutenant through the university's Reserve Officer Training Corps program. Her first assignment was with the 615th Air Mobility Operations Squadron at Travis Air Force Base, California. There, she was the Chief of Deployable Communications, providing rapid communications support to AMC and USTRANSCOM assets. Her next assignment was to Pope Air Force Base where she held a variety of positions, including Chief of Network Control Center, Mission Systems Flight Commander and Executive Officer for the 18th Air Support Operations Group.

Upon completion of her graduate program, she will be assigned to United States Air Force Europe Headquarters, at Ramstein Air Base, Germany.

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14. ABSTRACT

This thesis analyzes the fields of E-Business and Network Centric Warfare (NCW) in order to identify gaps and overlaps within the two bodies of knowledge. Successful implementation of E-business is more than simply applying a technology to an existing business model. It is about evolving business processes and structures in order for the organization to accommodate for this new dynamic environment. This thesis proposes that while the two areas' success fundamentally resides in the implementation and exploitation of technology, it is only through sound IT Governance policies and strategic alignment practices that success can be measured. Technology has the ability to bring increased capabilities to the warfigther. This work suggests the Air Force must analyze the implications of technology to its current structure, policies and processes prior to implementation on the enterprise. This thesis presents how the Strategic Alignment Model, as developed by Henderson and Venkatraman, can be applied to Air Force operations in order to better align its IT and mission objectives. Finally, this thesis proposes a model of the components necessary to execute an E-Business model within an organization and suggests the same components are necessary to execute NCW initiatives.

15. SUBJECT TERMS

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