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THESIS

**NETWORK CENTRIC OPERATIONS AND NAVAL
OFFICERS OF THE FUTURE: A FIRST ORDER ANALYSIS
OF DESIRED KNOWLEDGE, SKILLS, ABILITIES, AND
PERSONALITY TRAITS**

by

Scott A. Hendrix

September 2001

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Erik Jansen
George Thomas

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AND PERSONALITY TRAITS**

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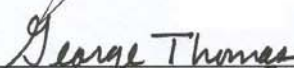
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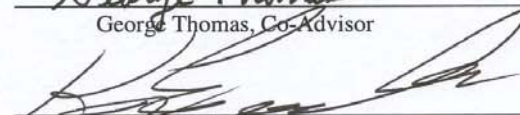
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ABSTRACT

The world is changing and future naval leaders must change with it. This thesis examines the future political, social, economic, and technological environments the Navy faces to determine future officer characteristics. A standard interview protocol is used to record the views of senior naval leadership and senior DON civilians who are experts in future warfare concepts and/or Navy manpower. From these interviews, future warfare and labor market requirements are examined. Due to increased speed and lethality during network centric operations (NCO), future officers will need to be broadly educated leaders who possess good decision making skills and core values. Future labor market requirements will demand officers who are leaders in diversity and possess leadership styles that motivate future generations. Because of the caliber of individuals demanded by NCO, future officers will need to possess greater interpersonal and team building skills to be effective leaders. To maximize the human potential of future officers, a new human resource strategy must be forged, one characterized by an adaptive manpower system that is holistic in nature as well as forward looking.

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EXECUTIVE SUMMARY

The Navy needs a more adaptive manpower system. In coming years, the Navy faces many different environments and uncertainties. The difficulty of warfare will increase. Warfare will see the advent of more precise and lethal weapons, increased maneuverability, speed and range. To operate successfully in such environments, the Navy is turning to networked operations. Network-centric operations call for more decentralized and quicker decisions made possible through the linking of sensors and shooters with technology thus allowing for increased battlespace awareness and dispersion of assets. Asymmetric warfare and the proliferation of weapons of mass destruction also will impact the Navy. The economic environments will likely call for a reduction in personnel, reduced manning on ships, and increasing difficulty in attracting morally strong, bright and talented individuals into a service-orientated organization. The social and political environments will be characterized by likely continued deployments for humanitarian and peacekeeping operations and a growing civilian-military gap due in part to the decreasing numbers of the American populace who have served in the Armed Forces.

With this uncertain future comes the need for good naval leadership and a strong naval officer corps. This thesis presents the results of interviews regarding the knowledge, skills, abilities, and personality traits needed for future naval officers. The primary focus of the interviews is on the impacts of network centric operations (NCO) on the desired characteristics of naval officers with a secondary focus on discovering the impacts of future labor market forces. The interviews were conducted with senior Navy leadership in many of the Manpower and Training areas of the Navy and with senior Navy leadership in many of the forward-looking warfare-centered areas of the Navy.

From the interviews seven major themes emerged:

1. Network-centric operations require both generalists and specialists.
2. Network-centric operations will drive the need for better teamwork.
3. Core values are vital to the future force.

4. Dealing with reduced numbers of people, whether in manning or in decision hierarchies, will impact future officers.
5. Communication/interpersonal skills are vital to the officers of the future.
6. Diversity will provide opportunities and challenges to the future Navy.
7. Future generations will possess many of the key skills required to thrive in network-centric operations such as team networking skills and skills for managing information from diverse sources; the expectations of future generations for the work environment will be high.

Drawing on the data presented in the interviews, this thesis makes five recommendations for policies that will help the Navy meet its needs for successful officers of the future. The five recommendations for the Navy are:

1. Develop risk-taking, broadly trained generalists to be at the center of network-centric operations.
2. Develop better screening and assessments for future officers
3. Develop a human resource system that facilitates better teamwork
4. Provide an officer learning continuum to include interpersonal skills and managing diversity training
5. Pursue ways to bridge the civilian-military gap.

Finally, these recommendations are just part of an overarching need for a holistic human resource system. In order to meet future personnel demands, an all encompassing and adaptive human resource system must replace today's piecemeal and disjointed human resource system.

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I. INTRODUCTION

A. OVERVIEW

For to win one hundred victories in one hundred battles is not the acme of skill. To subdue the enemy without fighting is the acme of skill.

Sun Tzu

In his commencement address to the U.S. Naval Academy class of 2001, President Bush spoke of the changing global and military environments and some of the skills that a future naval officer might possess. Drawing on Secretary of Defense Rumsfeld's recently completed review of the military, he called for a military that relies more on technology and intellect than on attrition style brute force (Allen, 2001). Bush further commented that he was committed to "fostering a military culture where intelligent risk-taking and forward thinking are rewarded, not dreaded."

Who is this naval officer who exercises the right amount of "intelligent risk-taking" and practices "forward thinking?" What other attributes should future naval officers possess? In addition to those attributes, this thesis seeks to describe, in a first order analysis, the Knowledge, Skills, and Abilities (KSAs), and personality traits that will be desired for the naval officer of the future.

B. BACKGROUND

The military of the 21st century will likely find itself in a place much different than today's landscape. In 1997, the National Defense Panel (NDP) reported to Congress on the need for the transformation of defense, citing a changing future operational environment, one that includes being confronted by those who oppose US policies at home and abroad often with asymmetrical responses (National Defense Panel, 1997). Joint Vision 2020 reiterates that point and talks of our nation facing "a wide range of challenges [that will] require a military that can both win wars and contribute to peace" (Joint Chiefs of Staff, 2000). With the incoming Bush administration, another defense transformation study was ordered. RAND and the Institute for Defense Analysis (IDA), comprising of senior military professionals, scientific advisors, and intelligence

professionals, recently conducted studies and cited many of the same emerging threats found by the NDP in 1997 (Davis, 2000; Institute for Defense Analysis, 2001).

Understanding these threats and future environments is paramount. Different environments, whether the global geo-political environment or the American social environment, will heavily impact and shape the desired attributes of future naval officers. The desire to provide insights into this future environment drive this thesis research because the more we understand the future environment, the better we can anticipate the KSAs and personality traits needed to be successful in it.

The role of the military in this environment is questionable. Some envision less of a need for traditional combat forces and a greater need for peace keeping and humanitarian assistance type forces (Kaplan, 1994). Others, citing troubles in Iraq and North Korea, call for immediate increases in military procurement and maintaining large, standing forces (USA Today, 2001, Sen. Kyl, 2001). Still others foresee a military environment comprising of information warfare and asymmetrical fighting (Berkowitz, 1995). As one can see, uncertainty persists in the military's future operating environments. With this uncertainty come differing opinions about what future environments will look like, and there is no clear consensus on how to be successful in such environments.

Whether the naval forces find themselves in a coastal defense role stemming proliferation of weapons of mass destruction (WMD) or in a close combat fight with North Korea, the Navy will be part of a networked force. A fundamental shift from attrition style warfare to precision warfare with fewer assets and less casualties is occurring in the military. Network Centric Operations (NCO) are emerging as the primary methods of operations, whatever type of mission is being executed, and are becoming the cornerstone of fleet operations. This research focuses on those officers who hold key positions in NCOs.

When examining the future naval officer, this research considers a wide breadth of missions from traditional war fighting involving ships, planes, and combat ground troops to missions such as domestic disaster relief. The accurate prediction of dynamic events in future environments is not an exact science. Thus the question of, "Which

missions will the Navy ultimately embark on?” leaves us with considerable ambiguity in trying to narrowly define the officers of the future. This thesis is broad in scope; it provides a general, first order analysis of the KSAs and personality traits needed by the future naval officer. As the future comes into focus, more defined KSAs and personality traits will emerge. This thesis is only a first step in what should be a continual reassessment process to identify and prepare for future KSAs of the officer corps.

C. DEFINITIONS

During this research the question arose of what is the dividing line between enlisted personnel and officers. The traditional sense of an officer is blurring. In the future, the definition of who is an officer and who is enlisted may be even less distinct. This research looks at those individuals who are tasked with leadership responsibilities. Obviously, many of these KSAs and personality traits are worthy attributes of all members of the armed forces. However, this research looks only at naval officers, both junior and senior.

We also must define what is meant by our central constructs: knowledge, skills, abilities, and personality traits. Knowledge is defined as an organized body of information, usually factual or procedural in nature. An example would be knowledge of relational databases. Skills are the proficient manual, verbal, or mental manipulation of data or things that are directly observable, quantifiable and measurable. An example of a skill would be typing. Abilities are the power or capacity to perform an observable activity or task that results in a product or consequence. An example would be the ability to identify signs of sabotage or hacking (National Institute of Health Human Resource Management, 2001, Federal Aviation Administration, 2001). Personality traits are defined as the complex of characteristics that distinguishes an individual, especially behavioral and emotional characteristics (Webster, 2001).

During this research, the impact of Network Centric Operations (NCO) upon the future officer is frequently discussed. For the purpose of this research, NCO is defined as “military operations that exploit state of the art information and networking technology to integrate widely dispersed human decision makers, situational and targeting sensors, and forces and weapons into a highly adaptive, comprehensive system to achieve

unprecedented mission effectiveness” (Commission on Physical Sciences, Mathematics, and Applications, 2000). NCO occurs not only in combat operations but also in peacetime operations.

D. SCOPE/METHODOLOGY

As mentioned previously, this thesis sets out to perform a first order analysis of the needed knowledge, skills, abilities, and personality traits desired in our future naval officers. A first order analysis is not a comprehensive look at all the possible KSAs needed to succeed in all the environments that the Navy will find itself in over the next 30 years. Rather, it is a first step in a continuing process that attempts to quantify those KSAs and personality traits needed for the future work environment. This first step is broad and used as a discovery means to uncover the attributes of future officers.

Figure 1.1 outlines the major areas examined in this thesis. On the left side of the figure, aspects of “Future Work” include NCO and general warfare attributes. This drives “future officer requirements” as well as “system requirements”. Future officer requirements are those human requirements needed to do well in future warfare scenarios. Future system requirements are human requirements forced onto the officer by the system design. The reason behind the verbiage “forced” is the reality that many current systems and near-term systems will still be in place during the next 20-30 years. Thus, the requirements to run such systems impact the KSAs of the future officers.

Figure 1.1 also shows this research’s examination of the future labor market. To understand the future officer corps, one must understand the future recruit pool and labor market forces. By determining societal issues and individuals’ needs, motives, and values characteristic of the future labor market, one can gain insights into future officers. By exploring those characteristics of the future labor pool early, the Navy can determine future officers’ strengths and weaknesses and design better human development and systems acquisitions programs to provide optimal human-machine performance.

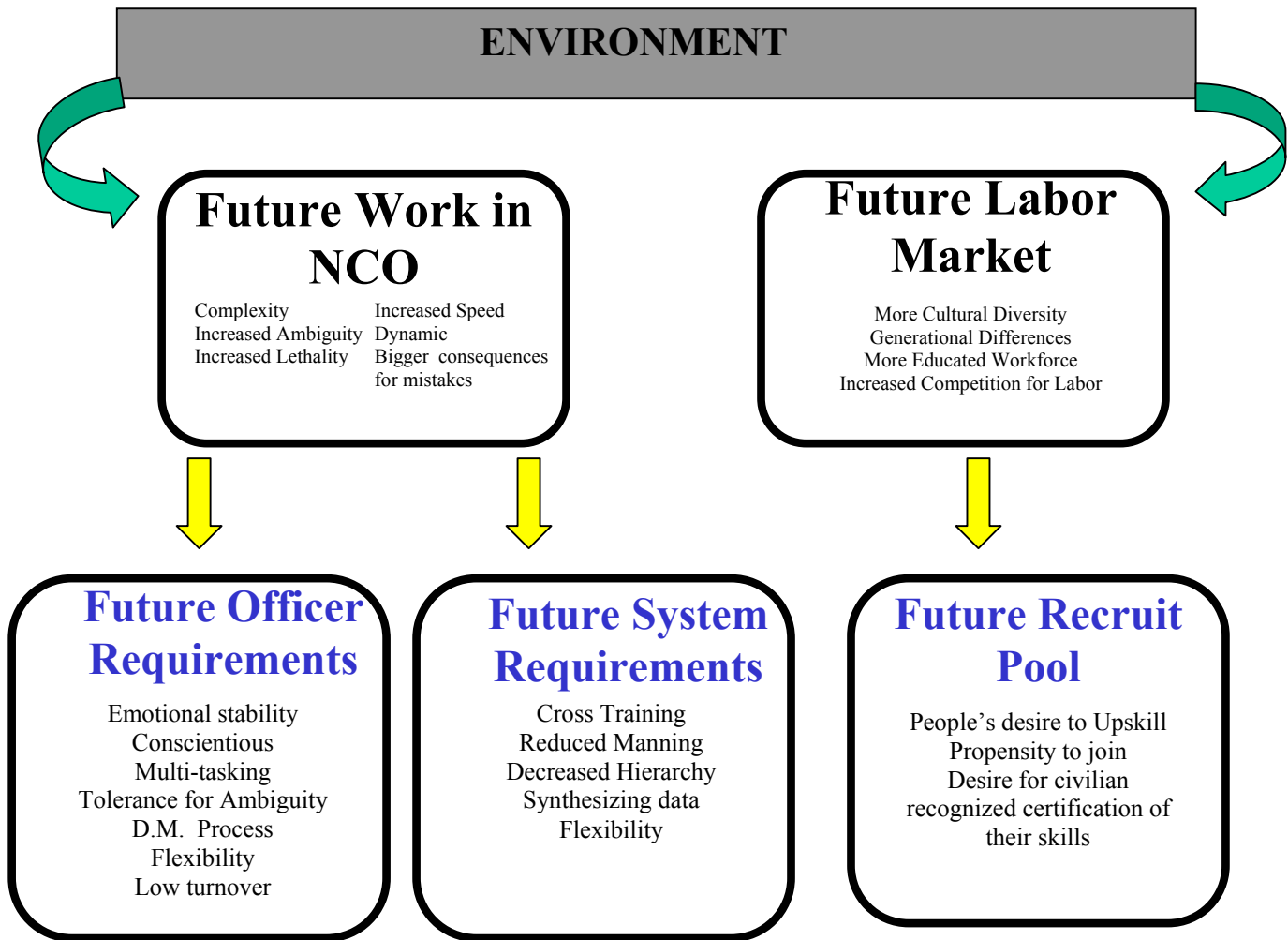


Figure 1.1. Conceptual Framework of Thesis Research.

The above-mentioned framework was used to determine the KSAs and personality traits by synthesizing:

- Selected readings on future warfare, NCO, military-society relations, and labor market trends
- Interview results of active duty and retired officers ranging in rank from O-6 to O-10, and professors from the US Naval Academy and Naval Postgraduate School, and high level DOD civilians who are experts in Naval warfare, NCO, and personnel issues
- Core competencies listed for 21st Century Warrior KSAs and personality traits generated by the Chief of Naval Operations Strategic Studies Group (Chief of Naval Operations Strategic Studies Group, 2001)

E. BENEFITS OF STUDY

As the Navy adapts to and shapes the future, it will need a firm understanding of the personnel requirements to succeed in a myriad of environments and, from that, it must determine the proper make up of naval officers. This study presents current, forward-looking leaders' perceptions of the attributes of future naval officers.

To provide a basis to examine future officers, Chapter II presents an analytical framework from which to understand the future. Chapter III looks at some of the emerging trends in several key environmental areas. Chapter IV provides a blended view generated by the interviews on future environments. In this chapter, the data and major themes of the interviews are presented. Chapter V then takes the ideas presented in Chapter IV and suggests ways to prepare the human resources of Navy to succeed in the future.

II. CONCEPTUAL MODEL

A. OVERVIEW

This thesis employs a conceptual model to define and assess the officers of the future. The systems model (see Figure 2.1) presented in this chapter provides a framework for examining the KSAs and personality traits of future officers. The systems model examines the different elements of organizational design at an organizational level.

To determine the KSAs and personality traits of the future naval officers, one must look at the entire landscape of the future and its environmental requirements. This model examines the future environment through several factors that will impact it: politics, economics, social factors and technology. It focuses on both the external and internal environments affecting the Navy. Recall from Figure 1.1 that this research examines two major areas of the overall environment: the military work environment, including things such as threats and national objectives, and labor market forces such as demographic trends and worker attitudes. Both areas, the military work environment and the labor market, are impacted by all the other environmental factors such as technology, society, politics, and economics.

B. THE SYSTEMS MODEL

The systems model examines five organizational design factors: (1) Task; (2) Technology; (3) Structure; (4) People and (5) Processes/Subsystems. The Environment/Context, Key Success Factors, and the System's Direction shape these design factors (McCaskey, 1985; Roberts, 1998). These in combination produce a culture that yields system outputs. When this model is applied to the future Navy as an organization, it yields insight into where the Navy is heading and helps define the desired KSAs and personality traits of the future officer corps.

The Systems Model

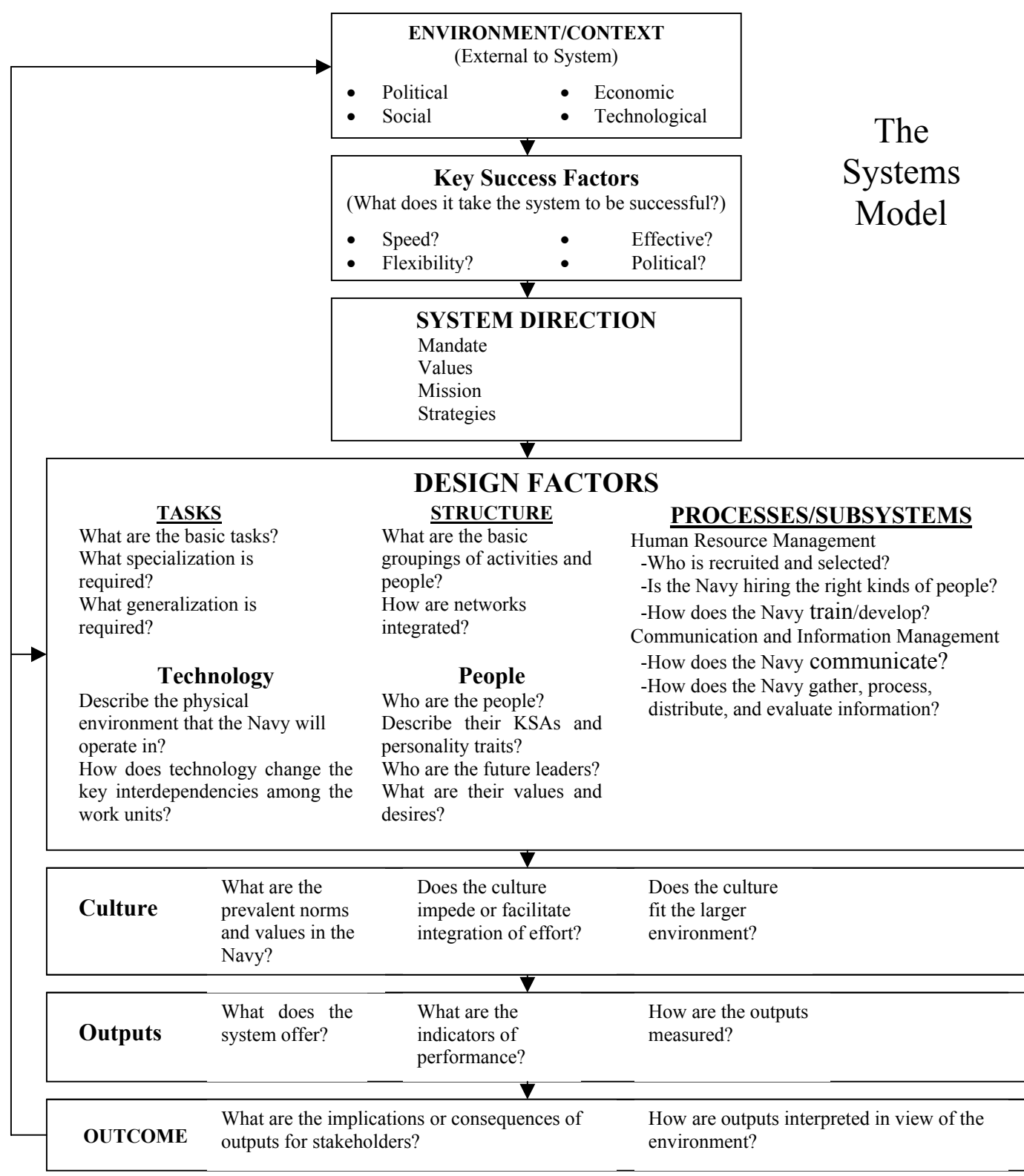


Figure 2.1. The Systems Model (After Ref.: McCaskey, 1992 and Nancy Roberts, 1998).

1. Environment/Context

The first element of the systems model is environment/context. It includes factors that are internal and external to the organization and system. Close examination of the political, economic, social, and technological environments occurs here. These elements profoundly impact the future of the Navy.

This research examines each of these environmental elements looking for driving forces, predetermined events, and critical uncertainties as Schwartz refers to them in his book, *The Art of the Long View* (Schwartz, 1991). Driving forces are those key factors that come from both inside and outside the organization. In the Navy's case, examples include technological change brought about by netted warfare or subtle shifts in societal attitudes toward war. Predetermined events are those events that we know are going to happen. The changing demographics in America are an excellent example. This country's workforce will become more diverse; a foregone conclusion due to minority birthrates and immigration in recent years. Finally, since trying to anticipate the future is an inexact science, there is an element of what Schwartz calls "critical uncertainty." To plan for that uncertainty the Navy must question the assumptions about how decision makers of today view the environment of the future.

Secretary Rumsfeld recently spoke to the members of NATO regarding some of these driving forces and uncertainties of the future:

The world of 2015 will almost certainly be little like today and, without doubt, notably different from what today's experts are confidently forecasting. The point is: none of us here has a crystal ball through which we can clearly see the future. While it is difficult to know precisely who will threaten us or where or when in the coming decades, it is less difficult to anticipate how we will be threatened.

Terrorism: We know, for example, that as an Alliance of democracies, our open borders and open societies make it easy and inviting for terrorists to strike at our people where they live, work, and play.

Cyber-attack: Our dependence on computer-based information networks make those networks attractive targets for new forms of cyber-attack.

High-Tech Weapons: The ease with which potential adversaries can acquire advanced conventional weapons (high-energy explosives, very fast torpedoes, surface-to-air missiles, sea mines, quiet diesel subs) will present us with new challenges in conventional war and force projection.

Ballistic and Cruise Missiles and Weapons of Mass Destruction: Our lack of defenses against ballistic missiles creates incentives for missile proliferation which, combined with the development of nuclear, chemical and biological weapons of mass destruction, give future adversaries the ability to hold our populations hostage to terror and blackmail. (Rumsfeld, 2001)

Determining as accurately as possible the attributes of the future officer relies on understanding these threats and challenges, determining what the Navy will have available to meet those threats and challenges, and then discovering the mismatches between the two. This thesis seeks to highlight some of the mismatches between those traits of today's officers and those traits needed to successfully operate the military systems of tomorrow.

2. Key Success Factors

In part two of this model, the question is asked, "What does it take for the system to be successful?" As applied to this research topic, the definition of success would be an organization that can thrive in this new millennium warfare arena. Key success factors such as speed, flexibility, reliability of systems, and accountability are crucial to the future success of the Navy as an organization in tomorrow's ambiguous world. In an uncertain, complex environment, one of the most important key success factors is effectiveness, which is usually gained through innovation (Roberts, 1998). Adequately prepared naval officers who are ready to meet the defense challenges in those future environments are the mechanisms to obtain such key success factors. Many of these key success factors will become apparent as the environment of the future is probed.

3. System Direction/Strategy Formulation

The next part of the systems model is the "System Direction and Strategy Formulation" element. The system direction and strategy formulation determines how those key success factors in the context of future environments will drive strategies.

Chapter V touches on some possible strategies generated by policy recommendations for the Navy to embrace to meet the demands of the future environment.

To understand the Navy as an organization, it is helpful to look at how the Navy fits into the larger picture of national interests and national security. National interests are the source from which national objectives and grand strategy arise, further determining the Navy's organizational missions. National interests can be viewed in terms of four broad categories: (1) defense of the homeland; (2) economic well-being; (3) favorable world order; and (4) promotion of values (Lloyd, 1997). Former President Clinton had three primary goals for national security: (1) enhancing our security; (2) promoting prosperity at home; and (3) promoting democracy (Lloyd, 1997).

While President Bush and Secretary Rumsfeld talk of changing military strategy such as the two major theater war requirements, certain parts of the National Security Strategy remain clear. To obtain our national interests, a policy of engagement in the world will likely continue in order to ensure that democratic values and individual rights are protected and to promote economic stability. However, President Bush recently has come under fire for being an isolationist. His administration emphatically denies that the President is an isolationist, citing the President's commitment to active foreign policy (Shanker, 2001).

President Bush, during the swearing-in ceremony of Secretary of Defense Donald Rumsfeld, talked of their three clear goals to guide American defense policy in the future. The first goal is to strengthen the bond of trust between the American people and those who wear the uniform. The second goal is to defend our people and our allies against growing threats: the threats of missiles, information warfare, and the threats of biological, chemical and nuclear weapons. And the last goal is to begin creating the military of the future, one that takes full advantage of revolutionary new technologies and will promote the peace of redefining the way wars will be fought. (Bush, 2001).

The Chief of Naval Operations Admiral Vern Clark recently commented how the Navy's mission fits into the national security strategy by stating that the Navy's mission is:

to sustain a strong and credible Navy. Using forward deployed and surge forces, we must be prepared to support national interest including strategic deterrence while projecting U.S. naval power globally from the sea, to influence directly and decisively events ashore through the sovereign presence of naval forces, throughout the spectrum of operations in peacetime, crisis, and war (Clark, 2000)

President Bush and Admiral Clark's comments point to a Navy that will continue to play an active role in engaging in a wide spectrum of conflicts in the future. Understanding this concept will help determine certain officer skills needed for the future.

4. Design Factors

The design factors are the aspects of an organization that form its culture (Roberts, 1998, McCaskey, 1992). These include tasks, technology, structure, people and process/subsystems. Below are the definitions and some applications of these design factors to this thesis topic.

Tasks are the basic jobs and tasks of the Navy including the specification and differentiation that is required to complete the task successfully. Tasks of future naval officers could include job specific examples such as unmanned aerial vehicle operator to more generic tasks such as the ability to enforce national strategy decisions across the globe.

Technology is the workflow of the organization, the key interdependencies among the work units or activities in the workflow, and the physical facilities and equipment used to accomplish the work. An example of technology that has a very significant impact on the officer corps is the technology that networks sensors and shooters together and assists in the flow of information.

Structure is the basic alignment of activities and people, how these groupings fit the work flow, and how these groupings are integrated through things such as hierarchy, task force, integrating roles, and/or networks. Today, this structure for the naval officer is usually built around the tools (i.e. airplanes, ships, submarines, etc.) upon which the warfare capabilities are built (Reason, 1998). For the purpose of this thesis, the basis of

future naval officers are examined from a functions or warfare area viewpoint, crossing the traditional platform lines. Hierarchies among work groups are also examined.

People deals with defining who these naval officers are, including their individual KSAs, personality traits, and attributes.

Process/Subsystems element of the model is further delineated into sub elements such as Human Resource Management, and Planning, Communication, and Information Management. Under HR management, one of the biggest factors examined is who will be recruited and selected as future officers. This thesis explores parts of HR Resource Management such as demographic changes taking place in America and labor market demands as well as some of the Planning, Communication, and Information Management processes present in hierarchies.

5. Culture/Outputs/Outcomes

The culture is what is produced after the previous four elements are allowed to unfold. Culture further leads to the outputs, which in turn co-produce the outcomes. Since this thesis's focus is on KSAs and personality traits, outputs and outcomes are only briefly covered. However, it is important to remember that the culture of the Navy is strong and plays a major role on whether those KSAs will be embraced or how those KSAs will be learned. Chapter V includes recommendations that will be affected by the Navy's culture.

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III. BACKGROUND

A. OVERVIEW

While Chapters I and II focused on the background and conceptual frameworks of this thesis, Chapter III focuses on the broad environment of the future. As Figure 1.1 illustrates, there are two important environs for this thesis. The first is the future task environment in which the Navy will find itself. The second is the future labor market environment. Determining certain driving forces is key to honing one's initial judgment regarding which factors will be significant and which factors will not be significant in the future (Schwartz, 1991). In this chapter, some of the key driving forces such as society, technology, economics, and politics are identified.

B. FUTURE MILITARY ENVIRONMENT

To understand the future military environment, five major areas for analysis were chosen. First, we look at some expert opinions on the future of warfare. Then we examine networked operations. The third area examined is technologies of the future, including future platforms and their implications for future officers. Lastly, economic factors, such as shrinking defense budgets, and political factors, such as the civilian-military gap, are examined. All of these five major areas yield critical data such as key success factors, system design factors, system's direction, and environment/context that are needed for the System Model application. These five areas further help form the basis for the interview questions.

1. Future Warfare

The latest National Security Strategy released by the White House talks of America's role in the future.

We must be prepared and willing to use all appropriate instruments of national power to influence the actions of other states and non-state actors.... we must have the demonstrated will and capabilities to continue to exert global leadership and remain the preferred security partner for the community of states that share our interests (The White House, 1998).

Eliot Cohen recently wrote in *Foreign Affairs* about how to defend America in the 21st century (Cohen, 2000). He spoke about the need for any future U.S. strategy to have

four components: defense against weapons of mass destruction (WMD), conventional dominance, short-term contingencies, and peace maintenance. The National Defense Panel reported similar conclusions, noting that the range of challenges will likely remain largely unchanged in future years but maintaining regional stability will assume a higher priority (NDP, 1997). The current National Strategy as discussed in Chapter II includes all four of Cohen's components.

It is likely that many of today's missions will continue to be performed in the future. However, since US adversaries have learned from recent combat operations in Kosovo or the Persian Gulf, they are unlikely to continue their status quo attempts to thwart the U.S. An adaptive adversary will exploit their strengths and attack our weaknesses. The NDP defined asymmetric threats as including: attacking our will to fight, denying access to forward locations, exploiting WMD technology, targeting fixed installations and massed formations, and moving the fight to urban areas (NDP, 1997).

Narrowing the focus to Navy specific tasks, Admiral Cebrowski recently talked about the Navy's core missions. Whatever the enemy, these Navy core missions will likely remain unchanged: mastery of the seas, protecting lines of communication, landing and supporting armies, rescuing armies and governments, conducting blockades, and enforcing sanctions (Cebrowski, 2001). While fulfilling those core missions, Admiral Reason writes about some changes to the future Navy's environment, commenting on the development of information capabilities which catalyses the development and refinement of other capabilities (Reason, 1998). He believes that it makes possible:

- Manufacture of more precise and more lethal weapons
- Unfathomable advance in maneuverability, speed, guidance, and range
- Decentralized, quicker, and better combat decision making through use of data distribution systems, expert systems, and redundant communications
- Diminished need for WMD for the Navy and also an increased need on effective defenses against the use of WMD by others
- Distribution and dispersal of combat power
- Dramatic reductions in warship manning

The nature of warfare will only grow more difficult for the Navy of the future as the information age unfolds. This next section describes some of those challenges that occur when one networks assets together.

2. Network Centric Warfare

Since parts of this thesis focuses directly on Network Centric Operations (NCO); it is important to define the overarching term of Network Centric Warfare (NCW). Because it is in its infant stages, the definition still is taking shape as the Navy better understands the concept. Network Centric Warfare is:

...about human and organization behavior. NCW is based on adopting a new way of thinking—network-centric thinking—and applying it to military operations. NCW focuses on the combat power that can be generated from the effective linking or networking of the warfighting enterprise (Alberts, Garstka, and Stein, 2000).

NCW is “characterized by the ability of geographically dispersed forces to create a high level of shared battlespace awareness that can be exploited via self-synchronization and other NCO to achieve commanders’ intent.” (Alberts, Garstka, and Stein, 2000). Thus, network-centric operations give the Navy “unprecedented ability to support well-informed and rapid decision making by naval force commanders at all levels.” (Committee on Network-Centric Naval Forces, 2000).

NCW, in short, helps with the speed of command at tactical, operational, and strategic levels of warfare, allowing for information to be collected, synthesized, and disseminated as knowledge and wisdom to the decision maker. NCW has several key concepts that should be examined further because they shape the KSAs and personality traits that future naval officers will need (Alberts, Garstka, and Stein, 2000).

The first key concept is the use of a geographically dispersed force, where co-location is no longer a constraint on massing forces, allowing for the dispersion of combat power and high value units. The second key concept is that the force is knowledgeable. This knowledge gives shared battlespace awareness, allowing for self-synchronization of operations. The third concept is the effective linking of entities in the battlespace. This yields a synergistic effort where dispersed and distributed entities come together and allow for the reallocation of responsibility and work to the optimal units or

individuals as the situation dictates. NCW is “essentially the same as the quest for information superiority (Beard, Odell, and Wald, 1999).

The CNO’s Strategic Studies Group (SSG), a future looking group that seeks to generate revolutionary naval warfare concepts, is proposing FORCEnet for future naval operations. FORCEnet is the architecture and building blocks of sensors, networks, decision aids, weapons, warriors, and supporting systems integrated into a highly adaptive, human-centric, comprehensive system that operates from seabed to space, from sea to land (SSG, 2001). Additionally a wargame ran annually at the Naval War College called GLOBAL, has as its main objective in 2001 the exploration of NCO. NCO appears to be emerging as the way we do business in future operations.

The self-synchronizing and common bond established by netted forces together calls for a high degree of teamwork. Since the Navy’s beginnings, teamwork has been an integral part of the service. However, the team or teams in NCO will be bigger due to the greater connectivity and more people will have the ability to communicate with more members of the team(s).

For the future Navy to survive as an organization, many of the attributes of NCO must become organizational attributes. Key design factors such as flexibility, speed, trustworthiness, and innovation are the cornerstones of NCO and also of the Navy organization as a whole.

3. Future Platforms

In the next several years the Navy is planning on introducing several new platforms. The Navy will find itself operating in a technologically advanced arena, often bound by economic constraints. Smart ship and smart squadron initiatives are ongoing using existing platforms and looking at ways to optimize manning. For the surface community, platforms such as LPD 17 and DD21 are in the works during the next 10 years. Further out, concepts such as the Streetfighter and high-speed catamarans have been introduced (Jaffe, 2001). The surface and aviation communities are looking at fielding CVN-77 in 2008 and, if approved, CVX during the later years. The Joint Strike Fighter along with several armed unmanned aerial vehicles round out the list of future platforms.

Why look at these platforms for future officers 20+ years down the road? Many of our current and near term capital ships will be in the fleet for years to come. Many of the requirements that we “build” into these systems will be requirements for tomorrow. Likewise, most if not all of these platforms contain a higher degree of technology than today’s platforms and employ the use of reduced manning principles.

4. Economic Trends Pertaining to the Military

As noted above, many of the approved or proposed platforms incorporate technological advanced weapon systems with the possibility of reduced crew size. What impacts will that have on the officer of the future?

The Center for Naval Analysis recently reported on optimal manning as it relates to technological change (Koopman and Golding, 1999). A major conclusion was that, as technology becomes more advanced, the workforce tends to become more skilled rather than less skilled. Bringing on a more skilled workforce implies an increase in resources for the Navy to recruit and retain critical personnel. An increase in the skills of military personnel will drive up military expenditures for pay and benefits of the workforce.

Economic theory points to two scenarios or a combination of the two. If labor costs rise, then the Navy could substitute technology in lieu of humans by automating many of the human tasks or the Navy could simply demand less labor and have a smaller force structure. Considering today’s declining defense budgets and the need for replacing aging equipment while simultaneously preparing 21st century systems, it points to a Navy with more technology and/or a smaller force structure.

5. Societal/Political Trends Pertaining to the Military

Recent issues such as the civilian-military gap and military professionalism have been at the forefront of the news. In this post-Cold War period, these are complex issues that society at large and the military professional have to work out. Sarkesian and Connor point to three fundamental issues: (1) the degree to which the military profession should reflect society and yet maintain its professional integrity; (2) the degree to which the military must adhere to its primary purpose, its *raison d’être*, and still successfully engage in operations other than war—or non-combat missions and contingencies; (3) and

to what degree should the military profession engage in politics within the American political system (Sarkesian and Connor, 1999).

Huntington, in his book written over 40 years ago, began to see a disconnect between the conservative ethos of the officer corps and the liberal society (Huntington, 1957). Janowitz wrote a few years later about the need for the professional officer corps to have greater interaction with the civilian community (Janowitz, 1960). These issues continue today as Meyer and Ancell point out in their book, “Who Will Lead? Senior Leadership in the United States Army” (Meyer and Ancell, 1995). They point out that there is still a disconnect between society and the moral makeup of the officer corps. As the number of civilians with military experience dwindles, this could point to a growing civilian-military gap.

C. FUTURE WORK ENVIRONMENT

Analysis of environmental factors as they impact labor markets is laid out in this section. Recall from the systems model that people and processes/subsystems are major design factors. This section also examines those design factors, probing into who are the future officers of the Navy and some of the human resource management processes used in the development of that workforce.

The *Workforce 2020* study concluded that the labor market will go through some drastic changes over the next twenty years (Judy and D’Amico, 1999). First, there will be an increased demand for highly skilled individuals, effectively increasing the demand for white-collar workers. Because this will lead to increased competition in the Navy’s traditional officer recruiting market, the Navy must decide whether to compete more vigorously or seek labor from non-traditional markets. The *Workforce 2020* study concluded that growing occupations of the future require substantially higher skills such as language, mathematics, and reasoning. For the foreseeable future, this thesis assumes that the Navy will recruit most officers from some type of formalized educational system. This section looks at the number of people going on to higher education, giving insight into the available labor pool for naval officers.

Additionally, as documented by the most recent census, the U.S. is becoming more diverse. This is what Schwartz called a “predetermined element” (Schwartz, 1991).

Demographically, the proportion of whites and males in the labor force will decrease in the 21st century, while the proportions of women and some racial minorities such as Asians and Hispanics will increase (Hattiangadi, 2000). Since President Truman signed the 1948 Executive Order into law providing equal opportunity for all uniformed members, the military began the long progression of integrating racial minorities and women into the military service. Since managing diversity will be an important role for any future naval leader, some diversity issues must be examined. Not only managing diversity in race and gender, but also managing diversity in ideas and thoughts with varying levels of education must also be considered.

Next, this section looks at the newest generation to join the Navy—Generation Y who are also known as the “Millennials.” This generation along with Generation Xers will lead the Navy in the first part of the 21st Century. While a generation cannot be stereotyped into a neat set of attributes, there is merit at looking at some of the patterns of behavior and initial thoughts of the next generation of leaders.

Lastly, this section examines certain social pressures that might influence families to persuade their children not to join the military. A few additional labor market trends also are presented to give more insight into where the labor market is going.

1. The Racial Diversity of America

As shown in Table 3.1, the U.S. population grew from 248.7 million to 281.4 million between 1990 and 2000. Whites grew the least at just over 5 percent. Asians and Hispanics increased dramatically in percent of total population, from 6.9 million to 10.2 and from 22.4 million to 35.3 respectively. Since the requirements for officers are expected to remain high during the coming years, it is highly likely that the Navy will continue recruiting officers from higher education institutions to obtain those with critical skills. This next section presents the racial diversity of the primary recruiting market—college graduates.

Year 2000 Population by Race

	Race alone *	Race alone or in combination**
	(mil.)	(mil)
Total Population***	281.4	281.4
White	211.5	216.9
Black or African American	34.7	36.4
American Indian and Alaska Native	2.5	4.1
Asian	10.2	11.9
Native Hawaiian and Other Pacific Islander	0.4	0.9
Some other race	15.4	18.5

Population by Hispanic/Latino Status

Hispanic or Latino (of any race)	35.3	35.3
White (non-Hispanic/Latino)	194.6	198.2
Black or African American (non-Hispanic/Latino)	33.9	35.4
American Indian and Alaska Native (non-Hispanic/Latino)	2.1	3.4
Asian (non-Hispanic/Latino)	10.1	11.6
Native Hawaiian and Other Pacific Islander (non-Hispanic/Latino)	0.4	0.7
Some other race (non-Hispanic/Latino)	0.5	1.8

* One of the following six races: (1) White, (2) Black or African American, (3) American Indian and Alaska Native, (4) Asian, (5) Native Hawaiian and Other Pacific Islander and (6) Some other race

** Alone or in combination with one or more of the other five races listed. Numbers for the six race groups may add to more than the total population and the six percentages may add to more than 100 percent because individuals may indicate more than one race.

*** Hispanic or Latino population may be of any race.

Source: U.S. Census Bureau, 2000.

Table 3.1. US Population by Race.

2. The Racial Diversity of College Graduates

Figure 3.1 illustrates educational attainment by race and sex. The numbers listed are for those individuals who have completed four years of college or more, which is the traditional recruiting market for officers. A key point is that the representation of women in the population at large who are college graduates has increased over 10%. Today, Navy officer recruits are approximately twenty percent women. In the future where warfare is based on more information and cognitive reasoning than pure physical strength, this could open up more opportunities to recruit from the women.

As shown in Figure 3.1, Asians have a relatively high propensity to graduate from a 4-year college. Though Asians make up a small percentage of the overall population,

they still could be a rich market from which to obtain officers of the future. With an increasing presence in Asia, Asian-American officers who have a background into Asian cultures or language skills could prove invaluable as the Navy increases operations in Asia.

Hispanics have the lowest propensity, of the races listed in Figure 3.3, to graduate with a baccalaureate degree. Additionally, both Hispanics and Blacks are currently underrepresented in the officer corps (Office of the Secretary of Defense, 1997). Due to the current internal labor market of the Navy, future leaders will be a direct result of current recruiting numbers and retention. Without higher than normal retention rates and better recruiting, minorities will continue to be underrepresented.

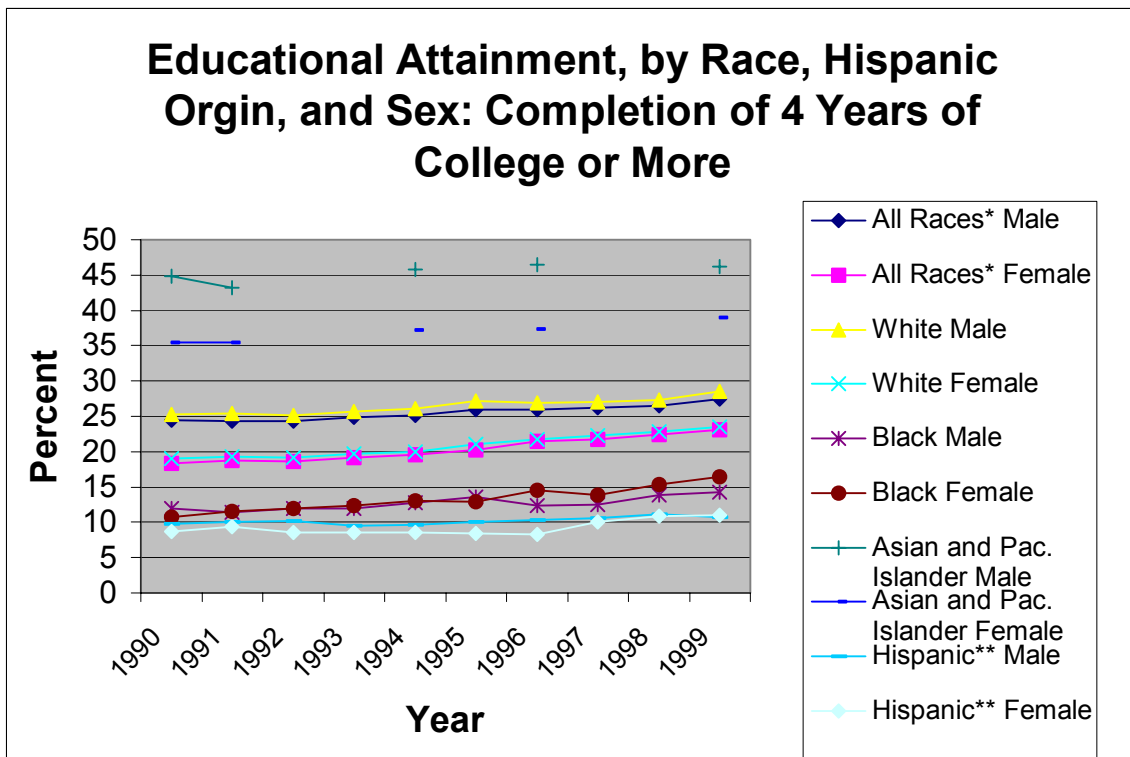


Figure 3.1. Educational Attainment by Race, Hispanic Origin, and Sex.
 (Note: 1. Data unavailable for Asian and Pacific Islander 1993,1994,1996,1998
 2. Data taken from those >=18 years old
 Source: Census Bureau, 2000)

3. The Next Generation of Leaders: The Millennials

In the coming few years, the Navy will usher in a new generation of leaders. Generation Y, also known as the Millennials, Nexters, or Generation Digital, were born from 1982 to the present (Howe and Strauss, 2000). Demographically, they are the most diverse generation with one in three being non-white (Blankenship and Katson, 2000). One millennial in five has at least one immigrant parent, and one in ten has at least one non-citizen parent. Additionally, they are the first generation since World War II to be faced with higher academic standards and are showing signs that they will meet them (Howe and Strauss, 2000).

While it is misleading to stereotype a whole generation, there are several trends that seem to be emerging from the observations of experts who closely watch this new generation. Optimism seems to abound in this generation and they are team orientated, able to accept authority, and enthusiastic about learning (Zemke, 2001, Strauss and Howe, 2000, Zemke, Raines, and Filipczak, 2000). One of the most inspiring news items for the military is a survey of the class of 2001 college freshmen conducted by Louis Harris and Associates; it showed that 74 percent of the students would be willing to fight for their country (Blankenship and Katson, 2000).

4. Propensity to Join the Military

With the recent recruiting woes, determining whether or not the Navy can recruit quality individuals to meet the warfare challenges of the 21st century is necessary. While there are very few surveys on individuals' propensity to join the military in an officer capacity, using the propensity to enlist as a proxy can give insights into public attitudes toward military service. High school seniors from 1976-1997 showed an increase in those who said they definitely would not enter the military (Segal, 1998). Segal points out that parents often have major influence on their children's decisions regarding military service, which is based upon their own experience with the military.

Is there an elite youth population in the U.S. unwilling to join the Navy? The children of Generation Y were born into families with the lowest child-to-parent ratio in American history: only 2 percent of those under the age of eighteen live in families with five or more children (Blankenship and Katson, 2000). Some scholars argue that the

propensity for parents to approve of their children joining the military is decreasing because of a low children-parent ratio that characterizes an “elite youth” culture. Some scholars even point to this as a reason why, in the past few decades, there has been reluctance on the part of the American society to accept casualties of war (Moskos, 1995, Luttwak, 1994).

5. Officer Spouses

New census figures show that most traditional families in the U.S. have both parents working (Patton, 2000). This trend will likely prevail into this new millennium. Within the military, full and part time working spouses account for over 60% of the traditional military households, showing a high rate of labor force participation (Wardynski, 2000). If the challenges of 21st century warfare drive the need for more professionalization of the military, then the policies of the Navy must account for professional families. The above-mentioned data point to increasing numbers of two-income households where both partners are working. Military policies, especially in the recruitment and retention areas, must account for this change in the labor market.

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IV. TOMORROW'S NAVAL OFFICER

A. OVERVIEW

Chapter III pointed to many changing factors in the future environment. Major warfare changes and major shifts in labor market conditions will shape the needs of the Navy. To understand how these changes might affect future officers, interviews were conducted with senior Navy leadership, senior Department of Defense (DOD) civilians, and academics from the U.S. Naval Academy and the Naval Postgraduate School.

B. DATA COLLECTION AND CONTENT ANALYSIS

Fifteen interviews were conducted ranging in time from 30 minutes to over two hours. The sample consisted of nine naval officers, all on active duty except for one retired officer, who ranged in rank from O-6 to O-10. All current warfare communities (air, surface, subsurface, and special warfare) were represented. Three DOD civilians were interviewed as well as three professors from the US Naval Academy and the Naval Postgraduate School. Interviewees were chosen for their expertise in either future warfare or manpower planning or both.

A standardized interview protocol of six questions was used (see Table 4.1). The personal interviews were recorded on audiocassette and then transcribed verbatim for analysis. The list of interviewees is listed in Appendix A. Once the data were collected, the transcripts were analyzed for major themes. These themes may be viewed as reflective of senior Navy leadership.

1. What skills/knowledge/abilities/personality traits will the future sailor need to be an effective naval Officer in 2010? How does this compare to what it means to be an effective naval Officer in 2030?
2. Network Centric Operations (NCO) are in their earliest stages of development. Are there different or unique knowledge, skills, abilities, or personality traits that an individual working in a networked environment must possess?
3. Continuing along that theme of Network Centric Operations, how important is teamwork? Is the Navy adequately preparing officers to work as team members in a NCO environment? What impact, if any, will NCO and/or new teamwork relationships have on the hierarchy leadership/decision maker structure of the Navy?
4. With concepts such as "smart ships" and future perspective platforms like LPD-17 and DD21, will the trend towards reduced manning continue? What impact will reduced manning strategy have on the Navy? Would this call for better testing and classification techniques and tools to support selection and placement of the officer of the future?
5. One of the Chief of Naval Operation's top five priorities is "to create a lifestyle of service that is attractive to bright, ambitious young men and women." How will the lifestyle tastes of Generation X'ers (1960-1980), Generation Y'ers (1980-2000) and future generations affect the Navy?
6. Population projections in the next century predict that there will be no majority in society. What does "managing diversity" mean for the Navy of the future?

Table 4.1. Interview Protocol.
(Source: Author).

C. THEMES

1. Theme 1: Network Centric Operations Requires both Generalists and Specialists

a. Theme

Citing increases in the complexity of the future environment, the interviews produced an overwhelming majority who believe that more specialization will have to occur in certain areas. One example of this theme is the information management challenge brought about by NCO, which pushes the Navy towards information specialists. However, the interviewees also overwhelmingly agreed that there is a need for generalists, who understand the “big picture” and integrate assets and human capital from all specialty areas.

Furthermore, the interviews suggest that officers of the future need two areas of in-depth knowledge, if not specialization. The first domain of expertise, a consequence of being a networked force, is a sufficient level of specialization in networks so as to understand the vulnerabilities, capabilities, limitations, and trustworthiness of the network. Secondly, due to connectivity, a broader view of the battle space to include military-political implications of the mission is essential.

b. Justification

Along with information management specialists, other key specializations must occur in order to have an effective future force. A few examples would be specializations in Human Resources, Supply and Sustainment Management, and a specific type of warfare specialty. One Admiral talked about how network centrality would affect all dimensions of the officer corps:

The whole corporation will evolve around network centric operations. And now, whether it is a warfare application, business application, or an education application. That network centric focal point is going to be there, and we are going to have people who are comfortable tying and using this network.

Since network centrality involves all parts of the officer corps, questions one, two, and three¹ probed those KSAs and personality traits needed in NCO and in general, giving further insight into whether or not more future officers would be generalists or specialists. The interviewees cited several examples of areas that needed specialists and those where the generalists fit into networked operations.

One Admiral stated, “We need both of them in the team.” Another Admiral commented on operators of the network: “some of those people may be generalists; some may be specialists working for the generalists,” and “we need to recognize that we are not growing the specialists to be the CNO.” Still another Admiral remarked that the Navy needs “a group that is incredibly cross-trained and a group that is incredibly focused.” Still another commented:

¹ Question one asked about generic KSAs and personality traits of all officers. Question two asked about those KSAs and personality traits associated with officers who engaged in NCO. Question three asked about how NCO and teamwork would impact the future officer corps. (See Table 4.1)

We need some generalists that are leaders, and that are good at those things. Managers and leaders...are integrators of diverse skills and abilities of other people to achieve the ultimate vision, objectives, or goals we are after.

One civilian spoke about the generalist/specialist issue:

Let me go back and give you a quick summary of organizational sociology. I think, maybe a century or two ago, managers, supervisors, executives were generalists. That is, they didn't specialize. If you were a farmer or a blacksmith, you did the whole job. You covered the whole. You kept the books. Life was simple. One person could do everything. [When we] went into the industrial age, work got to be much more complicated, and it got broken down and fragmented, so people began to specialize. Then sometime in the 20th century, probably during and after World War II, you needed people who integrated all these different specialties. So you [required] generalists, who could be multi-disciplinary and become the general management types who could take accountants, engineers, production people, and personnel people, and make it all sing together and improvise. Even at the highest level of organizations, [you are seeing] a specialization of the CEO function. They came up through a functional discipline but now they exercise broader capabilities. So I think in the world of the future, the people who grow up probably will no longer have one specialty coming up in their career and then becoming a generalist; they will probably have to have two, maybe even three specialties, and then become the generalists.

Most of the interviewees spoke from an Unrestricted Line Officer (URL) background and focused their comments on those traditional URL types of jobs. A networked force relies on support functions and reach back capabilities, so it is important not to downplay the importance of the Restricted Line officers of today. Additionally, many of the interviewees commented on the fact that future warfare might require new types of asymmetric missions, therefore calling for different types of specialization. One Admiral commented:

The missions of the armed forces are going to be different in the future. And network centric warfare gives you an opportunity to influence institutions of society without an exchange of fire, or without putting your American sons and daughters into combat. So NCW is a politician's dream because it enables you to influence the institutions of society that are maybe more important. The financial institutions of society may be far more important than anywhere else.

Specialization in a specific warfare will have to be a major characteristic of any URL officer. One interviewee stated that the URL officer has to be “specialized in information flow and generalist in everything else.” Another said they needed “less specialization in specific tasks and more specialization in information flow and battle space. Specialization in maximizing the use of that platform.” Still another said:

Officers that are leading it (NCOs), I think the officers leading it will have to less of a technical specialist and more, more, more war fighting and business manager like. More business management. My vision of the future is, an officer who has a very good business sense and understands the threat environment. Understands how the Navy fits into the National Security calculus. And how his or her ship, airplane, squadron, or submarine fits in that architecture.

Another Admiral stated:

So, the specialization that we are going to require for the future will be much more demanding on our people. You’re going to have to be multi-specialized to be the right kind of generalist. The specialties, which I don’t see this part of the Navy changing in twenty years, is still going to be the warfare.

Having this broader view was very important to any type of officer working in this network centric environment. An Admiral stated, “The officer now has the ability to understand how his or her actions are impacting the larger battlefield through net centricity. Now they know how it is happening.” Another said URL officers are “going to have to go broad and wide. The pilots have to understand what is going on in the network”, and they should “broaden quite a bit at the operational level.”

One civilian stated:

So let me propose that in the Navy in 10 years, you’ll need three degrees of specialization: Your warfare fighting (sub, surface, air), you’ll need specialization in information technology and communications, ...[and] national security/mil-pol [military-political] stuff. These are cognitive specializations.

He further stated:

The more our National Security environment becomes that complicated and ambiguous, the more we’ll have to require people at lower and lower

levels down in the chain of command to understand at a sophisticated level why we are there and what we are trying to accomplish. The old paradigm is to issue clear Rules of Engagement and let them operate within that. [But] what happens when the situation gets so complicated and the stakes get to be so high that the ROE that we thought of beforehand just don't apply?

Another civilian commented:

The mil/pol is the area where I think we have the greatest weakness. Unless you happen to specialize in that, so that you've got your subspecialty or your master's degree...it is whatever you picked up in area briefing or intel briefings along the way, and I don't think that will be enough.

A few of the interviewees talked about what types of education are needed to give the officers a broadened view. One civilian talked about education in cultures and languages:

In 2020 and I think even Admiral Tracey suggested this is everyone in the US military should be bilingual. We fight most of our battles overseas, hopefully, never here. It is not only the war fighting, but also the peacekeeping. And, how much more effective can we be if we, in our plane crews, in our ship crews, in our Battle Groups, we have the capability to converse naturally in the language in where we are going to operate. And along with that, goes an understanding of the culture, the history, the psychology of the people we are either serving or fighting.

While another civilian talked of:

What are the skills? I think, truly the same ones as the days of great, good seaman. That first and foremost. Second. Good strategic thinkers. And as far as specific knowledge is concerned, I think we can begin to broaden out from everyone coming out of the Naval Academy with an engineering education to a greater blending.

He went on to further say:

I think we can diversify education between engineering, technology management, and system administration as well. Because the information age, to a very, very great degree, is about how to manage an absolute cascade of data that is coming in all the time.

Still several more Admirals commented on the broader view saying:

I think at the tip of the spear, where the commander, the pilot, the OOD, is the one who has to push the trigger or not push the trigger, we need someone who has the generalist perspective on top of a foundation of several specialties.

[The Navy needs] intense specialization in certain areas--Example Combat system engineers, CHENG (chief engineering officers), operators. Operators go on to command.

Being master of all trades and still being a CO is increasingly a failed model. And if you specialize in a particular area and then you form a core of operational people, be it aviators, submariners, or surface guys...having this core of people what NCW is and not wedded to the demands of a particular platform. Coming to command divorces you from your platform and puts you into a different group. And then you become, your future is in the network and operational side of it.

Most of the interviewees touched on the subject of having more specialization in what the Navy would consider restricted line billets of today and also on how having a cadre of URL officers trained to be generalists would impact the current training and education system of the Navy. Everything from specialized warfare, to information technology, or geo-politics was mentioned as needing to be trained or educated. One Admiral stated:

We do have to develop training in curriculum which is broader in scope but at the same time, even up till 2030, we are still going to be flying planes, driving ships, and driving submarines. Those skills are learned skills that society doesn't teach, which we will have to teach. So, we can't get too distracted as we, make sure our warriors can understand, operate in this digital world, that they lose their skills as mariners and pilots.

Still others said:

Officers will still need their core values, but they will need education in the area of networks and everything that goes into networks.

The officers are going to have to be more flexible, adaptable. They need to be educated as opposed to trained to deal with the uncertainties and the unknowns and the things that will confront them. I don't think we'll be able to train them to be ready to respond to these sets of conditions; they'll just have to be able to integrate it on the fly.

Professionals will stay in certain areas. Why train people to do a job and then after a short time, send them off to do something totally different.

So when I'm talking about what kind of knowledge you cultivate, what kind of people you create, it is a whole generation of officers with information age sensibilities. That is the goal. That is for the general community.

What then can we expect of our CO's and Fleet Commanders. There has to be much more degree of sophistication of military and geo-politics... I think awareness is essential today, but, in addition, we're going to require actual diplomatic skills down at the ship commander level.

I don't think in 2010 or 2030 we will need one type of officer. We will always need a blend of different kinds of officers.

There is going to have to be some sort of more specialized officer corps. We need to have more communities, which are more specialized as well. Like HR and perhaps some others.

The Navy is finding that all these other areas are important. IT is important. HR is important. But we don't have an officer structure that supports that.

As the Navy broadens its view of the battlefield, this comes with some benefits as one Admiral noted:

As you reach out your view of the battlefield, you in some cases will be able to increase your time to think. You'll see something developing a little earlier in the fight. Now, granted, that some of that will be lost by the speed of missiles and the kind of threats that are out there today. But I think, in sum total, the fact that you have a bigger, better defined big picture and better presentation to you the decision maker, I think that the fight will be ultimately more manageable.

That Admiral went on to further state:

I think that some of our netted systems will allow us to get into their decision cycles a little earlier and maybe anticipate or thwart...an action that will be detrimental to you.

2. Theme 2: NCO will Drive the Need for Better Teamwork

a. Theme

Network Centric Operations, due to increased connectivity of sensors and shooters, will call for a high degree of teamwork to ensure that information and ultimately knowledge is passed on to the interested parties.

b. Justification

Questions two and three² from the interview focused on NCOs and teamwork. Interviewees noted that teamwork would be different than in the past. Teamwork always has been important to the mission of the Navy. However, the interviews emphasized more deliberately developing these teams and building trust in a netted environment. This “electronic” environment is much different than the physical world we tend to build teams in today. The points presented here are the need for teamwork, the need for trust, and how to build both. Theme six, which is discussed toward the end of this chapter, presents the challenge of growing diversity in the Navy. Diversity can have grave effects on teamwork and trust building if left to chance.

(1) Need for Teamwork. In response to the teamwork question, interviewees emphasized the importance of teamwork. One Admiral said “When it really comes down to life and death, it is based on your teammates.” Another Admiral mentioned, “Teamwork will certainly be as important as it is today. Probably more important.” While others commented, “Teamwork [to NCO] will be absolutely critical” and “I think [NCO] will require more teamwork, and broader, simultaneous teamwork.”

One civilian spoke on the growing dimension of teams:

The team will no longer be what we call the primary work group. That is, the rifle team, the aircrew, the division, that live, sleep, work, and die together—physically, physically. What happens when that is not the team of the future? The team of the future is people who only communication mechanism is the network. May never have and never will see each other or touch each other. The team sometimes might be a very dynamic network of nodes, where the team is, where one guy who pops up on the network, one time with one piece of critical information, and you never

² Question two asked about those KSAs and personality traits associated with officers who engaged in NCO. Question three asked about how NCOs and teamwork would impact the future officer corps. (See Table 4.1).

hear that person again. Is that a member of the team and how do you trust that information? If you've never seen that person before and you'll never see that person again? And yet that piece of information might have fatal consequences one way or another.

That same civilian later pointed out that:

I think we will redefine what teamwork means. It will be how are you in unit cohesion, strong trust and mutual respect, how is the communication flow, and commitment and loyalty to the decision, however the decision is made.

Another civilian spoke of the effects of net centricity and teamwork:

There are two reasons I see it as important as we move out to 2030. One, I think that with smaller crews...people are working more independently. So, when they are working, clarity and communication are very important. The other aspect is, in a NCO, where people are bound together...in a very networked environment—being able to communicate is absolutely vital. Most of that is by oral or electronic means.

And yet another civilian noted the social dimension of teamwork and NCO:

The social dimension, the social connection of members in network centric warfare is going to have a lot to do with cohesion. It used to [be that] military cohesion was thought of in terms of the unit, the ship...we aren't going to be able to think just in those terms anymore in the future. Cohesion is now going to be something that will be fleet wide, or battle group wide, or theater wide. We are going to have to realize that the human capital is the most important investment we make.

(2) The Need for Trust. Trust and net centricity was an issue that many of the interviewees touched on. One interviewee went as far to say, "Trust is the most important factor for the future." One Admiral mentioned:

It (network centricity) makes teamwork more important because of the trust issues. Because each member has a certain function to perform and there is not going to be the layers of checking. So that the team aspect will become much more important to us because we don't have the error factor I don't think because how fast information travels and how fast a decision has to be made.

Others agreed that trust is essential, pointing to a growing dependence on lower levels of decision makers. One military officer said “the ability to trust—you have to respect talent and position less. With that will go an extraordinary degree of trust.” Another officer said, “T squared. Talent and Trust. You have to find the talent, then train them, and then trust them.” While another Admiral stated:

The tools change as you get into the information age. Because I think leadership at a much junior level will be more important. You will be more dispersed; things are going to be decentralized. And you are going to have to trust people at very junior levels with very important aspects of the networks.

(3) How to Build Trust and Teamwork. Many of the interviewees talked about specific ways to build trust. One Admiral stated:

When we start talking netted operations, some people are terribly concerned that you will never see or touch another human being who you are teaming with. My sense is that these machines with the use of net meetings, or collaboration at sea, or VTC,the fact that I can't see you in person but that I can see you on the video screen even though you are on the other side of the world, just talking back and forth...my sense is we won't have any trouble building that teamwork. It will be a little bit different than it was, but at the end of the day, the need for teamwork will never go away. We will learn to build that trust. Some of that trust will be built over the airways where in the past it was built in two sweaty flight suits standing next to each other.

Other civilians pointed out:

So how do you develop decision making and information processing when you have the team that is now very dynamic, very fluid, sometimes very transient, and [in] some cases unreliable. We forge teams the old fashion way, through blood, sweat, and tears, literally. And when you have done that with a team, again, in old traditions, you will die for your teammate. That is what we teach you.

Trust. How do you develop at the front end and the back end? How do you develop the trust and unit cohesion that we come to rely upon so importantly? A lot of it comes back from tribal sociology, way back to the village and the family, and the tribes. And that is why the primary group is so effective because we have many traditions, psychological and emotional bonds to those people, who are part of your work group, and probably the most attentive ones are close to their families.

Others brought up the point that teamwork is forged by physical contacts. One military officer stated, “It is hard to beat the teamwork that is developed by rubbing elbow to elbow” while another officer said, “You have to nurture teamwork through getting people together; it has to be physical.” One civilian noted, “We can’t be too disconnected. We still have to have people to people relationships.”

Others thought that besides those physical bonds that “trust is predominantly built on communication” or by “building in learning and education to develop the teamwork.” One Admiral warned about bringing disruptive people to the team. “The fracturing of team cohesiveness; we have to be careful ...who we bring in. In the future, it will be even more important.”

An additional disruptor to networked teams is getting away from the platform bias. An Admiral stated that naval officers “must divorce yourself from the loyalty to the platform.” Another military officer stated, “You must wean people away from their platform and turn their focus outward. It is more difficult to generate teamwork when you are not physically with the team all the time. There will have to be some experiment or steps taken to nurture the team.”

One civilian noted an additional way to build trust not only in the team but also in the system:

When something works people develop of trust. Nothing succeeds like success.

That is the social dimension—when you see something that works you buy into it. You’re going to invest in it. The technical part of trust is that we must do far, far better in the area of information security than we do today. Trust can be built by a strict and rigorous encryption regime. And it will have only moderate impact on efficiencies.

Finally, an officer pointed out a crucial factor in building trust and teamwork: “there is a trust factor there with all this information. You have to trust them. And they have to have the same value system that you do.” Teamwork drives other requirements like communication/interpersonal skills, core values, the managing of diversity, as shown in the following themes.

3. Theme 3: Core Values are Vital to the Future Force

a. Theme

When answering question one³, the interviewees continually commented that the core values of the Navy would still play a crucial role in future warfare. Ethical behavior would be as important, if not more important, during NCOs where decision making cycles are compressed, weapons have increased lethality, and naval officers will likely be thrust into more ambiguous missions.

b. Justification

All indications point to NCO forcing a reduced hierarchy in decision making, driving decisions to lower and lower levels of the chain of command, which imposes requirements for the utmost ethically sound officers (Odell, Wald, and Beard, 1999). Traditionally, decisions of greater importance were deferred to higher levels of command. In the future, this will be unlikely due to the speed of the battle and information flow. Senior commanders have come up through the ranks and have demonstrated core values consistent with the Navy. Now, the interviews paint a picture of a more junior officer being thrust into critical decision scenarios before their core values have been tested by their longevity in the organization. One Admiral noted:

[Officers] have to think more ethically more than the past. The complexity of the world is increasing exponentially. So the traditional warfare scenarios that I've found myself in are now going to be clouded by a lot of info and...by ethical decisions that have to be made, that they have to make, that are tradeoffs between the levels of risks they are willing to accept in warfare.

Another Admiral stated officers need a:

Better understanding of how to take the information they have and apply ethical standards to it...because network centricity places a lot of the decision making back in the node, and the Marine on the ground, because he is hooked in and has all the information, that he is going to break something or kill somebody, when in the past it was just "charge the hill."

Still another Admiral stated a similar comment:

³ Question one asked about generic KSAs and personality traits of all officers.

The individual sailors have got to be able to process the information and have frameworks of ethical thinking that allow them not to hesitate when we move into battle.

The military officers in the interviews were very emphatic about the need for core values. Below are listed remarks from the military interviewees:

The first mistake we make, is to assume...that the officer of future is going to be much different. He or she isn't. They are going to bring the same traits as they brought forever to the Navy...a sense of duty and a sense of service, and they will have the same intelligence and physical abilities that we have always valued in our officer corp.

For some reason we believe that this officer will be significantly different 10 or 20 yrs from now. Some of the tools they use and some of the knowledge they have will be different but that won't be...different than when we made other technological leaps in the past.

On the question of do we want someone who is specially trained for high tech missions: Give me an officer who is in it for honor and has the intelligence to learn and it will work out.

[Core values] have to remain the same. If you look at any managerial or leadership book from the Bible on up in time, those core traits are consistent. The words may change subtly, but those core traits remain. What makes you a good leader, the characteristics of a good leader haven't changed. They have been articulated in different ways. I marvel at how much money can be made by printing the same thing in a different book with a different cover. It is just expressed differently.

I think our core values are important. I think it is important to be honest. It is important to have moral courage; I think all of those things are important and will always be important in an organization that is built on trust. We stay in this organization not out of financial reward, but we get a different kind of reward. And I don't think you get the same reward unless you have some of those same kinds of values that the organization fosters and creates.

The underlying character of the naval officer will not change. The requirement for courage, intellectual honesty, the requirement for compassion for your shipmates and the sailors who are working with you, the integrity that is key to our organization. I don't believe that the need for those will change one single iota. The reasons that won't change [is

that] these are the core leadership. You can't lead effectively if you aren't imbued with those core character traits. These are enduring qualities, whether it is 1990 or 2010.

I think leadership has to endure because that is the only way we survive. We have to have strong, good leaders.

4. Theme 4: Dealing with Reduced Numbers of People, whether in Manning or in Decision Hierarchies, Will Impact the Future Officer

a. Theme

Question four⁴ from the interview asked about the impacts of reduced manning. The answers from that question and from Question two⁵ regarding NCO point to an overwhelming consensus on the continued trend of reduced manning and functioning with shorter hierarchies. Those reduced manned ships, squadrons, and submarines will change the basic structure of the ship. Those fewer individuals will have greater demands placed on them, and due to the nature of increased speed of the battle, the decision hierarchies will flatten. The result is a need for more capable officers in those key billets.

b. Justification

The interviewees focused on four points under this theme. The first is the need for more capable people. The second is that the demands placed on these individuals will be as great or greater than today's demands. Thirdly, speed of command will have to emerge as part of NCO, giving way to a more empowered workforce. Lastly, in order to succeed under these reduced manpower conditions, strategic planning in acquisition and human development must take place.

(1) More Capable People and Less Room for Inexperienced People. One civilian talked about the need for smart operators. He said:

The National Security Environment will be even more complicated and more ambiguous, more chaotic than it has been and it is now. There will be much stronger emphasis of OOTW; we will be in an info environment, which will be much richer, complex and confusing than now. The technologies available will not only be more sophisticated, flexible, precise, and reprogrammable, but they will also be more expensive, and

⁴ Question four asked about the effects of reduced manning. See table 4.1

⁵ Question two asked about NCO specific KSAs and personality traits. See table 4.1

some respects more fragile, and more dependant on smart operators than less.

Not only was there a dependence on smart operators but also the interviewees noted that fewer people in the chain of command would be available to help with tasks. An Admiral said:

We are going to need fewer people but the skills of those people are going to be a lot more important because they won't have the backup or someone standing in the wings ready to catch them. So you will have to have a much more highly trained, educated crew on that ship from the very most junior person to the most senior person, to make that ship effective.

Other military officers added similar statements:

The vertical chain of command made up for many individual weaknesses.

To make this work, it requires stronger and stronger individuals who are more capable, more mature, [possessing the] ability to act independently, yet with a firm [mindset] never losing the big picture [and] that they are part a specific organization, never losing the picture that they are acting so independently that they don't recognize that are part of a dependant organization. You have this really strong chain of command that makes up for these weak people. It gave them strength to do what couldn't be done. Now we shift to this operational combative organization where there are a lot more independent actors, and those individual actors can't be the average "mojo" off the street.

The quality factor is going to have to increase in order to fully exploit what is offered and demanded by network centric warfare.

Several interviewees noted some human resource processes that would need changing due to this reduced manning. A civilian stated that the Navy needed "a group that is incredibly cross-trained and a group that is incredibly focused" on ships like DD-21. Another Admiral stated that "there will be less room for inexperienced people; you can't be a nugget in a squadron." Still more officers spoke of similar concerns:

There is no room for inexperience in a minimally manned ship or squadron.

[DD21] is designed so that the officer is at their maximum potential.

The ship is not designed to work with a sub optimum individual.

[The Navy] must have a system in place for instantaneous replacement.

If you have a reduced manned ship, every person's skill is vital to the success of that ship. So if you lose somebody, you have to replace them [with] somebody of like skill.

As mentioned earlier, these reduced manned ships will push the Navy towards more highly educated and trained personnel. Many saw the lines between officer and enlisted fading. An officer stated "the line between officer and enlisted will get fuzzier. What is going to cause this is education." Another interviewee declared:

You won't be able to tell the difference between the officer and enlisted corps. There won't be much difference in their skills. Our enlisted sailors will be extremely educated.

(2) Speed of Command will Increase Calling for More Empowerment at all Levels. Many of the interviewees talked about the flattening of hierarchies. One Admiral noted:

When you get to that networked environment you do away with the layers that you have. You know the Third class can't tell the Second class who tells the First class who tells the chief who tells the lieutenant. Whoever is sitting at that terminal is going to have to be the one who tells the decision maker if he is not the decision maker, he can't have to go through a lot of levels to get a decision. So he has to be right next to the decision maker somehow. That doesn't necessarily mean geographically but you can't have a lot of different layers or you've negated one of the important aspects of speed of command of a network.

Another Admiral had a similar idea stating that decisions "can't be chopped through the hierarchies that have worked in the past if it going to be of any value."

Several interviewees noted an increase in empowerment. Words like initiative and autonomy were used. The following are comments on the need for empowerment:

Smaller size crews, more distributed in nature, are requiring people to stand up and take charge, take responsibility, take accountability, take authority.

You are empowering the individual node in net centrality by providing them the commander's intent and then the battle space awareness to allow them really know how their actions will impact the commander's intent.

As the information that we are all using...it flattens organizations. And it puts more power in the hands of the user and not the hierarchy above [him/her]. And once that person has got the power, you've got to let him operate with that information you've given him.

This increase in empowerment at lower levels would call for a different culture in the Navy. One civilian describes the future Navy as having "skills, personalities, and individual initiative and empowered workforce much like the Microsoft, IBM, or other leading edge companies." They went on to further describe the Navy workplace as:

Not a lot of wiring diagrams. People understand mission and commander's intent. [They understand] what are the core competencies of the company and what is my role in the company...People are good at self-organizing; they work for ideals and goals instead of being told what to do and when to do it. Empowered, enlightened, IT capable.

One Admiral saw NCW coming to fruition stating:

As we develop a more educated, capable force, and that force has to operate in a more complex netted environment, we are going to need, and expect our...officers to act and react on initiative. They will be operating independently.

(3) Greater Demands will be placed on NCO Crews. Stress in combat has always been great: both physical and mental. Many of the interviewees saw stress likely increasing in the future. Here is what they had to say:

The stresses of future naval combat and warfare in general will be greater.

We need to begin thinking about cycling people more rapidly. I think we are going to have to begin looking at personnel policies particularly during crises and wartime, where people get rotated and rested more frequently.

The tempo and intellectual demands of NCW warfare and future warfare in general are going to be enormous. And our hardware and our ships are all going to function with far more reliability than the "wet ware" of our

human beings. And we are going to give special, special care to that side of the equation.

[Eastern front Germans during WWII] would pull veteran troops off the line routinely and leave them for a couple of weeks with fresh guys coming in. So they would impart all the knowledge that they had and socialize with them and begin to care for them, and then they would take care of them when they went back into battle. This idea of cycling and recycling needs to be looked at closely.

Reduced manpower strategies require greater forethought, both in system acquisition and human development. Many of the interviewees saw a disconnect between reduced manpower and the way we build hardware and develop humans. One Admiral noted that:

I think we are forced to a smaller force structure. And in order to adequately staff with fewer people, it has to be built into its design. Therefore, we need to design those platforms and systems thinking about the person upfront, how that person is going to work and operate. We build the thing and then figure out how the person is going to work.

Another Admiral noted:

It will change the way we operate. The way we man things...when it comes to homeport, there are going to be a bunch of people going out to maintain that ship. When the ship comes home it needs a different mix of skills than the people who are on the ship when it deploys. Less operators, more maintainers.

Others talked of the training structure changing because “you have to be a generalist because there are only a few officers on the ship” calling for a knowledge and skill set that is broad and wide.

5. Theme 5: Communication/Interpersonal Skills are Vital to the Officers of the Future

a. Theme

Future naval officers will need excellent communication and interpersonal skills to effectively lead a more highly educated workforce. NCW provides a much different environment within which the Navy has traditionally communicated. As the Navy transitions to a netted force with highly educated operators, steps must be taken to foster good communication.

b. Justification

Communication in the military has always been important. From the first signal flags to the netting of the forces in NCOs, communication plays an important role to the Navy. In the information age, this communication need is amplified, especially in NCO where face-to-face communications are not always possible. Additionally, the trends toward a more highly educated empowered workforce who are accountable for higher and higher-level decisions, will call for savvier officers who possess interpersonal skills needed to lead an educated workforce in dynamic environments.

One civilian declared, “Communication skills are timeless. What we get hung up on is the media, which [one] we use to communicate.” In addition he said, “it is important to be clear, concise, and to the point. The media might change but the message stays the same.” Another said, “Being able to tell people what you need and expect is very critical as well.” One military officer stated the following about communication and empowerment: “What I’m including in communication is the officer on the bridge who provides a quick, clear communication to compel...the people who work for you do what you want them to do.” Still others said:

I think you get back to this team idea. You don’t have this same separation in that environment as you do on a ship today, so that the team is close, and the team is drawing its energy and support from each other, and that will sustain the team longer. So the interpersonal relationships are going to be much more important because it is that will sustain them through a crisis situation.

One other personality trait that I failed to mention was the ability to communicate. You have to be able to talk with people, hear what they say, understand what they are telling you, and communicate back what are your intentions are and your command intentions are. Good communication skills in a bunch of media—predominantly talking.

When I think of KSAs I think of 2 classes: 1) Technical skills 2) Social skills. It is these social skills that separate the successful from the unsuccessful people. These are not soft things. These are being able to communicate well, being able to give good presentations, or persuade, being able to negotiate. Those types of skills are important to professional people. Depending on which, some will be more important than others.

Others talked about the network providing a social function as well. An interviewee, while describing the network that links sensors and shooters, stated, “I think it will force some social things.” One Admiral talked about more social interactions using that warfare fighting network saying, “There will be a lot more interactions, whether it be electronic or personable, sociable, or work”, and further stating that the trust requirement discussed earlier would be “predominantly built on communication” through this network. This is unique in the fact that most combat systems don’t account for social aspects. They are designed for fighting where as this future network, due to trust and communication necessities, might also double as a social network. A truly human centric design would account for human factors; perhaps things like an individual’s morale, to ensure humans are at their highest potential.

6. Theme 6: Diversity will Provide Opportunities and Challenges to the Future Navy

a. Theme

Demographic changes in the United States are shaping the workforce of the future and today. In order to attract those officers necessary for the Navy to succeed, the Navy needs to do a better job at reflecting the diversity of the United States. The Navy needs to recruit and retain its fair share of talent in an increasingly diverse workforce. Through these diverse sets of ideals and mindsets, combat power and mission readiness will be increased.

b. Justification

Question five⁶ during the interviews asked about how “managing diversity” would impact future naval officers. The respondents spoke of three points when answering this question. First, they spoke about the inadequacy of the current system. Secondly, they spoke of why we need diversity management and lastly, they spoke of some ways to achieve a diverse and inclusive environment. The following are excerpts from the interviews.

(1) Current Inadequacy. When asked about the progression of women during that Admiral’s career, one Admiral said:

⁶ Question five focused on the need for managing diversity and how that would impact the future officer corps. See Table 4.1.

Opportunity has changed a lot, but I'm not sure that I would say that the people have changed as much as the opportunities. The mindsets have not necessarily kept pace with the opportunities. While laws change opportunities, it doesn't change the individuals who make up the organization or their mindsets.

Another Admiral stated:

I don't think we do a good job at managing diversity in the Navy. I think it is not necessarily a friendly environment to people who don't fit the accepted mold. And there are tracks established in the Navy, and there are certain things that establish our credibility in the Navy, and if you don't have one of those things on your uniform then you don't have creditability. And I think we have to get beyond that. We have to accept people for their skills that they bring to the Navy and not view them based on a particular career path that was chosen or chosen for them.

Many talked about how the current officer corps doesn't represent the enlisted force or society at large. One Admiral said:

We don't do as well as we want to do for representative diversity. We know good and well that our officer population doesn't match our enlisted population. That is cause for concern. We want to be a representative mix of society. Our leadership has told us that we that is what they want us to be. If you truly respect what the constitution said our country was all about, we were raised a people's army...It is a volunteer organization. Our hope is that we can attract people from all across the board.

Due to the current predominantly internal labor market of the Navy, many interviewees worried that that the representative mix is not what it should be. One Admiral declared, "If we want a cadre of Hispanic officers in twenty years, we have to recruit them today." Another stated the problem as "The officers that will run the Navy in 30 years from now are standing here today." Others were concerned about the future because the lack of representative leadership asking, "Will we be able to get people in the future? We need to do a lot better." Another Admiral made the same point saying that diversity "is a big challenge. Our officer corps is not very representative of the population at large. And we are not making great strides in getting them here."

(2) Why we Need Diversity Management. Respondents had a consensus on the current inadequacy of the Navy's diversity. Many commented on why

there is a need for diversity in the first place. Many interviewees saw diversity as a must if we want to attract future officers. One Admiral stated:

My sense is that if we truly champion diversity, I think that not only should we do that, we have to do that. Because if you look at the population out there, we are a diverse nation and we are going to get more and more diverse every year, so we have to do that if we are to be a military that is in touch and relevant to the American people. And one way we can do that is to find these alternate ways to ensure people are successful. It has nothing to do with changing standards; it has everything to do with appreciating that individual's background and what their strengths would be and find a learning tool that lets them use their strengths to become successful.

Still others agreed and spoke of how the Navy's image is hurting itself:

We don't realize how the Navy is viewed from the outside. We would be very much viewed as a plantation. Where the white guys live in the big house and the other guys serve him.

How do we reach that talent? The Navy's image is working against us. They don't see a future with us.

The Navy has to, as close as possible, reflect the social, economic, and racial demographics of the country it serves. Otherwise it is seen as an elitist, out of touch organization.

Several of the interviewees talked about having better results with more diverse individuals on the team. One civilian stated "We need to evolve not only to more diverse, but a diversity of ideas, background, and education, and educational background." Another talked of talent stating, "We have to really respect talent. Wherever that talent may lie. And an organization that allows it to flourish, wherever that person comes into the organization." Another military officer noted:

You need to do this for a very practical reason, besides the moral reason to do all this. The results are better. If you have a diversity of inputs and ideas you end up with a better result in the end.

Still others had comments such as, "You don't win in conflict unless you understand your adversary"; or "You don't come up with the best solution unless you understand all perspectives." Another comment was that "the best solution

can only be fielded if you have all the perspectives. Diversity then is a great, great plus.” Another said, “We are in a world that is increasingly international. [Diversity] gives you sensitivity into the cultures of other people.” Another Admiral stated the need for inspiration of junior personnel saying:

What I worry about is the leadership of the Navy also being diverse. I know what will happen to the enlisted force. I know what’s going to happen to the enlisted force. I know what the junior enlisted population will look like. It will largely be people of color. What I worry about is the ability for the officer corps who will not be largely people of color to be responsive to the needs of that force. I think we can have a potentially very dangerous situation in terms of driving people out of the Navy. I don’t think there is any way the junior enlisted will be inspired to stay if they can’t look up and see someone wearing an officer uniform that sort of looks like them.

(3) Thoughts on how the Navy Should Manage Diversity.

When pressed on the issue of “how” the Navy should manage diversity, no clear models emerge. One Admiral suggested:

We’ve got to instill in all our people the value of each person and with each and every person that they interact with. It is easy to say. How do you do that? You have to figure out how to value every individual and use those talents and skills of that individual to the maximum extent. How do you teach that? It’s leadership, relationship skills, it’s personal development, it’s mentoring, and I’m talking actions.

One Admiral suggested, “It starts with education. You can’t wait till the last second to change overnight. When you do, that is an incredible disrupter.” Another officer added, “I’d be sensitive to second languages in recruiting and boot camp.” While other military officers suggested things we don’t do. He said, “We don’t change standards. We need to change the modality on how we get them to our standards.” Another officer stated a similar comment saying “If we truly champion diversity, maybe we shouldn’t have the human being as the clay, maybe the mechanism by which we get people to the standards change.” Others talked about focusing diversity training on the officers. He said:

Managing diversity and leading diversity [are important] because leaders are the ones who provide the command climate to make sure diversity becomes something very positive and strong for the command.

Others took a more passive approach saying, “As the country at large becomes more diverse, the people through time, exposure, and education [become more diverse]. It is not a big deal.” Another officer talked about getting people to see the value in diversity. He said:

Diversity—it can be very either very beneficial or incredibly disruptive. It is another dimension that you have to handle, you have to address, that you have to consider. Some people view it as a distracter. Others view it as an opportunity. We have to view it as an opportunity, and in reality it is.

One item that was absent from the interviews was the need for officers to be better educated in managing diversity. All had a general awareness of changing demographics, and a few cited diversity issues as reasons why some individuals leave the Navy. However, there was not a full appreciation that officers, through better education in diversity issues, leadership and interpersonal skills could use diversity as an asset in building teams and trust and not have it work to the detriment of the Navy.

7. Theme 7: The Future Generations—1) They Will Possess Key Skills to Thrive in NCO Such as Networking as Teams and Managing Information from Different Sources. 2) Their Expectations for the Work Environment will be High

a. Theme

The upcoming generations will likely have a better grasp of the technologies than the Navy’s current leadership. This is especially true in the aspect of NCO because future generations will grow up in a world of networking via electronic means and expect it in the Navy. Along with these desired skills, they also bring high expectations for their work environment. The Navy will have to meet their expectations if they are to going to be the employer of choice.

b. Justification

Question six⁷ from the interview focused on specific generational differences. Many interviewees’ comments focused on the skills they bring with them. Many thought that these technical skills would be shaped by society and would be ahead

⁷ Question six was about the desires and expectations of the Generation Y and the follow on generations and how they relate to the Navy. See table 4.1.

of the military technical skill sets in many ways. In other words, the military technical hardware would lag the technology found in the general populace. Additionally, as the quality of life improves in the United States, the interviewees commented that there would be high expectations from these generations regarding a fulfilling work experience. Lastly, comments are provided about how the Navy needs to change to meet the expectations of these future generations.

(1) Key Skills. Two Admirals noted that the younger generations are comfortable at multi-tasking. One said:

I think they are comfortable with technology and they are very comfortable with multimedia and able to focus on lots of different things at the same time. Be kind of multi-tasked and singularly focused on one thing...The younger generation has that talent, and whether or not it is because it has all been available in their bedrooms, I'm not sure; but they have that talent, and it lends itself to a network environment where so many different things are going on. And it is not always the most obvious thing that is the problem, or it not the thing that is in front of you that you need to be able to tackle.

Another noted, "They multitask as a faster speed. We are developing a whole generation that thinks like that, that operates like that."

Many interviewees said that they were impressed by the networking skills of the younger generations. One civilian said:

There is a generation growing up to whom networking will be as natural as the old industrial hierarchical systems were to the soldiers and officers of World War II. Who then, the people [behind] corporate line organizations of the 1950's and one of the reasons for the great American boom after the second world war, beside from the fact that we destroyed our enemies, was that these were people who knew how to function in a hierarchical mass production environment. Whether the mass production of fire, the mass movement of troops on a target or the mass production of vehicles, airplanes, or any other consumer product that is out there.

That civilian went on to further state:

We have a generation...that is particularly and innately in tune to industrial age warfare. I think the generation coming along now, whether it is Y or next one Z, will be so innately attuned to networking that for them NCW will seem like the only way to go. The only thing that makes sense. But that is a hopeful thought. Between now and then, of course, we have a generation in the way. And that generation isn't making the

leap as easily to networking. It finds it very hard and is made extremely uncomfortable by de-control. Gee, there are people out there with information I'm not controlling and maybe acting on it. And that is profoundly troubling I think, still to the flag level. And will be while they are around. Just look at the kinds of people who fought in World War II and then became the leaders of business in a line organization,...both in commerce and in military affairs. I think you will find a generation in tune with networking who are going to do wonderful, wonderful things.

Another Admiral noted:

There are very strong bonds being built today in our young generation over the net, and I don't think there will be a problem with building that trust and bond in netted warfare.

On the topic of teamwork and the new generation, many thought that they were teamwork orientated. One civilian stated:

Everything they do is organized around a team. They are so familiar and comfortable with that concept that they are uncomfortable on their own. That kind of organizational kid is a real phenomenon. I don't think the Navy understands it enough. With the generation that is coming into the Navy now, are kids that [teamwork] is what they know and you should watch them in groups. The Navy has a generation that has grown up with that. I think you have lots and lots of kids that have grown up that way. I think you will find that the desire to be part of a team and the understanding on how to be sociable and interact in a team is inherent than ever before. It has led to a generation of kids who understand teams, [and] likes them.

The consensus in the interviewees points out that American society and all of its technological offerings would produce the baseline technical skills that officers need to be successful. One Admiral stated, "I don't think that there will be a technology divide in the future." Still others said "The American culture will keep pace with the evolution of technology." Other interviewees stated:

I don't think it is going to be trying to find people to be intelligent enough, or adept enough, or acclimated enough to operate our military technology. I don't think that will be a problem. It will be different. It will evolve with society and technology in general.

Junior officers--The skills of watch standers will change, because of the nature of technology. But society keeps up with that.

Another responded when asked about who has the propensity to thrive in netted environments stated, “The younger kids coming into the Navy have it. I think that they have learned it throughout their lives.” Another Admiral described the future officer as:

Personality traits are the same, the abilities are the same, the knowledge...is provided by the society...the skills, hopefully, they bring a lot of that with them from their college education. We will have to teach them some of those skills as they apply to warfare.

(2) Expectations. Many officers and civilians noted the need for the Navy to meet the expectations of future generations. One interviewee acknowledged “if we want to recruit that person into the Navy and we want to retain them in the Navy, we have to fulfill their expectations.” Others talked about an inadequate personnel system. One Admiral noted:

We really have to adjust to the two-professional family. We are behind the times in that area than in any other part of our personnel system. If we don't, we are going to lose some very talented officer for that reason alone.

We have totally gone volunteer [force], we have to be the employer of choice. We have to adjust the quality of life, the quality of service to be that. That is a different picture than when we had a conscription mentality.

When compared to their generation most thought that, “They expect a higher quality of service.” Some of the expectations included education:

Education wise, society has convinced everybody that they have to have an education. The Navy will have to provide that to its enlisted folks, while they are in the service.

They say, “What is in it for me?” or “How will this improve my learning or earning ability in the future?”

Another expectation was security and flexibility:

Think tanks keep telling us that they want to jump jobs every 2-3 years. We aren't actually seeing that. We still think that security is still important to them. We can give that to them [with] a new job every two to three years, we just have to articulate it that way.

We are on a path to scratch two itches of the generation that is coming up: One is Flexible in their employment. And two, at the same time, providing them some security.

The future generations like stability.

Besides being cyber literate, they are entrepreneurial. They are in an entrepreneurial society. They don't work in the same environment for 30 years.

One big expectation was a challenging and meaningful work environment:

Opportunities, upward mobility, respect, making a difference, being a part of something bigger than themselves.

The younger people want to be challenged. They want to continue to learn, further development and there is one group that is not concerned as much about job security and they are about being employable. If they know they are learning and challenged, and they know a lot, then I know you can get a job.

One civilian noted that our work environment is not challenging enough declaring:

The commercial side is perhaps a touch ahead of us in general application, and I think an awful lot of our young people in our military will already have those skills. They will be disappointed if the Navy is behind those technologies that are available in the commercial world. It will be a big challenge for us.

A few of the interviewees pointed out that many individuals from the newer generations have no expectations or don't even consider the military officer corps as a viable career. One Admiral who worked extensively in recruiting stated:

People don't relate to the military. A lot of people don't even think about joining the military. It is just not on their list. We have fewer members of their family that ever served. And so, out of sight out of mind.

(3) How to Meet the Expectations of Future Generations. On meeting those expectations, the interviewees were split. Some thought that the Navy would eventually evolve its personnel system and practices to meet the needs of future

generations while many thought it would take a radical, revolutionary change. One Admiral stated:

I do think it is going to take a complete change in how we train people, recruit people, and how we even look at people to really make the transformation from platform centric to network centric.

While another officer stated:

The officers will naturally evolve. What we have to do is evolve the organization to utilize those skills. I'm not so much worried about what skills we will have available or bring in. It's can the institution utilize those skills and that we are still not back, thinking and operating, in an analog world where in all our recruits are up in a digital or even network plane. That is a greater concern as we look to the officer of the future.

While some of the interviewees took the middle ground stating:

The research question you'll have is, "Will NCO require or drive a change in the personnel structure of the Navy that is as revolutionary as that which I described?" You may find as it evolves, that we don't have to be revolutionary. But in order to attract people who have the KSAVs (knowledge, skills, attitudes, and values) that we need for NCO, we are going to have to consistently monitor it. At some point we'll probably have to break away and make a major change in the personnel structure of Navy.

One civilian suggested one way to meet the technical expectations of the younger generations is to incorporate some of the civilian technologies into the Navy's training design. He said:

In the past, the military technology, because it was developed in the military, and didn't have as wide of permutation through society in general, was used, and we needed unique schools to teach very fundamental habit patterns. Not the case now. I think the challenge for us is to upgrade our training processes at the same pace that the civilian cultural changes are taking place, the infusion of these technologies these PDAs, wireless communication. To upgrade not only our force but also our training at the same pace of the technology infusion is a challenge we have never faced before.

8. Miscellaneous Items Emerging from the Interviews

The following are some excerpts from the interviews that fell into no particular theme. They are general comments on the future environment that the Navy will likely

find itself in, and general comments on some of the skills that future officers should possess. Just one or two people mentioned them so they were not included in the previous themes. However, there are some particular insights that might be helpful for further research into the future officer skill sets. They include thoughts on how the interviewees see the future environment and how tomorrow's technology and NCO will impact the officer's KSA and personality traits.

(1) Environmental Comments. Some interviewees hinted at the Navy performing different tasks than it does today. One Admiral believed:

The missions of the armed forces are going to be different in the future. And network centric warfare gives you an opportunity to influence institutions of society without an exchange of fire, or without putting your American sons and daughters into combat. This nation doesn't want to lose a single person. I think that will drive the leadership of this country.

While another thought:

The paradigm of war fighting shifts from kill or be killed to multiple objectives, dynamic requirements that sometimes change over time, and environments that are not predictable. The technology is more predictable but the operating environments are not. What we can extrapolate from today are things like OOTW, anti-terrorism, narcotics interdiction, humanitarian assistance, peace keeping, etc.

On the Navy's effort to bridge the gap between itself and the civilian world, one Admiral noted:

What are the challenges of manning the force? Where are the pitfalls? I think it is the stratification of the membership; the separation from society. It is nice to say it is all-volunteer, if it were all volunteer we wouldn't be so screwed up in our recruiting system now. We need to be a part of society just like the citizen-soldier. We need to have participation from every segment of society. Then that communication happens, everyday awareness.

A couple of interviewees saw a greater link between the Navy and civilian world in regards to technology. One civilian advocated using Reservists as the core of information technologies professionals. He said:

What you do with the Reserve strategy that I'm talking about is you bring that knowledge in very, very quickly. They go to drill every month, so

they bring new things as they hear it. Their job is to be part of a sensory apparatus for the Navy, bringing in new things.... You want to create a real center of gravity in the Reserves of people like this. This is natural Reserve specialty. There are a lot of people making their quarter of a million or more a year as CIO's, senior info management people, who would be happy to do a weekend a month and two weeks a year serving their country. That is an appeal that can be made easily, and of course if you have them in the system, whenever they are on active duty, they will help with what you got and in a crisis you have a cadre that is readily available.

Another civilian had the same insight. He said:

The private sector is so much further ahead than we are and if we don't figure out a way to partner with the private sector and throw those acquisition laws out the window, I think we are in serious trouble.

On the topic of NCW and conducting NCO, the interviewees were consistent in their thoughts that it is the wave of the future. One said that, "NCW is a logical step in warfare," while another said it was needed because "the sphere of information is growing." Still others commented saying:

Can we ever make it to a networked military? We are going to wonder why we even asked ourselves this question thirty years from now.

For Nelson it was a band of brothers two hundred years ago—now it will be a bandwidth of brothers in the future. That is going to create a social and intellectual milieu that will create untold new military efficiencies.

I believe this interconnectivity will create really a whole new sense of community—especially among naval officers because we will move to a navy of the many and the small, not the few and the large. The navy 20 to 30 years hence is, I hope and I think will not consist of 11 or 12 Battle Groups and a couple of arsenal ships. But rather a lot of smaller platforms, the Steetfighters if you will of the future. This itself will redefine the camaraderie.

(2) Skills. A few interviewees talked about obtaining the skills of the future through broader types of education. One Admiral stated:

We probably want to focus on the development of decision-making skills. Leadership skills. Teamwork. Obviously, some technical aspects of the underpinnings of our systems. I think the focus is going to be, almost a liberal arts approach to the development of our force.

A few of the interviewees talked about the ability to be innovative. One Admiral said, “We need more and more innovators. We have to have a corps of officers that are innovators.” Another agreed stating, “We need innovators, the experimenters. One thing in our culture we defer everything to the chain of command structure.” Another noted about who are the best innovators saying, “There is nothing that says the best operator, particularly in the world of the future, is the best innovator.”

Another thought that prevailed to a more limited degree was the idea that officers will have to be comfortable with ambiguous situations and know how to deal with uncertainty. A civilian talked of future officers saying, “These people will have to deal with change and uncertainty.” Another interviewee talked of officers needing traits such as “tolerance for ambiguity—How to deal with that, how to manage through it. We need people who can think on the fly.” Another stated:

What kind of things people do we need? The kind of virtues that we like to have now but will become increasingly important in the future, and it is going to sound a bit contradictory, but a tolerance for ambiguity. If you are going to sit around and wait for precise marching orders, if you are going to sit around and wait for absolutely perfect intelligence, if you are going to sit around for the situation to clarify so you know exactly what the right or wrong answer is, the more you are going to be ineffective. So, you have to have a tolerance for ambiguity, but you also have to have the willingness to be decisive in the face of that ambiguity, recognizing that you may be wrong, recognizing that the consequences that unfold from your decision are not totally known.

Those decision-making skills were deemed important by other interviewees. One cited a lack of critical thinking skills in the workforce saying:

I think one of the most important skills is problem solving. Knowing how to quickly diagnosis a problem and how to impose or test solutions. That may obvious but it is not. It is amazing how many people don't have that sort of trait or skill.

Still, those decision-making skills need something more states one civilian. He calls for the need for patience. He said:

Military culture, navy cultural teaches our people to be decisive. Right or wrong, take an action. In some cases, any action is better than no action. Well, in an increasing world that I described, we going to have to teach our people that no action is sometimes the best action. And how do

people distinguish the difference. So, tolerance for ambiguity, willingness to be decisive in the face of conflicting information, and along with decisiveness is patience. To a certain degree patience in a lot of instances, time is your ally. Sometimes it is your enemy. So, how do teach people to differentiate those circumstances. There is no book answer to that.

One civilian talked about the communication abilities of the newer generations. He noted:

Our world is very small that we have communicated within in the past. They have a whole new bigger world of communication available. (Interviewee cites an example of a high school kid in a chat room)-- They're communicating not just with the kid down the block, they're communicating all over the world. It's a whole new perspective it brings to us and a whole new understanding. And if the goal of network centric warfare is to make the battlespace transparent, to see the whole picture, that's how they are training, they are training to see this whole picture where we only saw small parts of it, so there is a huge upside in communicating and thinking in that type of manner.

Yet another talked about the future warfighter possessing some balance:

Warfighting, there has to be a balance. You can't put shackles and chains on them and only unleash them in war. To be a warfighter is not a blank check to not be a part of our society.

Obviously, leadership will remain at the core of the officer corps. Many of the previous themes are what comprise leadership in an overarching sense. Still, many comments about leadership were made:

The whole world will get more complex. If I was going to differentiate between an officer of 2010 and 2030, a network centric officer vs. a straight stick SWO for example, what is the skill set difference between them? Relationships and leadership are the same. The tool bag may be a little different; the things you work on may be a little different.

It includes being able to work as a team, which I think is a highly important skill in this environment. Having leadership skills, obviously, more important than ever.

Leader has to be motivated, has to have values, and has to have sufficient charisma for people to want to be led.

V. POLICY RECOMMENDATIONS & CONCLUSIONS

A. RECOMMENDATIONS

The themes and ideas presented in this thesis lead to two major points: uncertainty will abound in the future, and warfare will be increasingly complex and characterized by dynamic change. To meet future challenges, naval officers must possess many of the characteristics that have long been the foundation of the officer corps: core values, leadership, and an action orientation. But with the information age, new KSAs can be expected to emerge. Moving away from attrition-style industrial warfare, the new warfare arena will be characterized by greater quickness, greater lethality, and greater complexity. Yet, smart decisions and teamwork still will be rewarded in combat.

To thrive in this environment, the naval officer must possess new knowledge, skills, and abilities and also maintain many of the traits that have been timeless cornerstones of good leadership. Drawing from the data presented in the interviews, five recommendations are listed below from which the Navy might benefit.

1. Develop Risk-Taking Broadly Trained Generalists to be at the Center of Network Centric Operations

At the heart of network centric operations is a cadre of tactical officers who have initiative and take actions that meet the overall commander's intent and ROE without requiring further authority from higher levels of the hierarchy. This is the essence of empowerment needed to achieve the speed and self-synchronization of NCO. This empowerment requires certain types of officers to use the power wisely and a certain type of senior officer to relinquish power and control over a situation. At the core of this empowerment is risk: risk that a wrong decision might be made by an individual or risk of allowing that individual the opportunity to make that decision. Both have more uncertainty than the old, slow, redundant, levels of hierarchy. However, without this autonomy, network centricity buys the Navy nothing more than quicker information flow without reaping the rewards created by it. In addition, the Navy becomes more vulnerable to those organizations who do empower their personnel and thus gain the advantages of speed through quicker decision making.

If the Navy is going to give that autonomy to those lower level officers then it has to prepare those officers for those responsibilities. First, officers at all levels must broaden their knowledge of the battlespace. This can be accomplished by experience and education. It starts with divorcing officers from their primary platform for warfare (i.e. airplanes, ships, submarines). Thinking jointly, or at a minimum Battle Group wide, will help expand the horizon of these officers. Additionally, education in Joint Professional Military Experience early in an officer's career is essential to understanding commander's intent and having a foundational knowledge of the inner workings of joint operations. The recent induction of Navy Lieutenants into the Naval War College curriculum is a step in the right direction. However, the scope of JPME is too limited. To account for new homeland defense and humanitarian operations, joint education should include information and skills needed to work with other governmental agencies (such as CIA, FBI, FEMA, etc...) and non-governmental organizations.

The next step is trusting those empowered individuals and teams. The question arises, "What type of person are you going to trust?" From the interviews, this appears to be someone who has a tolerance for ambiguity, someone who takes calculated risks, someone who shows initiative, and someone who possess strong core values. All of these are important. This leads to the next point.

2. The Navy Needs Better Screening and Assessments for Future Officers

To relinquish that control and empower lower levels of the hierarchy, senior officers will have to trust their more junior officers. Trust is built by interacting with people who have the same core of moral values, demonstrate competency in their job, and show maturity, situational awareness and conscientiousness to make the best decisions they possible can make. Additionally, when the inevitable bad decision is made, having a culture and reward/punishment system in place that look at the motives behind the decisions and not just the results of the decision, will push officers to a more aggressive outlook. With a zero tolerance type culture and little or no reward for taking calculated, well-reasoned risks, the default position will be the safest route. With that safest route go lost opportunities to capitalize on the power of net centrality.

So how does the Navy screen for these officers? There is value in examining personality traits in addition to general intelligence and technical skills. Tests are emerging for what research psychologists call the “Big Five” factors: conscientiousness (i.e. dependable, industrious, efficient and achievement-oriented), emotional stability (i.e. calm, steady, self-confident, and secure), extraversion (i.e. sociable, ambitious, and active), agreeableness⁸ (i.e. courteous, helpful, cooperative, and considerate), and openness to experience (i.e. cultured, intellectual, imaginative, and analytical) (Barrick and Mount, 2000).

These tests are still in their developmental stage. However, there is merit in examining these tests for use in conjunction with traditional methods of selection to determine the best types of officers. There are other ways besides these tests to observe these traits such as practical exams or interviews in group settings. The goal remains the same: Bring in quality officers. If junior officers are continually thrust into critical decision nodes of the networks early in their careers before the organization has time to evaluate them, it is vital that the best possible screening occur to ensure a proper fit into the Navy organization. Improper fit could lead to erosion of that essential trust necessary for net centricity. Additionally, if a certain personality trait is lacking, tailored training and education into those areas could be conducted.

Many of the “Big Five” personality factors are excellent traits to have in team members. These team members’ collaborative nature will increase the shared battlespace awareness, speed of command, and self-synchronization needed for NCW to be successful.

3. The Navy Human Resource System Needs to Facilitate Better Teamwork

Ask just about anyone, and they will say the Armed Forces incorporate a teamwork environment. Certainly, the Navy would not work without this teamwork.

⁸ It is important not to confuse traits like agreeableness with “yes” men or women. It is not. An agreeable person is someone who is considerate of other’s opinions and possesses a spirit of cooperativeness to work as a team. Certain individuals are bad for teams, causing disruptions. However, the individual who is disruptive in a positive manner that challenges the group to think should not be excluded. Having someone like that on a team in a capacity that minimizes the disruptions but challenges people to challenge their assumptions will prove to be beneficial. It is the officers’ job to manage a diversity of ideas.

However, this teamwork is often forged despite policies and procedures that are counter-productive to the fundamentals of teamwork.

First, the personnel rotation system is designed around individuals. Many people throughout a deployment cycle are arriving or departing. To use a sports analogy, individuals are detailed to the ship, squadron, or submarine just in time before deployments, the real “game” if you will, unable to benefit from the “practice” the Battle Group completed during the Inter Deployment Training Cycle (IDTC). It is during the IDTC that the team learns to work together and where the mistakes are to be made. Turbulence created by constant personnel rotations works counter to this teamwork and learning environment. With future warfare, waiting until “game time” to integrate new team members is too late and reduces combat effectiveness.

Secondly, with the blending lines between enlisted personnel and officers, the leader will become more of a coach. This calls for good interpersonal skills and many of the “Big Five” factors discussed earlier. One area that the leader will have to show skills in is managing diversity and inclusion. Diversity issues can easily become obstacles to building better teamwork. The diversity of ideas, diversity of race and gender, diversity of intelligence levels (to mention only a few sources of diversity) all add to the complexity of teams. Having a leader who can work with all of those and establish good communication and trust will be essential. Considering the changing demographics in America and within the Navy, a dedicated training track in managing diversity is needed.

4. Provide an Officer a Learning Continuum to Include Interpersonal Skills and Managing Diversity Training

As the Navy transitions from an industrial age warfare model to one of the information age, people aren’t seen as machines. Lower and lower levels of the hierarchy are “getting paid to think”, and their ideas and suggestions should be heard lest officers stifle their creativity. Through leadership training, officers can harness the motivation of this highly educated workforce and better understand how to motivate them intrinsically. It is the proverbial “teaching a man to fish” and not just “feeding him fish.” This might mean being less of a manager and more of a coach or mentor; it certainly involves being less of a micromanager. The rigors of combat will still undoubtedly call for hard decisions to be made. However, it is the bonds of the team that push the individual to

perform life-threatening acts in the face of adversity, not just the authority behind an order.

This leadership training should include elements as discussed above and also ways to enhance trust in the information environment. We might not be, as one interviewee put it, “rubbing elbows in two sweaty flight suits” in the ready room. The Navy will be building trust by connecting geographically dispersed units over a network. That trust might be easier to develop for the younger generations, but it still needs to be fostered. Officers must be the leaders who promote such connectivity.

5. Pursue Ways to Bridge the Civilian-Military Gap

Many of the interviewees pointed to a society that was ahead of the military in technology and/or had very different viewpoints than the mainstream military culture. Most would argue that both the military and the civilian society that it serves could learn more from each other. Partnerships with civilian institutions such as companies or universities can increase the dialogue between the military and American society.

Such partnerships can bring in new technology and new, innovative ideas. Officer partnerships where officers can take a couple of years away from deployments to work at a high tech civilian company could be a starting point. Breaking down barriers to allow for a flow into and out of the military without suffering career setbacks would increase the flow of new ideas.

With regard to the civilian-military split, the Navy has not seized the opportunity to share many of the good attributes of its organization. The Navy traditionally has shied away from the press. Much like an information warfare campaign, the Navy must educate the American public on its missions, purposes, and culture. Perhaps this calls for dedicated media officers. This media officer could focus on public relations type behavior, being proactive to get out the positives of the Navy and acting as a liaison to the public. This diverges from the traditional “advertising” method where the Navy pays to get the word out. There are a myriad of examples of where the Navy can promote itself. An example is the bombing of the USS Cole, which was a tragic incident and a black eye for the Navy. But the Navy did little to show the American public the heroic actions on the part of the crew.

B. CONCLUSIONS

As the Navy steams into the 21st Century it will be faced with change; change in the methods and tools of combat, and change in the type of people it recruits. Dealing with this change takes foresight and the building of a flexible Manpower system that can react quickly to a changing environment. This thesis mentions a few of the shortfalls of the Navy's Manpower system. Even if the recommendations were followed to exact specifications, they would still fall short. The bigger problem is a holistic HR system that is adaptive in nature. As the Navy looks to the future, it must continually update, project, flex, change, and anticipate the future KSAs of the officers. A HR system is needed that continually assesses the future, not just near term. Today's HR system is piecemeal and disjointed. In order to truly optimize the human capital of the Navy, a holistic system, with dedicated HR professionals and clear leadership lines to decision makers, is required to manage the human capital of the Navy. The creation of the Navy's new HR community may be the genesis for development of the needed flexible Manpower system.

APPENDIX A. LIST OF INTERVIEWEES

Associate Professor John Arquilla, PhD, Information Technology Department, Naval Postgraduate School, Monterey, CA.

Rear Admiral (SEL) Nancy Brown, Deputy Director and Fleet Liaison, Space, Information Warfare, Command, and Control for OPNAV (N6B), Washington, D.C.

Professor Carson Eoyang, PhD, Associate Provost for Academic Affairs, Naval Postgraduate School, Monterey, CA.

Mr. Daniel Franken, Director, Director, Joint Futures Lab, US Joint Forces Command, Norfolk, VA.

Professor Louis Giannotti, PhD, Information Technology Department Chairman, US Naval Academy, Annapolis, MD.

Vice Admiral Alfred Harms Jr., Chief of Naval Education and Training, Pensacola, FL.

Rear Admiral John Harvey, Director, Total Force Programming, Manpower and Information Resource Management (N-12), Washington, D.C.

Rear Admiral Joseph Henry, Director, Military Personnel Plans and Policy Division (N13), Washington, D.C.

Mr. Matt Henry, Assistant Deputy Chief Of Naval Operations Manpower and Personnel, Washington, D.C.

Admiral James Hogg (RET), Director, Chief of Naval Operations Strategic Studies Group, Newport, RI.

Rear Admiral Barbara McGann, Provost, Naval War College, Newport, RI.

Rear Admiral Samuel Locklear, Commandant of the Midshipmen, US Naval Academy, Annapolis, MD.

Captain William McRaven, Commodore, Naval Special Warfare Group One, San Diego, CA.

Mr. Murray Rowe, Director, Naval Personnel Research, Studies and Technology, Millington, TN.

Rear Admiral Robert Sprigg, Commander, Naval Warfare Development Command, Newport, RI.

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