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THESIS

**INTRANET TECHNOLOGY:
CONSIDERATIONS FOR IMPLEMENTATION
WITHIN THE DEPARTMENT OF DEFENSE**

by

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and
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March, 1997

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Intranets, internal networks based on the same technology and protocol as the World Wide Web, have emerged in the past two years as a very popular medium for communication and information exchange within organizations. Organizations are flocking to this new tool in order to maintain or improve their market share and enhance communications and productivity. The purpose of this thesis is to give the DoD some guidance in deciding if this new wave of technology is suitable for its computing and information environment. A qualitative approach is used in obtaining the data for this thesis. The primary assumption of this research is that the introduction of an intranet is similar to the introduction of any information system. Therefore, a sample of information technology professionals with at least five years experience in planning, developing, managing, and implementing information systems within DoD or large, bureaucratic, and hierarchical organizations is interviewed. The interviews reveal a process of implementation that is heavily dependent on variables such as culture, structure, and size of the organization. The process has four major phases: leadership buy-in, prototype introduction, attainment of critical mass, and intranet refinement. The authors conclude that intranet technology creates the opportunity for the DoD to become more productive and more efficient. They note that the real test for DoD implementors is in the application of the technology.

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INTRANET TECHNOLOGY: CONSIDERATIONS FOR IMPLEMENTATION WITHIN THE DEPARTMENT OF DEFENSE

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ABSTRACT

Intranets, internal networks based on the same technology and protocol as the World Wide Web, have emerged in the past two years as a very popular medium for communication and information exchange within organizations. Organizations are flocking to this new tool in order to maintain or improve their market share and enhance communications and productivity. The purpose of this thesis is to give the DoD some guidance in deciding if this new wave of technology is suitable for its computing and information environment. A qualitative approach is used in obtaining the data for this thesis. The primary assumption of this research is that the introduction of an intranet is similar to the introduction of any information system. Therefore, a sample of information technology professionals with at least five years experience in planning, developing, managing, and implementing information systems within DoD or large, bureaucratic, and hierarchical organizations is interviewed. The interviews reveal a process of implementation that is heavily dependent on variables such as culture, structure, and size of the organization. The process has four major phases: leadership buy-in, prototype introduction, attainment of critical mass, and intranet refinement. The authors conclude that intranet technology creates the opportunity for the DoD to become more productive and more efficient. They note that the real test for DoD implementors is in the application of the technology.

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I. INTRODUCTION

A. PURPOSE

The Internet has proven to be a very popular and powerful medium for communication, data transfer, and electronic commerce. As the number of individuals and organizations connected to the World Wide Web continue to grow, the amount of positive publicity increases proportionately. Many organizations are defining their business strategies in relation to the electronic commerce the Internet offers. The strategies that they are employing include the use of Internet technology external to the boundaries of the organization, as well as, internally. Intranets, internal communications systems that do not go beyond company boundaries, are spawned from existing Internet technology. They are the latest wave of information exchange.

Intranets have become the fast lane on the information highway for organizations in pursuit of the ever illusive technological edge. They are rapidly replacing networks as the most talked about method of information exchange within organizations. Corporations such as Silicon Graphics (SGI), Eli Lilly, and US West Cellular are among the major businesses that have designed intranets to enhance communications and productivity.

The popularity of intranets is second only to its claims of enhanced communications and productivity. Organizations are flocking to this new tool in order to preserve, maintain or improve their market share. Although the mission of the Department of Defense (DoD) is not focused on profit, it does seek to enhance communications and productivity. Timely, accurate information is a tremendous asset in the enhancement of mission readiness and support of the warrior. If intranets

can deliver efficiencies in the processes that support this mission, it is possible that intranets are an answer for many of the activities in the DoD.

Because intranet technology is still in its infancy, few studies have been done to determine its impact on organizations. The purpose of this thesis is to give the DoD some guidance in handling special considerations for the DoD that may develop during an intranet implementation process.

The authors seek to answer the question of whether or not there are special considerations necessary for implementation of an intranet within a DoD organization. Also, the authors go further to look at special managerial challenges facing DoD organizations willing to build intranets and document some of the lessons learned from organizations that have already gained experience in the implementation and management of this technology.

B. DEFINITIONS

1. Implementation

The term implementation refers to more than the simple connection of computers and other sorted hardware via network cabling. In a broader sense, the word implementation describes a process that includes all actions necessary to develop, design, install, and maintain an information system. In a typical systems development life cycle (SDLC) diagram (see Figure 1), implementation often refers to one of the latter phases. In this diagram, taken for Kendall and Kendall's book *Systems Analysis and Design*, it is actually the last phase. However, for the purpose of this thesis, the term implementation covers all phases of a system's life cycle. Simply stated, in this thesis when the term implementation is used it refers to the entire life cycle. The term

installation is used to describe those activities commonly associated with the implementation phase of the SDLC.

2. Special Considerations

As pointed out in the previous section, the primary purpose of this thesis is to find out if there are any special considerations surrounding the implementation of an intranet in DoD organizations. Specifically, are there things that should be taken into account, given the uniqueness of DoD organizations and the technology? In this instance, a special consideration is any issue, consequence, or characteristic related to intranet implementation that presents possible obstacles for the success of the project.

Essentially, special considerations point out areas that need to be addressed if intranets can be tailored to fit within the constraints of DoD organizations. Furthermore, implementing that technology in organizations of the various categories requires addressing issues pertinent to fitting the technology to that specific organization.

An underlying assumption of this thesis is that DoD organizations share the qualities of most large hierarchical and bureaucratic organizations. For example, many DoD organizations have a very structured way of communicating and are slow to adopt change. The authors recognize that the

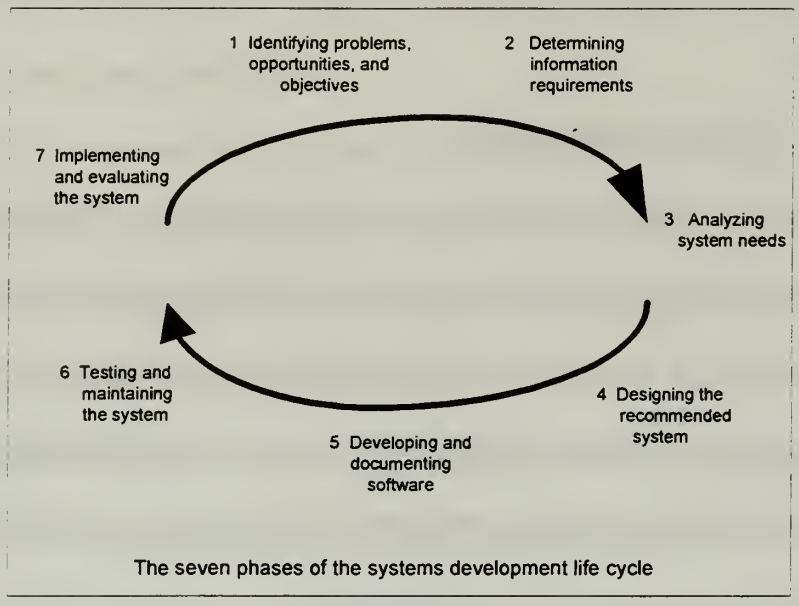

Figure 1

DoD has organizations that vary in structure and culture. However, the thesis attempts to find special considerations that generally apply to most DoD organizations.

3. Successful Intranet

This thesis acknowledges that intranets can be installed in any organization that is willing to allocate the necessary resources. But, a goal of this study is to point out opportunities for implementors to increase the chances of the intranet performing as expected once implemented. A successful intranet is one that meets the expectations of its end-users. Expectations can vary with respect to individual organizations. Therefore, determining the success of the intranet is subjective. However, for the purpose of this thesis a successful intranet is one that becomes a fully integrated

communications tool and begins to free the organization from dependency on paper and unnecessary meetings to accomplish the mission of the organization.

C. THESIS OVERVIEW

Following this introductory chapter is the literature review. The literature review chapter, Chapter II, provides a description of intranets and discusses the issues surrounding their implementation. This chapter points out some of the possible benefits of deploying an intranet within an organization and proposes that there are several challenges that need to be addressed before the technology becomes a mature and stable platform for communications and collaboration. The chapter concludes with a summary that observes the lack of information contained in the literature concerning special considerations for specific types of organizational cultures and structures. Thus, this chapter points out the need for the study.

Chapter III is the methodology chapter. This chapter describes the method of research and the steps taken to obtain the data. Also, this chapter serves as a prelude to the following chapters by introducing the sample used for the research and discussing the steps taken to code and analyze the data.

Chapter IV is the data chapter. In this chapter the researchers present the data as it was delivered by the sample. The chapter is structured in a format that follows a process implied by the sample during the interviews. Four phases of the intranet implementation process are explained in this chapter: leadership buy-in; prototype introduction; achievement of critical mass; and intranet refinement. These phases are explained in detail and supported with a discussion of the associated

activities and success variables for each phase. The chapter does not attempt to analyze the data. The researchers handle this task in the next chapter.

Chapter V pulls all of the previous information together to answer the primary research questions. In this chapter the researchers analyze the data collected through the interviews, the literature, and their personal experiences as DoD managers to deliver considerations of intranet implementation for DoD organizations.

Chapter VI concludes the thesis. This chapter contains a description of the limitations of the study, a summary, and conclusions.

II. LITERATURE REVIEW

A. INTRANETS

An intranet is an internal communication system within an organization. Protected from external intruders, end-users are able to combine text, graphics, and/or video to communicate throughout the network (see Figure 2).

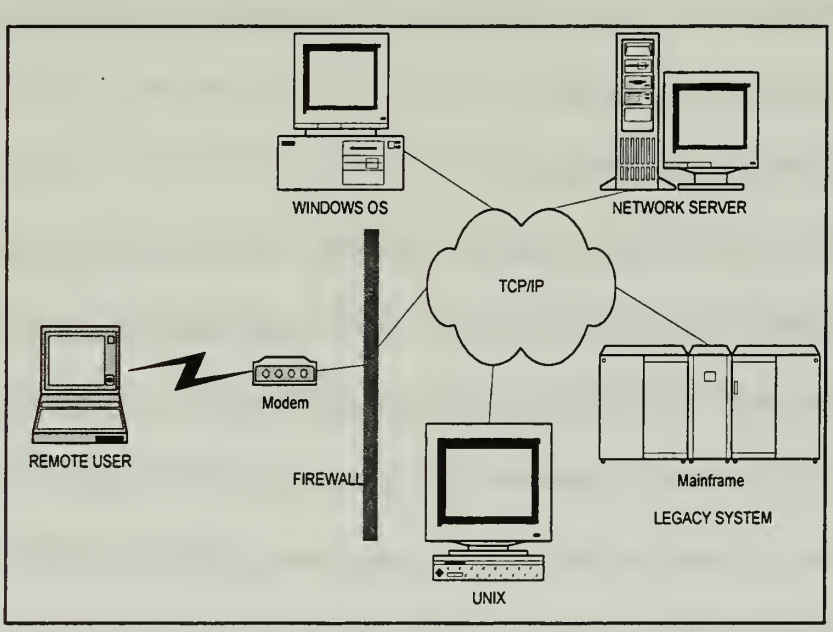

Figure 2

Communication over an intranet is conducted by transferring files of data. The files may be graphics, text, video, or audio. The most common of these is text, which is presented in Hyper-Text Markup Language (HTML). The files are stored on computers that are configured as web servers and can be accessed via Hyper-Text Transport Protocol (HTTP). Intranets can contain a multiple number of servers or can be designed to operate on a single stand alone server (Milliken, 1996).

Intranets have emerged in the past two years as a very popular medium for communication and information exchange within organizations. The technology was featured on the cover of Business Week and was number three on Fortune's list of the top ten trends in technology (Holtz, 1996). A study conducted by the Business Research Group predicts that 70 percent of all U.S. companies will have an intranet by January of 1997 (Business Research Group, Newton MA). Furthermore, 90 percent of corporations are evaluating intranets and more than 50 percent believe that this technology will eventually dominate the desktop networking environment (Delphi Consulting Group Inc., Boston MA).

B. INTRANET ADVANTAGES

The rise in popularity of intranets is not without reason. Simply stated, intranets are fast, reliable, and scalable. These same advantages were fundamental to the rise of Transmission Control Protocol/Internet Protocol (TCP/IP) as the dominant protocol of the Internet (Milliken, 1996). Upon closer inspection, the utility of intranets is far greater than that revealed by a superficial look at technical attributes. Intranets offer several advantages to organizations willing to implement them.

1. Ease of Use

The user friendliness of intranets can be largely attributed to the intuitive nature of the user interface. Most of the system navigation and information retrieval can be accomplished via a point and click interface. The simple interface makes information available and accessible to end-users of virtually any experience level and reduces the amount of training necessary for the novice user (King and Mizerak, 1996). The importance of a user friendly interface is clear, considering the intent of most intranets is to allow information to flow to all levels without obstruction.

Many successful intranet developers have expanded the concept of a user friendly interface. Several designers have developed overall schemes for their intranets that capture a particular motif or theme. Silicon Graphics, a high-tech company located in Silicon Valley, has designed its intranet to capture the essence of a newspaper. The employees log on each morning to find the day's top headlines which include the current stock price, upcoming conferences, current events, and other important company information (Buckler, 1996). Hence, an abundance of information is made available to employees without requiring any effort to look for it. At Turner Entertainment, the intranet was designed to be entertaining. The home page of the intranet resembles a refrigerator with several refrigerator magnets. Each magnet is a link to the home page of a division of Turner. The home pages contain press releases, new project initiatives, new product announcements, programming schedules, and more (Roberts, 1996). The use of themes, as in these two examples, enhances the intuitive nature of the interface by providing a structure to the system that is understandable and clear to the end-user.

2. Pull vs. Push Approach

Intranets are designed in a manner that gives the end-user the power to control the amount and type of information received. The end-user has the ability to access the information that is pertinent and relative to his or her needs. Conversely, if the information published on the web is deemed unnecessary by the end-users, it will not be used. This is a notable shift from the traditional way information is distributed in organizations (Holtz, 1996).

At Schulumberger Ltd., a Fortune 1000 oil company with more than 51,000 employees, the concept of pull vs. push dominates the company's intranet. The company's CIO has designed the

intranet to be a self service tool to all employees of the company. For example, one way Schulumberger uses its intranet is to post information concerning employee expertise on the web. If an employee needs a specialist who works with cement in sub-zero temperatures, he or she can simply log onto the web and search using those key words (Mullich, 1996). The employees are responsible for publishing information related to their special qualifications on the web. Once an expert is located, they can be contacted via the web, other electronic means, or any conventional type of communication.

3. Technical Flexibility

One of the significant reasons organizations continue to implement intranets at such a high rate is the flexibility that they offer (Milliken, 1996). The use of a common protocol, such as TCP/IP, gives intranets the capability of networking platforms that are diverse in terms of hardware and software. For example, machines using entirely different operating systems (Unix vs. DOS) can successfully network via the intranet. This offers organizations with a wide assortment of systems, a powerful solution to an otherwise messy network situation.

In addition to the ability to tie diverse systems together, intranets can be implemented on top of the network infrastructure that is currently in use. In other words, the organization can use the topography readily available, be it fiber, coax, or copper. Obviously, there are tradeoffs associated with the choice of infrastructure, but using the existing one drastically reduces the cost of implementation.

Intranets can be used to extend the life of previous generations of information technology, commonly referred to as legacy systems. As many organizations find the replacement or upgrade

of outdated systems extremely costly, the use of an intranet provides a short term solution to the problem. An intranet can be leveraged to serve as an interface between older legacy systems and newer, more powerful ones. This is accomplished by accessing databases stored on the older systems via a common gateway interface and presenting that information in HTML format. Because of the power of the technology, the interface can be achieved virtually transparent to the end-user.

4. Consistency of Information

The use of an intranet as a central point of communication, collaboration, and data transfer frees organizations from many problems of traditional information exchange. Instead of maintaining information in many different formats, locations, and mediums, information can be presented in standardized formats, published to a single location, and updated easily (King and Mizerak, 1996). When dealing with time sensitive information, this make the tasks of maintenance and version control more manageable (Stevens, 1996).

An example of how an intranet can effectively solve problems associated with dealing with information in various formats and locations, is Hewlett-Packard's use of its intranet. The company found that by using a web-based network, they were able to eliminate thousands of pages of printed internal policy manuals, sales literature, product information, and news releases by placing them on-line (Eng, 1996). Subsequently, employees no longer maintain binders and loose leaf folders of information that may or may not be the current and correct versions.

An intranet's ability to aid in managing the consistency of information is especially beneficial in the area of training. Training can be a very costly endeavor. Intranets help reduce this cost by eliminating the need for printed manuals and eventually supplanting the need for CD-ROM

cost by eliminating the need for printed manuals and eventually supplanting the need for CD-ROM versions of training materials. They also handle the work of distributing the programs. Thus, intranets have the potential to eliminate most of the problems associated with the traditional method of supplying training and documentation material. They are flexible, can be managed from a central point, and have a global reach (Stevens, 1996).

5. Low Relative Cost

Gartner Group, Inc., a research company based in Stamford, Connecticut, estimates the total cost of a small system operating Windows 3.1 at $44,000 for a five-year period. Most of the cost, nearly 85 percent is the result of the labor involved in administration, management, updates, changes, and support. Furthermore, the company proposes that the amount could increase by as much as 40 percent if the computing environment consist of mixed systems (Horwitt, 1995).

Because of the high cost for network systems, many organizations have been enticed by the promise of low implementation cost for an intranet. Of course, the cost of implementing an intranet increases substantially if the infrastructure does not exist. However, assuming the organization has the wiring, the abundance of software, much of it free and of high quality, makes the buy-in cost for an intranet lower than any other technology suite (Millikin, 1996).

In addition to lower start-up cost, intranets also harbor possibilities for lower operational cost relative to other alternatives. The potential for operational savings is the result of several factors. First, all of the client computers can communicate with the same protocol, thus eliminating the need for different server software for each type system. Second, only one type of software, the web browser, needs to be installed on each computer. Third, computers can be scaled down to what is

commonly referred to as "thin clients" and allow the network servers to handle most of the computing. And last, updates, patches and distribution of new releases can be conducted via the web, reducing the time and cost of system administration (Horwitt, 1996).

The nature of intranets and their application makes it difficult to quantify the amount of savings that result. However, there is one area that organizations are seeing a direct benefit: paper costs. Intranets are regarded as a technological innovation that will allow organizations to transition to a paperless state (Eng, 1996). The reduction in paper, printing, and copying cost translates into a direct reduction in expenses on organization balance sheets.

6. Productivity Enhancement

A key advantage of an intranet is the improvement in productivity that occurs as a result of workers effectively utilizing the web. When workers are able to use an intranet to communicate and collaborate, more time is available to perform regular duties (King and Mizerak, 1996). Intranets offer enterprise-wide productivity enhancements in the areas of timeliness, accuracy, cost, and information availability.

Claremont Technology Group, Inc., a consulting and research firm based in Beaverton, Oregon, conducted a study of Silicon Graphics' intranet, Silicon Junction. The study found that 63 percent of workers at SGI used the intranet in performance of jobs. According to the study, SGI users consider the information obtained from the intranet accurate, timely, and critical in helping them make better and faster decisions. Furthermore, the study revealed that employees have an increased knowledge and understanding of SGI's products, services, corporate initiatives, and strategies.

Cigna Property and Casualty has also seen the productivity benefits of an intranet. The company is using an intranet-based system to reduce its headquarters-based loss control staff from 21 to 10. Cigna's intranet was designed to connect with several other services and databases from which the 10 headquarters-based researchers could conduct research queries. This system has freed up time for the loss control specialists in the field to track safety protocols and implement safeguards for loss control. Cigna has found that their intranet has enhanced productivity by solving technical loss control problems, accommodating an on line loss control library, eliminating repetitive research, reducing travel time, and providing a link to external databases of standards and industry specific information (Schwartz, 1996).

7. Just In Time Information

The advantages that intranets have in dealing with time sensitive information was alluded to in previous sections, but this point is critical and warrants further discussion. Time sensitive information can be defined as information that is perishable and must be used in a timely manner. To delay in using certain time sensitive information, for many organizations, could result in the loss of any dividends that information could have rendered. Intranets can play a big role in ensuring that the rewards of effectively utilizing time sensitive information are not lost.

The results of a study conducted by *InfoWorld*, a high-tech magazine, illustrated the importance that companies place on dealing with time sensitive information. The study determined that larger companies are most likely to implement an intranet. The reason is, typically, the larger an organization gets, the slower it is to react to changes or new information. Many organizations are investing in intranets because it gives members access to perishable information. Consequently,

members are able to react faster to changing market demands or new information, giving the organization a competitive edge (Stamates, 1996).

C. INTRANET CHALLENGES

In addition to the many advantages of intranets, the literature suggests that there are some limitations to their capabilities. However, vendors are hurrying to solve many of these problems in an effort to capture a share of a market that is expected to rise to an estimated $7.8 billion by 1998 (Eng, 1996). For this reason, perhaps it is better to refer to these limitations as challenges.

1. Information Overload

The greatest strength of an intranet is arguably the unprecedented ability it gives organizational members to share information. Indeed, the power of the intranet lies in the vast amounts of information that can be shared by publishing it on-line (Holtz, 1996). However, with many users placing large quantities of information on the intranet, it becomes difficult to find the resources needed. Anyone who has spent hours on the Internet searching for information can attest to this challenge.

Companies are pondering ways to help employees find the information they need on the intranet. The concern is that with information spread over so many servers, particularly in a widely distributed environment, that end-users might become frustrated and give up the search (Mullich, 1996). Search engines, such as the ones common on the Internet, can be used to handle this problem but they provide only a partial solution. They do not prevent end-users from getting lost, confused, and subsequently giving up or starting over again.

2. Competition

In terms of collaboration and information sharing, groupware is the intranet's biggest competitor. Products such as IBM Lotus Notes, Microsoft Exchange, and Novell GroupWise are attractive to Information Systems departments for a number of reasons. Foremost is the advantage groupware products have in the categories of security and replication (Roberts, 1995). Replication, the copying of data and directory information to various machines, is particularly important in an organization that wishes to distribute consistent information among groups. It allows the end-users to update information or applications and ensures those changes are reflected to other end-users of the same data. However these groupware products are generally unproven at the enterprise level (van Kirk, 1996). Most of their success has been realized at the department level.

Although groupware products are more robust than intranets, the leading groupware vendors seem to be acquiescing to the popularity of the internal webs. Both Microsoft and IBM have released updated versions of their groupware platforms that are intranet compatible (Lisle, 1996). The combination of groupware with an intranet promises to be extremely beneficial to implementors. Users will enjoy the power and robustness of groupware with the functionality and flexibility of an intranet (King and Mizerak, 1996). The debate is no longer which is the better between groupware and intranet, but whether to implement an intranet alone or an intranet in conjunction with groupware (Radosevich, 1996).

3. Application Deficiencies

One of the biggest problems facing intranet implementors is the lack of robust applications that can be used on an intranet. There are not very many real business applications available at this point. Most of today's intranets simply enable end-users to view downloaded information in a basic web page format (Horwitt, 1996). Basically, the only interaction an end-user can have with the downloaded data is limited to fill-in-the blank querying. The problem is that basic web authoring tools don't provide the convenient solutions of the traditional database tools (Kohelhepp, 1996). Therefore, the work of application development is left to the technical specialist with a grasp of the C++ or other programming language such as Java. Java, a language developed by Sun Microsystems, is being used by some implementors to develop small applications, commonly referred to as applets. Applets are really pseudo compiled programs that are located on the server and are downloaded to the client. Once downloaded, they must be interpreted. Normally, the interpreter is included in the web browser. In spite of the potential of applets, currently they are limited due to the length of time required for interpretation (Kohelhepp, 1996). This may not be the case for long.

Several companies are working to develop solutions. Industry giants such as IBM, Digital Equipment, Sun Microsystems, and others have begun to work on this challenge. In their efforts to create solutions, vendors have inadvertently caused another dilemma for intranet implementors. The proprietary nature of the software the vendors are developing forces the organization to standardize its platforms (Raynovich, 1996). This hurts the organization's flexibility in networking in a mixed computing environment. Organizations that desire strong business applications for their intranets

may have to choose one vendor's web products (Raynovich, 1996). Creating an industry standard is a possible remedy to this problem, but with several companies fighting to have their products declared the standard, the situation may not be resolved for some time.

4. Misuse of Technology

The intranet does have the potential to increase productivity. That does not mean that it will. Whether or not the technology actually lives up to its billing, depends on the manner in which it is used. The fact that most internal webs are connected to the Internet brings another challenge to intranet implementors. Employers are finding that the wealth of information available on intranets as well as the Internet, can be a cause for concern. The problem arises when employees spend valuable time at web sites that are not related to the business of the organization. Leisure, sports, entertainment, chat rooms, and interactive games are among some of the tempting web sites that capture employee attention and hinder the productivity of the organization (Muhammad, 1996).

A study conducted by Nielsen Media Research found that employees at IBM were misusing their Internet connections more than four thousand five hundred times a month. Other companies such as Apple Computer, AT&T, and Hewlett Packard also had significantly high occurrences of this type of misuse (Muhammad, 1996).

Corporations have established firm policies governing the use of the Internet. However, it is not easy to enforce these policies. Deciding whether an employee is surfing a non-work-related site can be difficult (Muhammad, 1996). To handle this challenge software developers have begun to design programs that allow organizations to censor the web sites accessed to make certain that they are work related. Typically this is done in one of two ways: monitoring and blocking. A

monitoring scheme allows management to track the sites that a user has visited, the time of the visit, and the amount of time spent there. Blocking, on the other hand, simply restricts access to certain sites.

5. Early Stages

Essentially, the fact that intranets are relatively a new phenomenon is not a challenge in itself. However, several issues surround the youth of the technology of which implementors should be aware. A critical one is the relationship between the implementor and the vendor. Because intranets are in their infancy, some of the vendors that implementors purchase products from today, may not be around in the future (Roberts, 1995). Hence, organizations might find themselves with products and without support or maintenance. Also, as intranets continue to mature there will undoubtedly be growing pains for the technology (Kohlhepp, 1996). Currently, there is a demand for greater speed, more flexibility, and enhanced scaleability. Most experts agree that intranets are here to stay but organizations would be wise to weigh the immaturity of the technology when implementing a system.

D. ISSUES OF IMPLEMENTATION

A working knowledge of some of the advantages and challenges of intranets is not sufficient when determining whether or not to implement a web-based network in an organization. Organizations are beginning to reach the conclusion that there are a number of issues that they must consider before purchasing intranet technology. As a result, they are attempting to define visions, strategies, and objectives for their collaborative computing systems (Radosevich, 1996). The issues,

of course, vary depending on the situation. However, it is possible to establish a set of points to consider that will help implementors develop a successful intranet (Millikin, 1996).

1. Security

Implementing an intranet brings with it a host of security implications. Organizations have to consider the protection and preservation of the information contained in the network as well as the network itself (Millikin, 1996). The situation becomes even more difficult when it is necessary to allow outside users such as dealers, vendors, and partners access to the network (Hostetler, 1996).

Furthermore, there is rising concern that many network security breaches will originate inside the organization (Paone, 1996). Steven Cobb, the Director of Special Projects for the National Computer Security Association (NCSA), estimates that at least 75 percent of security problems are internal. Also, he states that there is significant room for improvement in the prevention of internal attacks (Paone, 1996).

The popular method of securing networks is the use of a firewall. A firewall is a computer, a router, or a combination of these components with software that allows managers to control what users are allowed to access the system. Firewalls are a central point through which all inbound and outbound traffic must pass. Therefore, most of the security monitoring, control, and management can be conducted from that location. These devices are fairly effective at protecting networks from outsiders but have yet to prove themselves as a credible means to handle internal security problems (Paone, 1996).

2. Control

Although highly dependent upon organizational culture, another issue that is worthy of consideration prior to implementation is that of control. With the ability for the typical desktop computer to operate as a web server, organizations face the problems associated with controlling the growth of the internal web (Millikin, 1996). For example, some companies are concerned that employees will post information on the web that is inappropriate or libelous. Others are worried that confidential information might be transmitted throughout the organization via the intranet (Salamone, 1996). These are legitimate concerns and warrant consideration in designing an effective intranet.

3. Training

Training of end-users on new platforms and systems is a must. Therefore, it is an integral part of any IS development plan. Intranets are recognized for being easy to use and subsequently have a reputation of low training costs. In fact, several intranet users report a reduction in training costs since the implementation of the internal web (Horwitt, 1996). Contemplating the costs of training is important but ensuring that users are able to maximize the tools at hand is essential for the success of the intranet (Millikin, 1996).

4. Management

The management of an intranet incorporates several issues including the distribution of tools, installation of software, maintenance of the system and control of the web-based network (Millikin, 1996). One of the attractive features of an intranet is the ability to do much of the management from a single location. Nevertheless, intranet management can be difficult because the tools required to

do the management tasks are still forthcoming. For instance, tools that allow management to plan for increased usage, measure system performance, and troubleshoot network problems do not exist (Horwitt, 1996).

5. Network Infrastructure

If the organization's current network is based on TCP/IP, the protocol of the Internet, then establishing an intranet requires fewer changes to the existing infrastructure. However, if the network does not use the Internet protocol, then the implementor is forced to upgrade or replace the network operating system (Millikin, 1996). In addition to the protocol requirement, bandwidth is a major concern. A small bandwidth will decrease system response time and frustrate end-users. It is critical that the network has the capacity to handle the growth in traffic (Ubois, 1996).

E. CONCLUSION

A review of the literature reveals that: there are many possible uses of intranet; organizations stand to benefit substantially from implementing intranets; and there are drawbacks to intranets. Several writers raise questions that need to be answered before the technology reaches maturity. They point out some of the major drawbacks to intranets and advise a consideration of the key issues surrounding intranet implementation.

There are several holes to be filled regarding the effective planning and implementation of intranets. An important one is the role that culture plays in the design, development, and operation of the technology. Although culture was discussed briefly, it was not given significant attention in terms of its effect on the success of the system. The literature fails to reveal if certain cultures and structures are more conducive to intranet implementation and utilization. Another void is the lack

of material that suggests or outlines a plan of attack for intranet implementors. The bulk of the literature concentrates on technical attributes and applications, leaving many strategic management issues to be answered on a case by case basis.

III. METHODOLOGY

A qualitative approach was used to obtain the data for this thesis. Although quantitative methods direct the researcher to what has been done, they very rarely explain why something was done. Hence, it was determined that a qualitative approach was the best method to answer questions related to the methods and aspects of intranet implementation, as well as, more abstract issues involving organizational culture and socio-political environment.

A. POPULATION AND SAMPLE

A primary assumption of this research is that the introduction of an intranet is similar to the introduction of any information system. With this assumption in mind, the population was identified as information technology professionals with at least five years experience in analysis, design and implementation of Management Information Systems. From that population, a sample of six information technology professionals that had backgrounds in planning, developing, managing, and implementing information systems within DoD or large, bureaucratic, and hierarchical organizations were selected.

The six individuals selected to participate in this research are all very successful people in their respective fields of information technology. Three work for extremely reputable, high-technology firms located in Silicon Valley and three are members of the IS staff at the Naval Postgraduate School. Their experience in the discipline of information technology is extensive. In total, these individuals' careers encompass more than seventy-five years of experience and skill related to information systems planning, design, implementation, and management.

B. DATA COLLECTION

1. Methodology and Approach

The principle method of data collection for this thesis was the interview. The approach taken for this research follows the model of Irene and Herbert Rubin. In their book, *Qualitative Interviewing: The Art of Hearing Data*, the Rubins describe an interviewing approach that attempts to gain insight into a particular research arena by combining experiences of the interviewees into common themes (Rubin and Rubin, 1995). Using their method, the researchers for this thesis were able to collect data from the sample, collate the information into common themes, and organize the results to answer the primary research question of whether or not special considerations exist for the implementation of intranets in the DoD.

2. Style

A topical style of interview was considered most conducive to this area of research. Topical interviews, one of several types in the qualitative family, are used to find explanations for specific events or to describe a certain process (Rubin and Rubin, 1995). Hence, selecting a topical style of interview allowed the researchers the benefit of narrowing an extremely broad subject area.

3. Structure

After selecting a method, an approach, and a style of data collection, the researchers determined that the structure of the interview sessions should be semi-structured. The semi-structured interview lends flexibility to the interview process by eliciting specific information from the interviewee while allowing the interview to change, when necessary, to ensure the maximum information is gained from each interview. Each interview began with a brief announcement which

introduced the topic and allowed the interviewee time to note any concerns and questions. Predetermined interview questions that were designed to elicit detail, example and content followed the announcement (Rubin and Rubin, 1995).

4. Interview Protocol

The interview protocol for this research was divided into five sections or phases (Appendix B). Phase 1, the interview opening, began with an informal conversation intended to develop trust and establish a rapport with the interviewee. Following this brief discussion, a short announcement was read which fully described the purpose of the interview and the information that was sought by the interviewers. Phase 2 began the interview with subjects that were relatively comfortable and easy for the interviewees to handle. In this phase the researchers sought to gain background information about the individuals' experiences and projects. Phase 3 and Phase 4 were the heart of the interview sessions. In these two phases, specific questions, first easy then more difficult, were asked concerning the topic of research. Finally, in Phase 5, the researchers answered any further questions, addressed any outstanding issues, and closed the interview.

All questions were the same for each interviewee, however, because of differences characteristic to the personality of each interviewee, it was possible to probe further with some interviewees more so than others. Also, with each successive interview, information was obtained that proved helpful in later interviews. For example, the first interview yielded the construction of a framework which was fundamental to a hypothesis concerning the structure, size and technical sophistication of end-users in relation to the ability to successfully implement an intranet. The framework was added to the interview protocol and used in later interviews.

5. Interviews

All of the interviews were conducted in person and were informal in nature. Each interview was recorded with the permission of the interviewee and ranged in length from one to three hours. The interviewees were advised that the identities of personnel and organizations mentioned would be kept confidential. Following a semi-structured approach, the interviews began with open-ended questions and progressed toward more specific questions.

To avoid confusion, all questions surrounding broad terminology, such as the social and political aspects of company culture, were clearly explained during the interviews. Furthermore, special care was taken to avoid using DoD specific terms and expressions when dealing with private industry interviewees. Each interviewee was given the opportunity to ask questions throughout the entire interview process. This was necessary to ensure that interviews provided answers in the context framed by the research questions and interview protocol.

Follow-up questions were answered via telephone calls or electronic mail.

C. DATA ANALYSIS

1. Transcription

The recorded interviews were transcribed for data analysis. Each interview was painstakingly played back from tape in order to glean each point for data analysis. The interviews were collected into one large document and prepared for the coding process.

2. Coding

After completion of the transcription, an axial coding process was used to organize the data into distinct and coherent themes. Using this type of coding process, main categories were

developed and then supported by individual ideas. Supporting ideas were in turn arranged into subcategories (Rubin and Rubin, 1995). The data for this thesis was divided into four main categories. These categories were developed from a preliminary review of the data and in accordance with the research questions. The subsequent subcategories are numerous and discussed in the ensuing chapter.

IV. RESULTS

This chapter presents the data obtained from six IS professionals. Three of the individuals interviewed work within the DoD as researchers, educators, and information systems consultants. The other three are civilian and employed by successful hi-tech companies in Silicon Valley. All of the interviewees have experience in implementing, planning, and managing large scale information systems projects. It is for this reason that they were invited to participate in this research and address the question of whether or not there are any special considerations when developing, designing and deploying intranets for DoD organizations.

The interviews provided the framework for the structure of this chapter. After analyzing and coding the interviews, it became apparent that the interviewees were describing the implementation of intranets in a very complex fashion. Their descriptions entailed several different issues and a significant number of variables. When closely scrutinized, the data revealed that they were actually describing a process of implementation, a process that is heavily dependent on variables such as culture, structure, and size of the organization. Furthermore, the interviewees outlined a set of activities involved in successfully navigating the road to a fully functional intranet. The chapter is organized by the implementation process, activities that support the implementation process, and variables of success which effect the implementation process.

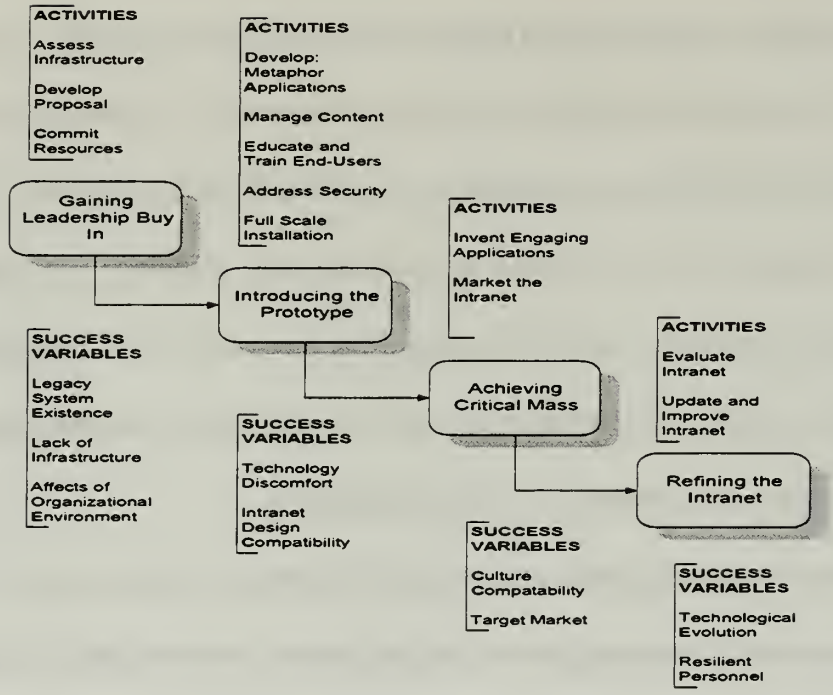

Figure 3: Intranet Implementation Process Model

Four major phases of the process are identified: leadership buy-in, prototype introduction, attainment of critical mass, and intranet refinement. These four phases are divided into activities that support the respective phases (see Figure 3). The majority of the interviews suggest that the four phases remain the same for almost any organization. However, there is strong evidence that the activities within those phases vary and do not necessarily occur in the order presented in this chapter.

A. GAINING LEADERSHIP BUY-IN

The first phase in the implementation process, gaining leadership buy-in, involves all activities that are essential to convincing senior management to allocate resources for the project. The term, senior management, may have different connotations depending on the organization in

question. Used here, it implies that senior management is that individual or group of individuals who have the power to approve or disapprove a request for resources. The interviewees from the private sector referred to senior managers as the top level executives in the company, those at the vice-president level and above. On the other hand, the interviewees with government or military experience generally referred to senior management as the commanding officer of the activity or base.

1. Activities

This phase includes three major activities. The interviewees agreed that successful completion of the activities with thoughtful consideration of all variables will significantly improve the chances of an intranet progressing to the next phase. The activities included in this phase are assessing infrastructure, developing the proposal, and gaining commitment of resources.

a. Assess the Infrastructure

Determining the present infrastructure of the organization is a fundamental activity in the implementation process. The interviewees stated that this activity is the basis for all others. They placed an extremely high value on determining the infrastructure requirements of the organization. They all agreed that the first step in determining the necessary infrastructure is to assess the existing one. Upon completion of this activity, the implementor should have gathered enough information about the infrastructure of the organization to begin planning and analysis of an intranet project.

The infrastructure of the organization is a combination of assets. It includes both people and hardware. The interviewees described four basic elements of infrastructure required to

develop an intranet. They are technical propensity of the organization, robust telecommunications network, credible IS group, and strong data management capability.

(1) Technical Propensity of Organization.

Technical propensity of the organization is an abstract value. It refers to the level of technological savvy an organization possesses. It accounts for end-user proficiency with information technology, their comfort level in dealing with information technology, and their ability to adjust to technological changes. In other words, technical propensity relates to an organization's ability to adapt to changing technology and its members ability to re-skill themselves accordingly. As one of the interviewees said:

> It requires people that can learn faster than the technology replaces itself. They need to be able to rapidly re-skill themselves with respect to the technology choices that they are using.

The interviewees provided examples that suggested the possible existence of a continuum from low to high technical propensity. Most included computer and software companies in the high category, telecommunications companies in the middle category, and real estate companies in the low category. This categorization indicates that an organization can operate in a highly technical business environment yet not have a corresponding high technical propensity internally. Consider telecommunications companies which operate within a high tech industry. The sample members agree that invariably the majority of these firms are middle level in terms of technical propensity.

The subjective nature of technical propensity may create problems for implementors when beginning their assessment. In fact, the sample mentioned the possibility that a given organization could have several different levels of technical propensity throughout the organization. For example, the engineering department may have a high technical propensity while the finance department's propensity is low.

(2) Robust Telecommunications Network.

Assessing this element of infrastructure involves determining the organization's existing network capability for transferring data. Does the organization have a wide-area network or a local-area network? Does the organization have dial-in capabilities? Does the organization's network have the bandwidth necessary to process large amounts of data? These questions and others require answers before implementors can be certain they have done a thorough and complete job of assessing the telecommunications network. As one interviewee commented:

> One (requirement) is that you have a robust telecommunications infrastructure. That means the wire probably. That means the protocol that you send down that wire and the system software you send down that wire. You need a strong robust thing or you don't have any interoperability capability at all.

The interviewees suggested starting with the desired network in mind and comparing it to the current network. Acquiring and installing telecommunications infrastructures can be very costly. Hence, the sample encouraged implementors to do a detailed assessment of the current network situation.

(3) Credible IS Group.

The third element of infrastructure introduces a vital component in any information technology project. That component is the people responsible for developing, researching, designing, and maintaining information systems. As the name of the element signifies, those people must not only exist, they must be credible.

Determining the group's credibility is another task that is subjective. However, the sample pointed out that credibility is primarily a function of reputation. Hence, they agree that the general reputation of the IS group is a good measuring stick for their credibility. If the group has a lousy reputation then chances are, according to the sample, they do not have the credibility to create the relationships necessary to successfully implement the intranet.

(4) Data Management Systems.

The final element of the infrastructure is the systems that an organization uses to manipulate and manage data. This element concerns the back-end systems that store and retrieve the data. Since an intranet can only present information that is stored on other systems, assessing this element is crucial. As one interviewee said:

> You need a good, strong data management capability. For that, we are using Oracle (database), relational (and) object oriented. Also (including) SQL (a standard database query language) in that. Therefore, you can use it in intranet applications.

This comment emphasizes the fact that an intranet merely allows end-users to view data. The real work of an intranet is done by the data management systems, transparent to the end-users. This includes things such as data bases, object-oriented programs and standardized data base languages.

There was a common recognition among the interviewees that intranets are not very beneficial to the organization unless they can access and disseminate that organization's information. Thus, the sample pointed out the importance of determining how well the current systems manage and manipulate data.

b. Develop the Proposal

A second activity necessary to gain leadership buy-in is developing the proposal which will present the idea to the senior members of the organization. The proposal can be formal or informal. This activity is not concerned with the formality of the proposal but concentrates on issues that will increase the chances of a positive reception of the presentation by senior management. Upon completion of this activity the implementor hopes to obtain leadership's acceptance of the idea and subsequent endorsement. Therefore, presenting the project in a way that appeals to senior management's motivations is a prevalent thought in performing this activity. The elements in this activity are identification of opportunities, identification of contribution to organization's mission, and presentation of the proposal.

(1) Identification of Opportunities and Needs.

The sample noted that if the implementors could identify areas in which the intranet could be useful, convincing leadership to accept the idea would be considerably easier than presenting the proposal without a useful application. The sample urged against the implementation of an intranet for the sake of the technology itself and then as after thought attempting to find an excuse for leaders to accept the proposal. To the contrary, the sample suggests that the sole purpose

of the intranet should be to improve a process or to invent a new way of doing business. One interviewee repeated:

> So in starting an intranet, if you can find a tool that makes things easier or provides something that isn't even out there and you know people want it, you can make it happen.

To find a suitable opportunity or need, an implementor has to take into account the organization's products, services, suppliers, partners, and technology connected to the daily exchange of information within the organization. According to the sample, once a suitable application has been found, it should become an integral part of the proposal. Often a great application exists but is extremely difficult for implementors to locate. Such was the case at a major retail corporation when developing plans for their intranet. One person made this comment regarding the situation:

> They were very (underutilized). That was a very interesting situation. I was surprised. They didn't have a lot of situations where it was relatively apparent the technology would buy them a lot. That was one of the things their VP said. I do know that it's true because he was the VP of IT (Information Technology) and the CIO for the company.

Nevertheless, according to the interviewees, it is imperative to the success of the intranet that implementors succeed in finding an application that will help sell the proposal.

(2) Identify Contribution to Organization's Mission.

This element is closely related to the previous one. While it is important to identify opportunities and needs, it becomes even more beneficial to the implementation team if they

can directly relate those opportunities to achieving the goals of the organization. Obviously goals vary with the organization. However, if the implementor can find a way to use the intranet to impact the mission of the organization, it will pay big dividends in gaining leadership support. These comments were made by two individuals:

> Get them focused on what problems they want to solve and use those examples of cost savings and time to market solutions.
>
> And we also realized we could make money off this on-line technology so the executives were more willing to go for it.

These two comments point out the importance the sample placed on using a solution-based approach to gain leadership's support.

c. Present the Proposal

This element in the phase has the objective of gaining senior management acceptance of the idea that an intranet is a feasible and worthy project. It does not necessarily mean that resources will be allocated at the time of acceptance but it does represent an initial commitment to the idea. Depending on the business processes of the particular organization, resource allocation can begin any time following or simultaneously with the initial idea acceptance.

The proposal may be presented in one of several different ways. Some organizations may demand formal presentations while others prefer an informal one. Whatever the method, the interviewees agree that this element can have a significant impact in gaining the leadership buy-in. The sample suggests that it is not so much the nature of presentation, but the person to whom the presentation is made, that benefits the implementors in their endeavor to implement an intranet. One

member of the sample mentioned that their idea for the company's intranet was introduced to CEO of the company. That CEO quickly supported the intranet and the company became a leader in intranet technology. Another member of the sample mentioned that their idea had been introduced at the middle management level. This member's organization has yet to receive the necessary support to continue the implementation. In fairness, there are other issues that have precluded implementation at this organization but certainly the lack of acceptance of the idea is a factor.

d. Commit Resources

Assuming that the implementor has been successful in receiving acceptance of the proposal, the next activity involves the actual commitment of the resources. They indicated that implementors are then forced to determine how those resources will be allocated. In the most general terms, the sample postulated that a primary starting point for resource allocation would be the establishment of a management team followed by acquisition of materials.

e. Establish the Management Team

The various alternatives for establishing a management team were pointed out by the sample. The majority of the individuals working within the government assumed that the existing IS department would manage the intranet. This would be accomplished by simply moving additional tasking to the present staff or hiring new employees. On the hand, the majority of private sector interviewees suggested an alternative approach. They stated that the management team should be composed of IS and communications department professionals. In relating the need to involve those people who are responsible for the day to day communication in the organization with technology professionals, one person stated:

> All of the things around the technology are not for IS. This steering committee consisted of IS members and internal communication members. Something that's very common in at least technology companies and I think in other companies as well. It's a hybrid of those two organizations that really focuses this tool.

Members of the sample acknowledged that there were no right or wrong answers in setting up an initial management team. However, some members mentioned the use of consultants to help struggling implementors grasp workable concepts for managing and deploying an intranet. Including professional consultants on the preliminary management team was seen as a means to reduce the amount of insecurity in the early stages of intranet implementation.

> They (a successful consulting firm eastern US) were in that soft, heuristic end of the business all of the time. Those (companies that had implemented intranets unsuccessfully) people are coming to them and saying, "Can't we do some of this stuff through an intranet. You already understand our corporate culture and you understand our methods of communication. You are really perfect to adapt that to this new technology and help us find a way that we can take slow steps to build our success.

In addition to professional consultants, some members of the sample mentioned including individuals of partnering organizations with intranet implementation experience as members of the management team.

f. Acquisition of Materials

This element is one that was primarily brought out by members of the sample that work within the DoD. In fact, in each discussion with DoD employees the issue of acquisition was mentioned. The issue of acquisition was mentioned by the private sector interviewees as well but not to the same level as their public sector counterparts. For the DoD employees, the issue was not

what to buy but how to buy it. They propose that a large scale implementation, as in the case of most startup intranets, requires a tremendous amount of effort to step though the acquisition process of the government. They caution implementors to plan for pitfalls such as contractual protests and lengthy delays.

2. Success Variables

The success variables or set of possible conditions within the organization, which effect this phase are existence of a legacy system, lack of infrastructure, and organizational environment.

a. Existence of Legacy Systems

The existence of a legacy system, a previous generation of technology used by an organization, was seen by interviewees as a substantial hindrance to the implementation of a newer and more capable system. If an organization has an existing communication tool such as Lotus Notes, then senior management is reluctant to scrap that system in favor of an intranet. This occurs for several reasons. First, a significant investment has been made in the legacy system and would essentially be lost if the system is retired. Second, end-users have, in many cases, become comfortable with the system and would resist the transition. Finally, an existing system can reduce the chance that a need for an intranet is recognized. One person stated:

> At that time, we did not have a communication tool like this (computer based collaborative communications tool). So we did not have a legacy system, like have Lotus Notes. They (other companies) were slow to adopt the intranet because they thought it was the same thing (as Lotus Notes). Well it's really very different, but because they were very comfortable with Lotus Notes as a legacy system, it was very hard for them to change.

The members of the sample argued that if an organization has a legacy system, then the implementors need to do a thorough job of developing the proposal to address the tradeoffs associated with the two alternative systems. Otherwise, gaining leadership buy-in will be extremely difficult.

b. Lack of Infrastructure

In terms of cost, the lack of infrastructure was seen as the biggest barrier to leadership buy-in and consequently, to a successful implementation of an intranet. The primary reason for this was the huge cost associated with updating an insufficient telecommunications infrastructure. Because of the cost, it was noted that senior management would require a cost justification for the additional investment required to bring the organization's infrastructure up to speed. The requirement for a cost justification creates additional problems for the implementation team, as many of the financial benefits of intranets are not easily identifiable.

The telecommunications element of infrastructure was not the only one of the four that was considered a barrier to implementation. If the organization did not have the staff necessary to handle the management, research, and maintenance associated with the system (lack of a credible IS group), then according to one member of the sample, an intranet development would be substantially hampered. In short, the interviewees stated that strong infrastructure is an absolute must. If the implementors find themselves lacking in any one of the four elements, then perhaps time may be better spent addressing infrastructure needs before pursuing an intranet that has little chance of providing the results desired.

c. Effects of Organizational Environment

Events, practices, and customs of an organization were recognized by the sample to have a tremendous effect on the implementation process. The dynamic nature of these characteristics and others, which make up an organization's environment, presents major challenges to the implementation team. Members of the sample unanimously affirmed that the success of attaining leadership buy-in was highly dependent on the current state of both the internal and external organizational environment.

(1) Internal.

When describing the internal environment of an organization, most interviewees mentioned culture, structure, and state. The term "state" refers to the current level of change or upheaval in the organization. These factors are believed by the interviewees to have a substantial impact on the success of implementors in securing support from senior level executives. Also, it was observed by several individuals that since senior level managers often determine or least impact the internal environment, it is essential for the implementors to understand how that environment affects this phase of the process.

In general, according to the sample, the more open, flat, and collaborative the organization, the easier and quicker the acceptance and buy-in by the senior management. In contrast, the more hierarchical and restrictive the environment, the more resistant senior management is to the idea. Fear and lack of understanding were the primary reasons that the latter type of organization's management was reluctant to adopt intranets. However, all is not lost for these organizations. The sample agreed that with proper education and well-planned strategies, it

would be possible to find ways to convince leaders of restrictive organizations to accept the idea. One person, describing the fear surrounding an intranet project for a manufacturing firm said:

> There was a lot of insecurity in those first couple of meetings. The concern that came up was security, layered security. I only want for example, I want certain people looking at certain things. You don't have to turn your company into a Silicon Graphics or Microsoft to make this work.

In addition to cultural and structural issues, the state of the organization was discussed. Specifically, it was noted that organizations in transition were likely to be more receptive to significant changes such as an intranet. The general theory was that as organizations restructure, downsize, or reengineer they begin to look for ways to improve efficiency. If the intranet can be presented in a manner that facilitates the organization's transition, then the probability of favorable reception by senior management is greatly improved.

(2) External.

The external environment did not appear to create as much concern among the sample as did the internal environment of the organization. There were exceptions. The market in which an organization participates can have a tremendous effect on the leader's acceptance of an intranet. For example, one person remarked that there is tremendous pressure for private sector corporations in technical industry to implement intranets. The fear of being less than competitive drives many organizations to implement intranets, sometimes fairly recklessly. One person said:

> They (CIO's) have tremendous pressure on them to take advantage of this phenomenon and they see it as a bomb. Everybody knows about the explosive growth. Every company knows that they have to have some sort of strategy for taking advantage of it, and yet they don't understand the technology well enough.

B. INTRODUCING THE PROTOTYPE

A prototype is the initial pilot of an envisioned system. This aspect of the implementation involves coordination of all activities which lead up to the full scale installation of the intranet. The activities are development of a metaphor and applications, management of content, education and training of personnel, and the solution of security problem(s). According to the sample, a successful prototype reflects the standards and guidelines indicative of the organization's culture and structure. Therefore, careful planning should be done in order to ensure that the prototype evolves into a full scale installation of an intranet that comfortably fits the culture and structure of the organization.

1. Activities

a. Develop Metaphor

The metaphor of the intranet refers to the name given to the tool, the actual focus of its use, the technical propensity of the end-users and the culture of the organization it reflects. It should be, as its name suggests, a likeness of the organization. Therefore, it must be descriptive of the personnel, the mission, and the way things are done. The sample related that development of the metaphor is not a precise science. It was stated that once heard, the right metaphor projects the right sound, image, and feel. Furthermore, the sample revealed the interface designed around the metaphor, the placement of information and the graphics should be easily recognized and intuitive to the end-users. An interviewee involved in the development of the metaphor for their intranet sited the following experiences in deciding on a name for the intranet:

> Even the name, that's the argument I remember the best. Everything is in a name. We would vote on all these names and people would come up with arcane names that did not have the right feel. If you've been in the culture you would just know what feels right so you just monitor the feelings in the room.

Also, he mentioned the response from end-users when an extension of the metaphor, the navigation bar, was contrary to the perspective end-users had of their culture.

> In the first release, the navigation bar was a choo-choo train and that totally did not fit our culture. People thought it was just so stupid,...they were like, "Come on. We're leading edge what's a choo-choo train doing there."

b. Develop Applications

The development of applications in the prototype is important to the overall success of the project. Good publicity, which will be discussed later, provides an enthusiasm with the end-users that increases the likelihood of full utilization of the new technology. Therefore, implementors should seek out applications that entice the end-users to use the intranet by creating efficiencies that previously did not exist or give them access to items of global interest to the organization. The sample further noted that it is important to include end-users in this process in order to expose them to the solutions that the intranet offers to their daily activities.

c. Manage Content

Management of content involves the coordination, review, and authorship of information accessed by the intranet. When properly managed, content fuels the productivity the intranet offers. The sample revealed that the content featured on the intranet can aid or hinder the

success of the intranet as a communications vehicle or support tool for the organization. They revealed two options for content management: centralized and decentralized.

As previously mentioned, the sample suggested that implementors be a hybrid of communications and IS professionals. Coordination and review of content are the responsibility of communications professionals. Authoring, which requires programming skills in Hypertext Markup Language (HTML) and other languages relative to the focus and purpose of the site, is best suited for IS professionals or individuals with programming skills.

(1) Centralized Management.

Centralized management leaves the control of content and authorship of intranet information to one or more individuals. The sample strongly suggests that implementors customize organizational browsers to ensure that personnel enter and exit from the same page of the intranet each day. This page, the corporate home page, functions as a point of broadcast for corporate communications.

The sample implied that centralized management is most likely the choice for organizations with multiple levels of management because it simplifies the duties of censorship and provides consistency in style and format. In centralized management, all content is collected and reviewed prior to being published or authored on the intranet. Therefore, it may be necessary to employ additional personnel. The number or resources necessary is relative to the size of the organization and the volume of content proposed for authorship.

(2) Decentralized Management.

Decentralized management provides little, if any, guidance on content and authorship. End-users decide on content and author information for the intranet. The sample revealed that decentralized management is strongly related to the technical propensity of the end-users. They also felt that although this is the optimal position for organizations to achieve, there is a learning curve involved. The disparity in the technical proficiencies and communication skills of end-users can lead to undesired results. Those undesired results can range from lengthy, boring documents to entertaining animation and an overabundance of colorful graphics. In discussing the effects of decentralized management, one of the interviewees stated:

> It's actually a hybrid of technical and communications and you'll find people trying to author and they'll just throw up whatever they have on hard copy up on the web and its like page after page. That happened here and its still happening. It's a learning curve and you just grow and see.

Further, the sample noted that decentralized management can be a challenge for organizations characterized as low tech. Generally, these organizations have end-users that lack skills in authoring and end up outsourcing this task. For flatter organizations with a more open, collaborative culture and technically proficient end-users, the sample revealed that there is a tendency to reject the notion of having information pushed on them. These groups are more apt to request the establishment of departmental or divisional home pages vice accepting the corporate home page. The sample cautioned against giving up total control of the corporate home page. They suggest a compromise is to maintain one portion of all home pages for corporate communications use. One interviewee made this comment concerning content management:

> We formalized our intranet in Sep 94,... the grassroots team became a formalized team around our intranet, a four-person team that owns the first two pages, coming up with the metaphor, adding additional tools, researching the technology, coming up with the graphics. Most of all other content ownership is decentralized. Now, in a company that's different you may want to control every bit of the content at the top. You'd have to have a very top heavy organization. You couldn't have just four people doing that. You would have to have a lot of people doing that and every bit of content would have to be reviewed. And that may be a way for a company structured differently from our company to work. For our company, that wouldn't work.

d. Educate and Train

Educating and training end-users enables the introduction of the prototype because it equips end-users with the skills necessary to test and try the intranet. The sample revealed that one of the most attractive features about the intranet is that it does not require a great deal of training for the end-user. All interviewees agreed that once end-users are introduced to the ease of use and intuitive design of the interface offered by intranet technology, their reluctance to change will begin to dissipate. One interviewed noted the comfort which accompanies end-user training by saying:

> Now, once you train a person how to use a web browser, you (the person) can sit there writing all kinds of things all day. These people are gonna be trained. They feel comfortable with it.

Technology prior to the intranet required the end-user to learn how to use several applications, but with intranet technology the end-user is required to learn how to use a browser only. Therefore, use of all other applications come easy because of the point and click nature of

the interface that the browser offers. Another individual had this to say about the ease of training people to use the intranet:

> IS (Information Systems) in the past had tools for each of these before, but they were separate tools so you would have to teach people all of these different, separate tools. And now all you have to do is teach people one tool and they touch everything so we call it one stop shopping, an integrated performance tool.

The sample revealed that the group of the organization requiring the most education and training are the IS professionals and those individuals responsible for maintenance of the intranet. They stated that these professionals are challenged by issues of intranet and network technology, as well as, the elements of interoperability.

e. Address Security

Addressing security in the prototype models the coordination of access for the entire intranet. Although the perspectives of the interviewees varied, the overall impression was that security was very important to the development of the prototype. The comments ranged from all data being fully exposed to establishing interdepartmental firewalls that ensure multiple levels of security.

The prevailing thought among members in cultures described as open and collaborative is that security comes in the later iterations or upgrades of the initial implementation of the intranet. For them, the initial version of an intranet takes the perspective of keeping unauthorized users from penetrating the organizational firewall and ensuring data integrity only. Internal security and confidentiality are not considered until later. They revealed that the catalyst for concern about internal security occurs when the organization suffers a substantial setback to

their mission due to a breach in security. One person interviewed mentioned an incident in their organization where security was considered after a financial setback. He stated:

> I will say we had somewhat of a problem. I don't know if it was due to the intranet, but during the first quarter of this year, our customers did not buy as much product because they knew we were coming out with something new. I think a lot happened because we do product engineering on the intranet and it's open to the entire company. So it's very easy for leaks of our new products to get out to our customers. And I think we're buttoning down some hatches now because that hurt us bad financially.

Private sector individuals noted that security implemented in their organizations has been limited to firewalls which keep unwanted people outside of the system whereas DoD representatives stated that the lack of security could stall all efforts of an intranet implementation. The sample implied that the sensitivity of the data is the main issue of security. Although few of those interviewed felt that any information was actually secure when attached to networks, they all felt that robust internal and external security plans could produce a comfortable environment for most data exchanged on intranets.

f. Full Scale Installation

According to the sample, full scale installation signals the end of a successful prototype introduction phase. Full scale installation denotes the period of intranet implementation in which all personnel in the organization have access to it. The sample made it clear that full scale installation is handled as uniquely as the decision to implement the intranet. They suggested immediate full scale installation, as well as, a more phased approach. Each suggestion indicated

consideration of organizational culture, structure, as well as, geographic architecture of the organization such as remote departments and divisions.

The sample revealed a disparity in the ease of installation between organizations with multiple levels of management and flatter organizations. They implied that organizations with fewer levels of management are more apt to install intranets throughout the entire organization after the development of a successful prototype, where as, organizations with multiple levels of management are less optimistic about the technology and install the intranet by division or department.

2. Success Variables

a. Technology Discomfort

Technology discomfort, as the sample revealed, is a manageable success variable of implementation. They described it as the satisfaction or relief the end-user experiences as a result of the implementation of a new system. The sample went further to state that the implementation impacts end-users through changes or shifts in occupations or responsibilities at all levels of the organization. Table 1 lists four groups and their predominate concerns described by the sample.

End-user distrusts and lack of education about the new system negatively impact the use of the intranet. The sample recommended educating and training all end-users about the shifts that accompany the intranet and allowing end-users to participate in the applications developed for it. This tactic provides them with an understanding of the new technology and a level of comfort with the new system. The sample proposed that personnel concerned about the implementation of the intranet be focused on the solutions that the intranet offers to the business

activities of the organization in relation to the overall mission. One interviewee noted the discomfort one end-user had with changes in her job responsibilities after the implementation of an intranet. He said:

> I was just at a conference where we were talking about using this (the intranet) for staffing. A person spoke up and said if you did that you get rid of all the recruiters which was like, oh yeah, now the recruiters' jobs would change. She was so fearful of this technology because her job would change. There's also that reluctance to change, you're gonna have to learn something new and so if you have that employee community that like that then you're gonna have, I mean, everyone's reluctant to change to some extent.

It was revealed that IS professionals tend to be threatened by the intranet because changes to organizational technology generally result in an increase in their duties such as changes in security. Furthermore, these professionals feel that they are rarely compensated for the changes in personnel and other resources such as bandwidth. The other concern -- blame for changes in system performance -- refers to the possibility of the system slowing due to increased traffic on the existing infrastructure. IS professionals feel that if the system slows due to the increased use the intranet offers, end-users blame them rather than request new bandwidth. One person interviewed covered the concerns of IS professionals in the following comments:

> To varying degrees in all companies the IT (Information Technology) organizations feel that they have to be the policeman of the IT infrastructure and for very good reasons because you know you have security issues. They see it as a threat to them in the sense that they don't know how much it's going to add to their liabilities and their responsibilities. When they had an IT structure in the old mainframe days, where they had mainframes and a bunch of users this was one pipe. It could control everything very easily, security, access to information, organization of data, data integrity, etc. Then we went to client-server and things got a little bit more hectic

for them. Now with intranets, it holds potential to take it one step further so they feel threatened.

The sample implied that in organizations where the culture recognizes data as an asset, the top management is threatened by the possibility of unauthorized personnel having access to data and therefore affecting the organization's competitive edge. The other concern, data control, involves other personnel usurping their authority by accessing information before they can.

According to the sample, middle managers, are concerned about losing power or their job because they don't have control of the information that is dispersed throughout their area of responsibility. It was further stated that they are reluctant to change for this reason. However, the sample also stated that once top management overcomes job security concerns, middle management generally falls in line with the wishes of top management.

End-users are threatened by the new technology because they are concerned about being replaced by the new technology. The shifts in occupation or occupational requirements often accompanied by the intranet threatens low level personnel's job security. For this reason, they are also reluctant to change. The sample noted that just as middle management's resistance is overcome by top management, the responsibility of middle management is to overcome low level personnel's resistance by focusing them on the solutions the intranet offers.

IS PROFESSIONALS	TOP MANAGEMENT	MIDDLE MANAGERS	LOW LEVEL PERSONNEL
Redefinition of responsibilities	Data security	Power loss or job loss	Job loss due to replacement by the technology
Blame for changes in system performance	Data control	Reluctance to change	Reluctance to change

Table 1

b. Intranet Design Compatibility

The culture of an organization can be defined as a common set of shared values, meanings and understandings about an organization and its problems, goals and practices. It evolves through the observation of organizational activities and interactions, formal and informal communication and social activities. It encompasses the behaviors most recognized as "fitting in" and "getting ahead". Organizational structure is a pattern of interactions and coordination that links the technology, tasks, and human components of the organization to ensure that the organization accomplishes its purpose.

The sample noted that a successful implementation of any system skillfully analyzes organizational culture and structure and takes advantage of it to fulfill strategic goals. In this matter, intranets are especially sensitive. The sample indicated that no two intranets are alike and that it is necessary to take definitive steps toward developing platforms or metaphors of which the end-user can recognize intuitively and have comfort. Organizations that implement intranets as a result of mimicking another organization's style, metaphor or format usually result in failure because the structures and cultures clash.

C. ACHIEVING CRITICAL MASS OF AUDIENCE AND CONTENT

A "critical mass of audience" is a phrase used by one of the interviewees to describe the point at which an intranet attracts the minimum amount of users necessary for it to be considered a viable communication tool within an organization. On the other hand, a "critical mass of content" refers to the minimum amount of information contained on the web needed to achieve a critical mass of audience. The actual points are subjective but very real in terms of the impact they have on the success of the intranet. All of the members of the sample agreed that gaining end-user interest and participation is extremely important. Although, they used different terms to describe this sentiment, the data clearly indicates that they placed a very high value on successfully completing this phase.

The interviews suggest two activities and two success variables fit into this phase. To reach a critical mass implementors should invent engaging applications and find ways to market the intranet to their organizations. The ways in which that can be accomplished vary with respect to the culture of the given organization and the target level of the marketing scheme. Thus, the success variables for this phase are culture compatibility and target market

1. Activities

a. Invent Engaging Applications

Engaging applications are applications that draw members of the organization to the intranet. These applications appeal to the end-users because they usually provide a service or information that was previously difficult or impossible to obtain. They can be simple static web

pages routinely updated by an individual or more dynamic applications that involve back-end databases and CGI (common gateway interface) scripts. One example mentioned during the interviews is placing the stock price on the organization's home page. This type of application is actually in use at a large hi-tech firm in Silicon Valley and has been very successful. Another example is an online personnel directory that enables employees of the organization to locate individuals using a variety of search patterns and methods.

The benefits of engaging applications are an increased exposure and greater utilization of the intranet. One of the biggest fears among the sample was that their systems would not be utilized or scrapped. All agreed that the best way to ensure that this does not occur is to invent applications that effectively satisfy the end-user's needs. However, the point was made that the application does not have to be perfect. At times, applications can develop interest by servicing a need in a merely adequate fashion. The main focus of this activity, according to the sample, is to get something accomplished that generates some enthusiasm about the new system. Once the implementors have something successful to speak of, the eventual fate of the intranet becomes a factor of marketing.

b. Market the Intranet

The main focus of this activity is to get the word out to the organization that this new tool exists and can be beneficial in numerous ways to employees in their day to day operations. To reach the desired number of users the sample advocated the use of a well thought out marketing scheme. Prior to implementing the scheme however, they agreed that a certain amount of success should be associated with the product. If, for some reason, the project had no real success to

speak of, the sample surmises that perhaps marketing is a waste of time or at the very least extremely difficult. Reflecting on a less than successful project, one interviewee commented:

> Our feeling is that it was very important for us to get in touch with the end-users because they're whose going to sell the system for us. Once they see it and see it's going to help them, they're gonna come back and say we want this, this, and this. Apparently for some reason we're not getting to this point.

With some success in hand the implementors are now ready to use that success to attract others in the organization to the intranet. Hence, the next challenge becomes developing the marketing promotions. There were several different examples of promotions presented by the sample. Some were very simple and others were highly complex. Regardless of complexity, all of the promotions that showed significant progress were well organized and carefully executed.

One organization promoted its intranet through a program which it called "Web Fair". This program involved hundreds of people and a tremendous effort on the part of managers to coordinate all of the events throughout the company. It included small training sessions, several demonstrations, and even clowns. An interviewee described the purpose and type of promotion with this comment:

> It was to gain visibility because at that point we had about 20% of the company looking at it. We had these little mini-training sessions: So here's what we're trying to do; here are the tools to do it; here's how you browse; here's how you author. We had a contest, you know, win a T-shirt. You know, (we had) food and beer.

Other examples included one on one presentations. In these type of promotions it was imperative, according to the sample, to find people who would, following a presentation, help develop enthusiasm for the project.

2. Success Variables

a. Culture Compatibility

It was stated earlier that the success of the intranet is heavily dependent on ensuring that it is designed in a way that is compatible to an organization's culture. Similarly, the success of the marketing scheme for an intranet is heavily dependent on its compatibility with the organization's culture. Several members of the sample pointed out that the marketing scheme that works well in one organization may be exactly the wrong one in an organization with differing cultures. They implied that it was up to the implementors to determine the best plan of spreading enthusiasm for their projects.

b. Target Market

The sample agreed that there were three general market sectors in a given organization top level, middle level, and lower level. There were some discrepancies among opinions concerning if any were more important than other in terms of progress for an intranet. Some felt that a bottom up approach would be the most effective. That is, soliciting the support of lower level employees which in turn would convince their seniors to begin utilizing the technology. Others felt that the power of the top level employees would tend to force lower level

employees to acquiesce and fall in line. These individuals supported a top down marketing approach.

The approach taken to marketing ultimately effects the manner in which the marketing plan is laid out. Those who believed in a top down approach advocated a significant involvement of top level personnel in the actual implementation process, thus, using the top level managers as sponsors of the project throughout all four phases. Those who relied on a bottom up approach suggested appealing to the desires of the lower level employees by demonstrating how work loads could be eased with the technology. Members of the sample state that deciding what approach and which market sector to pursue first is subjective and left to the discretion of the implementors.

D. REFINING THE INTRANET

The sample revealed that each new version of their intranet was actually a refinement of the previous system. Initially, intranets are used as an organizational communications tool. However, as the intranet matures so does the comfort of the end-user with the technology. This comfort with the technology brings forth new ideas and applications that are conducive to the environment the intranet provides. Thus, the intranet becomes more than just a means of communication. It evolves into a system that comfortably fits the culture and structure of the organization. It becomes, as one of the interviewees noted, an integrated support tool.

1. Activities

a. Evaluate Intranet

Evaluating the intranet aids in focusing and directing its evolution. As previously stated many organizations look to the implementation of an intranet as a means to create certain efficiencies in the organization. Therefore, evaluation of the intranet includes the predetermination of success measures which quantify the impact of the implemented intranet. The sample revealed that several of the benefits of an intranet are abstract; however, items such as cost savings or growth in profit are certainly quantifiable and can be used to measure the benefits of the newly implemented applications.

b. Update and Improve Intranet

Update and improvement of the intranet impacts all of the previously mentioned factors. It gives the implementors the opportunity to create and in some cases recreate areas of the intranet. These changes range from format and style design to changes in the metaphor to achieve a more effective organizational fit. The sample revealed that feedback from systems of measure and end-users are valuable commodities to the update and improvement of the intranet. They stated that this information aids implementors in supporting the needs of their main customers, the end-users. They suggested that the implementors be flexible and look for ways to accommodate end-user needs without losing focus of the organizational mission and vision.

2. Success Variables

a. Technological Evolution

The technological evolution of the intranet is facilitated by the systems personnel's ability to answer the needs and demands of the organization. The work environment is constantly changing and one of the factors of that change is the technology that enables the personnel to successfully achieve the organizational mission. The sample revealed that continuous research of applications and enhancements to the intranet is the bedrock of its full utilization. The sample implied that the systems personnel are required to extend the uses of the intranet in order to bridge new technologies with the existing systems. The sample urged implementors to look beyond the normal boundaries of organizational transactions and applications in order to find avenues to keep the intranet a thriving organizational asset. One person described how the intranet had evolved in their organization in the following way:

> Another way of looking at this evolution is when we first started using our intranet. We looked at it as a communications tool. It was primarily for employee communications. When we realized you could do all these other things on top of it, it became an integrated performance support tool. We could reference information like communications and like putting the employee handbook on there. Services, I have an example, registering for classes via the intranet, transaction processing. All of our purchase requisitions are done via our intranet. We don't have paper requisitions anymore.

b. Resilient Personnel

Resilience is one of the characteristics an interviewee used to describe he flexibility required to address change in a seemingly chaotic work environment. Few organizations have the

luxury of operating in an environment that is particularly familiar because of rapidly changing technology. The sample revealed that resilient personnel hone skills that allow them flexibility in times of change and make the reluctance that usually accompanies the implementation of a new system a thing of the past.

E. SUMMARY

The information presented in this chapter points to the importance of integrating technical, managerial, analytical, and communication skills in the implementation of intranets. The sample outlined an implementation process model which establishes four phases of implementation and their associated activities and success variables. The phases are: gaining leadership buy-in, prototype introduction, attainment of critical mass, and intranet refinement.

Gaining leadership buy-in involves all activities that are essential to convincing senior management to allocate resources for the project. The activities of this phase begin with: complete and thorough assessment of the organizational infrastructure; followed by development of a plan and proposal; and culminates with a commitment of resources for the implementation project. Success in this phase is contingent upon: the existence of legacy systems, existing systems which compete with the proposed intranet; the state of the infrastructure and all that is necessary to ensure that implementing an intranet is not too burdensome; and finally, the impact the internal and external environment of the organization on the implementation process.

The introduction of the prototype involves the coordination of all activities which lead up to the full scale installation of the intranet. The initial activities of this phase involve development of a metaphor, a descriptive name given to the intranet that is reflective of the organizational culture;

development of applications that entice end-users to use the intranet; and management of the content to be published on the intranet. The next activities of the phase involve the education and training of end-users to ease the reluctance to change accompanied by new computing environments and an assessment of security needs based on the sensitivity of data and operations. After completion of all previous activities, the final step is full scale implementation of the intranet. The success of this phase is contingent upon the implementors' ability to ease discomfort of end-users caused by changes in technology and design an intranet that is compatible with the culture and structure of the organization.

Achieving critical mass incorporates all activities to gain end-user interest and participation in making the intranet a viable tool for organizational communication. The activities include the development of engaging applications that improve productivity or efficiency and methods of marketing to get end-users involved and excited about the intranet. The success variables of this phase involved proper assessment of the organizational culture and developing a marketing strategy accordingly.

The final phase, Intranet Refinement, involves activities which evaluate, update and improve the intranet. The updates are likened to upgrades or versions of software releases. Success in this phase addresses allowing the intranet to evolve into other uses in the organization and employing personnel with the necessary resiliency to remain flexible in the changing times.

V. SPECIAL CONSIDERATIONS FOR THE DoD

The data collected through the interviews and subsequently presented in Chapter IV has some significant implications for organizations of the DoD. The activities of the process outlined in the previous chapter create special considerations for DoD's intranet implementors. The implementation process is likely to require an alteration or adjustment due to the culture, structure, methods of communication, and operating procedures that are unique to many DoD organizations. This chapter describes some areas that deserve special attention. The intent is to inform implementors of possible obstacles on the path to a successful DoD intranet implementation.

The intranet implementation process model is referenced again in this chapter. The success variables have been replaced with the special considerations (see Figure 4). These considerations coincide with the phases of the implementation model as illustrated. Although the considerations may impact more than one phase, the chart shows the considerations associated with the phases for which they are likely to have the most impact.

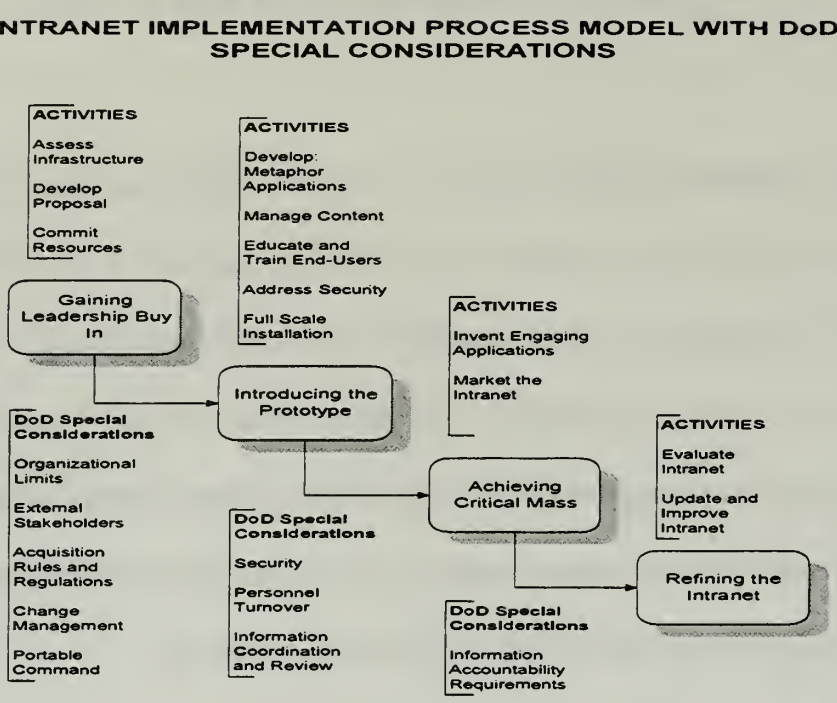

Figure 4: Intranet Implementation Process Model with DoD Special Considerations

A. GAINING LEADERSHIP BUY-IN

The interviewees pointed out the importance of gathering support from leadership in order to ensure the success of the intranet. As discussed in Chapter IV, implementors should hope to convince leadership to allocate resources for the project. Gaining leadership buy-in was revealed as very difficult for private sector implementors. As for the DoD, special considerations must be made to effectively gain leadership buy-in. A primary reason is that the DoD is a public organization that operates under stringent, budgetary constraints and a dynamic, political environment. Failure to address these considerations has the potential to damage the chances of a favorable reception of the intranet idea.

The considerations for this phase are: definition of organizational limits; external stakeholders, acquisition rules and regulations, change management, and portable organizations. Organizational Limits deals with the difficulty in deciding where the boundaries of the organization lie. External Stakeholders are considerations that force implementors to examine external stakeholders that have the power to block or hinder implementation. Acquisition Rules and Regulations is the consideration that focuses on the constraints placed on implementors by the laws and regulation governing procurement of materials within the DoD. Change management is a consideration that acknowledges the difficulty in administering a large scale change in an organization. Finally, Portable Organizations addresses concerns of organizations that are required to relocate to remote sites in order to fulfill their missions.

1. Organizational Limits

To gain leadership buy-in the sample noted that implementors should begin by determining the state of the organization's existing infrastructure. Later in the process they called for implementors to find an application that improved or invented a new way of doing business. These two points in the process were made assuming that implementors could accomplish those things for the entire organization. In other words, Silicon Graphics has an intranet for its entire company and so does Sun Microsystems. Not one interviewee advocated forming an intranet solely for independent departments of a company.

So, what are the implications for DoD? Just as every department of a private firm is connected to meet that firm's mission, so is the myriad commands and agencies of the DoD. In short, the size of most private companies allows them to form enterprise wide intranets. This is not

likely to be the case for DoD. It is more likely that any DoD intranet will actually resemble the Internet, with several independent networks connected together. This fact creates a special consideration for implementors. They must accurately determine what the limits of their organization's intranet will be. For a small organization this should not be a difficult task. However, for a large organization this may be a daunting and intimidating challenge. It is becoming increasingly difficult for large organizations to define where their infrastructure stops and some other organization's begins. Organizations can be extremely complex. Compounding this complexity is the fact that many organizations are becoming closely interdependent.

Many private sector manufacturing companies are developing partnerships with suppliers and retailers to gain the competitive edge and meet market demands. In the DoD the push for "jointness" is creating an air of interdependence among the branches of the armed services. The use of information technology is serving as a tremendous enabler for organizations, both private sector and DoD, that have recognized the value of interdependence. The implementor cannot begin to assess the infrastructure or successfully complete any other activity in the first phase without a firm notion of where the organization begins and ends.

The DoD is an incredibly large organization with thousands of subordinate commands and agencies, all intertwined to defend the nation. Therefore, boundary definition is a special consideration because drawing boundary lines within the DoD structure is very hard to do. Yet, to the management of any intranet project, it is a necessary task. The structure of DoD, a quasi-matrix, is basically comprised of an administrative chain of command and an operational chain of command. At the very low levels such as an aircraft squadron or ship, the boundaries can be drawn at the

confines of that individual command. Beyond this point in the chain of command the complexity grows exponentially. For example, a naval air wing which has operational control over several aircraft squadrons is made up of more than the personnel and assets that are assigned to the air wing. It is a command composed of smaller, independent sub-commands. The same squadrons that make up an airwing report to administrative commands that are responsible for ensuring that specific types of aircraft squadrons are available to the operational commanders. The example illustrates that in the DoD, organizations can be part of several different superior organizations at the same time. Thus, they may be required to share information in several different formats with several different entities.

DoD organizations that find themselves facing boundary definition problems should begin to address their situation by focusing on the organization's mission. Next, implementors must decide how the intranet will impact that mission and what units or subunits must be included. Setting the organizational limits around a particular mission should be a comfortable starting point for most organizations. Finally, implementors should build in flexibility to allow their intranet to evolve and meet changing needs and shifting boundary lines.

2. External Stakeholders

When the interviewees described the process of gaining leadership's acceptance and commitment, they generally stated that the approval authority rested with one individual, often the CEO or Commanding Officer. However, in the DoD there are several organizations that have an interest in what IS projects are funded and completed. Organizations such as the Defense Information Systems Agency (DISA) and General Services Administration (GSA) have been charged with managing aspects of IS for the DoD. Since there is not a centralized form of control

each individual managing agency can set standards and policies for their particular area of responsibility. For example, DISA is charged to make the DoD an interoperable organization. Hence, it is unlikely that an organization such as DISA would want any project started that would damage their goals and objectives. The same can be said for the other IS managing agencies and commands as well.

This creates a special consideration for intranet implementors because external stakeholders have the power to block certain IS projects. They exercise this power through control of the IS budget. The IS budget is something entirely different from the normal fiscal year budget developed through the Planning, Programming, and Budgeting System (PPBS). So, even if a particular project is approved by the leaders of the organization and funds are allocated through the normal budgeting process, the project may still face rejection from stakeholders who control portions of the IS budget.

It is possible that a DoD organization could implement an intranet without any problems or involvement with external stakeholders. However, it is equally likely that at least some part of the system will fall in an external organization's area of responsibility. Therefore, a wise implementor should consider all stakeholders, policies, and standards that may impact implementation of the system.

3. Acquisition Rules and Regulations

All of the private sector interviewees had very little to say about acquiring the material necessary for an intranet. In fact in each of the companies in which these individuals worked most of the required assets were already in place prior to intranet implementation. Even when discussing other non-intranet related materials, the private sector individuals treated acquisition as a trivial

process. One person said that the process at his company was as simple as filing out an electronic form and waiting a couple of days until the product showed up on his desk.

In contrast to the private sector situation, the DoD interviewees offered several comments that pointed to their frustration in acquiring technology. Their comments imply that rarely in the DoD is the necessary infrastructure, hardware, and software present in most organizations. Furthermore, the acquisition of those materials is even more challenging in the DoD and other government agencies.

The disparity in concern for acquisition between private sector and DoD interviewees indicates that DoD implementors may need to give special attention to this activity in the process. Most private organizations have formalized methods of procurement. However, most can select any supplier they wish. It is rare for DoD organizations to be able to simply choose a brand or company to supply their materials. They must follow the procedures outlined in the laws and regulations that govern acquisition and contracting to discriminate between the best alternatives of procurement. Depending on the scale of the project, the contracting required to commit resources can introduce significant delays. Implementors need a basic understanding of the regulations to prevent unforeseen problems in funding and purchasing materials.

The Federal Acquisition Regulation (FAR), Defense Acquisition Regulation Supplement (DFARS), and the Information Technology Reform Act (ITMRA) govern acquisition of IS related products such as those required to implement an intranet. These laws and regulations are structured to provide maximum competition between responsible companies while simultaneously allowing

the government the benefit of fair and reasonable prices for the goods and services requested; thereby, ensuring the fair and efficient use of public funds.

Whether the proposed intranet is simply an improvement of an existing infrastructure, an impending phase of an existing acquisition plan, or the first system to be implemented within an organization, the purchase of the technology is subject to procedures based on cost thresholds. There are three thresholds and they vary in amount of purchase and complexity. If implementors are able to buy all of the necessary materials for their intranet for less than $2500, it is considered a micro-purchase and is usually the simplest of acquisition methods. If amount of the purchase exceeds $2500 but is less than $100K, it is considered to be at the simplified acquisition threshold. Acquisition purchases exceeding $100K are considered major systems and are subject to additional requirements.

Although acquisition is an extremely important part of the process, implementors cannot be expected to be contracting specialists. That is not the point. Implementors should be aware of the impact that the acquisition process has on the successful completion of the intranet project. Most organizations have people qualified to deal with acquisition issues. It is wise for intranet implementors to tap into these resources when developing the intranet plan.

4. Change Management

One of the most difficult challenges that face intranet implementors in gaining leadership buy-in is getting others in the organization to accept a new concept or idea. Not only is this a challenge to gaining leadership buy-in, it is a challenge that exists throughout the entire implementation process. Specifically, the sample described their frustrations in attempting to change

the way bureaucratic organizations view information. They indicated that in many hierarchical organizations information is power and many members are reluctant to relinquish it. Contrary to the bureaucratic organizations, open or more participative organizations seemed to have little problem embracing the changes associated with intranet implementation. The differences here connote that implementing intranets in DoD, arguably a bureaucratic organization, require that implementors are technically proficient, as well as, seasoned in change management.

Implementors in the DoD may find this special consideration especially difficult in light of the fact that many organizations may have a very limited number of personnel that are computer literate. Lack of computer literate personnel, as pointed out by the sample, will increase the chance that members will not have a reasonable comfort level with an intranet. Therefore, unless implementors can successfully manage the change issue, an intranet implementation will probably fail.

In response to this challenge, the sample suggested several solutions. One was to develop a team of implementors from the communications and IS departments. This recommendation is affirmed by the work of change management theorists that suggest that one way to facilitate innovation in bureaucratic organizations is through the use of independent groups (Bushe and Shani, 1991). The groups are called parallel learning structures. Parallel learning structures are coordinated groups that work together to develop solutions and implement new thoughts or ideas (Bushe and Shani, 1991). Individuals that comprise these groups hold various positions in the organization (i.e. Communications and IS departments). The groups are intended to facilitate organizational learning and operate in parallel with the existing hierarchy.

The theory of parallel learning structures can be beneficial to DoD organizations in their effort to implement intranets. A major advantage of incorporating this theory along with the implementation model is that it provides an opportunity to gain input from many levels of the organization. Because they are included in the entire implementation process, end-user concerns are likely to be addressed throughout all phases of the process and not just in the final phases.

Other recommendations that the sample suggests will benefit implementors in the area of change management is to find an intranet champion, take advantage of crisis, and communicate the need for the intranet. These recommendations along with the model in its entirety should help implementors in developing effective measures in dealing with the change management issues they face. In fact, the implementation model closely parallels a change model developed by John Kotter of the Harvard Business School. Kotter's model defines eight steps to change (Harvard Business Review, 1995). Many of the steps in Kotter's model can be easily adapted to fit the implementation model developed in this thesis. Therefore, using the implementation model suggested by the sample and a review of change management literature should be a good starting point. However, if implementors find the issue too challenging, then the sample suggests that professional consultants may be beneficial.

5. Portable Organizations

A very unique quality of DoD is that it has organizations that are required to deploy. Many organizations are tasked to pick up and move to various parts of the world with little advance notice. Several military commands deploy to remote sites on a regular basis and others mobilize when called

into action. How then can an intranet be an effective communications tool for an organization if it can only be used on a part time basis?

Few private organizations deploy. For all practical purposes the notion of a portable organization does not exist. Instead, they are concerned with remote access through dial-up connections. To these organizations, their idea of a portable organization is an employee traveling with a laptop. While a remote access requirement does introduce some challenges, it does not compare to the challenges associated with building an intranet that is transportable.

This is a special consideration for implementors because it is likely that leaders of mobile commands will desire mobile systems to support operations in whatever theater of the world their commands are located. If the intranet proves to be effective at home, then certainly users will want to utilize that same functionality abroad. Intranet implementors must decide if the systems they design are meant to be immobile platforms or robust systems capable of meeting communication needs of the organization wherever it is positioned.

A possible solution to this problem is to create a portable network. An organization can simply transport all of it's computers, software, and peripheral equipment to its remote location. The hard part is connecting the machines. If the organization is embarked aboard a ship, then implementors could set up a network on the ship and simply plug up the machines once they are aboard. For those organizations that deploy to the same locations on a routine basis the same scheme would work. Only it would be in a building instead of a ship. Portable networks are certainly possible if the organization has the required financial and material resources and trained personnel.

B. INTRODUCING THE PROTOTYPE

In general, the data from the interviewees about this phase of the implementation was the importance of designing an intranet that comfortably fits the culture and structure of the organization. This implication for the DoD is that an intranet can and must be tailored to meet the needs of the organization. For example, an organization whose culture encourages its employees to exercise creative license would not flourish in an environment where web page authoring is centrally managed. These types of issues give rise to special considerations for the prototype introduction phase of a DoD implementation.

The areas that require special consideration are: security, personnel turnover and information coordination and review. Security provides a glimpse at the special needs of DoD in terms of information systems. Secondly, personnel turnover looks at the challenges created by constant changes in personnel. Finally, information coordination and review are considerations that address the DoD responsibilities in upholding the highest of social and political standards of conduct.

1. Security

Security was a concern of each person interviewed. All had some experience with some type of security breach or intrusion. However, as one might expect, the interviewees from the DoD placed tremendous priority on security of data. In one case, the perceived lack of security was holding up the entire project. On the other hand most of the private industry organizations implement intranets and then find ways to adjust security measures. These organizations, large and small, have found ways to use the intranet and satisfy their need for security. The differences in this area infer that DoD implementors should take special care during the prototype introduction to

address security because the issue of security presents a colossal hurdle to full scale installation of an intranet.

The argument can be made that security is a special consideration by virtue of the mission of the DoD. The DoD's organizations are concerned with national defense. Therefore, there is more of a need to ensure that data is secure because of the risks and potential threats. The various agencies of the DoD manage data that ranges from highly classified to unclassified. The security mechanisms chosen by DoD organizations are relative to the sensitivity of the data handled within the organization.

It is not the purpose of this section to exhaust the subject matter, but to lightly touch on matters of immediate concern when considering the implementation of an intranet in the DoD. Two areas worthy of attention are the levels of security and connection to the Internet and other networks.

a. Levels of Security

Levels of security describe the environment in which data is managed. It refers to the sensitivity of data the users are allowed to handle. For instance, do all users have the same level of clearance or are multiple levels of security required? In the case where all users have the same clearance, the security concerns are fewer and implementors are able to focus on matters of internal security such as data integrity and external security involving firewalls. The major concern with this type of security is keeping unauthorized users out and keeping users resident on the system from destroying information.

For multiple levels of security, the implementors are challenged to ensure that only authorized users are allowed access to certain information. In this environment, a possible security measure would be to use multiple firewalls within the organization to accommodate for the differences in clearances among users. In this case, the implementors are concerned with authenticating users within the organization when access is requested for certain levels of information.

b. Connection to the Internet and Other Networks

Connection to the Internet and other networks provides implementors with many other security concerns and challenges beyond their own intranet. It involves authenticating users who physically reside within their system, as well as, others who do not; ensuring that communication channels are secure and reliable enough to transport information without the tampering of unauthorized users; and, in the case where sensitive or classified data is exchanged, encrypting information. These issues are of significant impact to the implementors if the mission of the organization includes collaboration with stakeholders outside the parameters of the organization. However, it is possible for implementors to devise a plan to isolate portions of the intranet from outside connections while leaving others accessible.

2. Personnel Turnover

Each interviewee spoke of the importance of having trained personnel to manage and maintain information systems projects. Not only did they think it was important to have qualified IS personnel, they also felt that it was important to have a trained and educated group of end-users.

If the success of an intranet is based on the people who manage, maintain, and use it, as the sample implies, then organizations need to be sure that they can find and hire quality individuals. DoD organizations may find this challenging. The high rate of personnel turnover common in most DoD organizations is a special consideration for intranet implementors because of the dynamic manpower challenges it creates. While this practice allows for professional development of DoD personnel, it can impact the successful implementation of an intranet in the following ways: 1) corporate knowledge; 2) credibility of IS personnel; and 3) culture changes. Corporate knowledge relates to the bank of experience with the implementation project; credibility of IS personnel is the confidence of end-users have in the ability of implementors; and lastly, changes in personnel, particularly the leadership, can affect changes in culture that impact implementation projects.

a. Loss of Corporate Knowledge

The loss of corporate knowledge is the absence of personnel with experience in implementing the system unique to the agency. Often the "how to" of an implementation is not entirely academic. The need for experienced personnel, trained on a specific system is required. These individuals are experienced in understanding the culture of the organization, as well as, having an established rapport with the leadership and other end-users. They are the members of the implementation team that have been a part of the process from the very conception of the idea. Without proper documentation, this information can be lost and retard the completion and success of the implementation.

Organizations that face high turnover rates must develop policies that ensure incoming personnel are quickly trained and acclimated to the new environment. Policies can include

sending personnel to specialized schools before they arrive at the organization. Also, the knowledge transfer can be conducted in-house through documentation and mini-training sessions. Implementors should begin to formulate some way to guard against corporate knowledge leaving with each PCS.

b. Lack of Credible IS Personnel

The lack of credible IS personnel relates directly to the frequency and timing of turnovers. If manpower changes are managed in order to ensure that incoming personnel are formally trained prior to their report date and an adequate overlap is available to ensure new personnel are trained by personnel experienced on the intranet, comfortable, credible personnel result. However, if inexperienced personnel are tasked with the implementation, time and money that is critical to the life of the intranet may be lost due their inexperience.

c. Culture Changes

It is possible for changes in personnel to affect the culture of an organization. Changes in the IS organization can impact the reception of the intranet. If the IS organization has credible, technical personnel with exceptional personal skills, changes as a result of the new technology will be well received, but if the opposite happens, the result can be disastrous. If the change in personnel is within the leadership, it is possible that the focus of the implementation can change, as well as, the culture of the organization.

It is imperative that implementation projects are planned before or after leadership turnovers and are flexible enough to ensure that minor changes to the interface design, metaphor, are possible should the incoming leadership have a preference for one other than that already designed.

One suggestion is to offer incoming leaders the opportunity to make changes to specific areas of the intranet vice the entire metaphor. For instance, the Commanding Officer can be allowed to change a portion of the command home page to reflect a warfare specialty or interface of their choice.

3. Information Coordination and Review

Information coordination and review involve all activities which structure the information published on an intranet. The management of content is a critical activity in the long term success of the intranet. Interviewees pointed out that there are several different alternatives to dealing with content management. Their comments imply that different organizations may have various concerns and insecurities surrounding the types of material placed on an intranet.

For DoD organizations, this is an area that warrants special consideration due to the extremely volatile political and social atmosphere in today's DoD organizations. DoD policies of zero tolerance for sexual harassment, discrimination, fraternization, etc. impact intranet implementations. The potential for misconduct exists and is perhaps easier in a web technology environment. With the use of an intranet, it becomes very simple to move, collect, and publish information in ways, intentional or otherwise, that violate DoD policy. End-users must be made aware of their responsibility to ensure a positive environment for all members of the organizational team is maintained by not publishing content that leaves others with an impression that is contrary to good order and discipline. The areas of importance to this special consideration are: adherence to the chain of command and enforcement of standards of conduct.

a. Chain of Command

An established chain of authority is prevalent in the culture of the DoD. Whether or not all information must be funneled through the chain is at the discretion of the leadership. As previously mentioned, intranets foster an open, collaborative method of communication. Although this aspect of intranets can be a challenge for DoD structures, it is possible to overcome by implementors. The implementation of an intranet within this culture must address the exchange of information that the chain of command dictates. For example, if the Commanding Officer (CO) publishes information in which personnel may be able to respond and other members of the chain prefer to be advised of this information prior to the CO's receipt, establishment of procedures describing how such issues are handled should at least be addressed in an employee handbook prior to implementation.

b. Standards of Conduct

DoD agencies are publicly funded organizations; therefore, activities and practices of these organizations are held to standards beyond reproach. The leadership of DoD agencies is responsible and accountable for providing work environments that are not hostile to any particular group, race, sex, or national origin. This responsibility includes the information published on an intranet.

Special consideration of information and coordination review with respect to standards of conduct is important to ensure that information published on DoD intranets does not include content of offensive format or style. For example, end-users must be made of aware that the use of certain terminology and graphics such as favorite cartoon scripts may not be appropriate for

the image that the DoD is responsible for projecting. Furthermore, it is especially important to include policy that explicitly states the responsibility of DoD personnel to observe laws of copyright in their selection of text, graphics, video and other mediums.

C. ACHIEVING A CRITICAL MASS

Achieving a critical mass, according to the interviewees, is basically a function of marketing. The point of achieving a critical mass is that it allows the organization to use the intranet for enterprise wide communication. For DoD organizations, achieving a critical mass is an absolute necessity. It is imperative that leaders have the ability to communicate with subordinates with the confidence that the information has been received and understood.

Most DoD organizations use a push model of communication to get information to end-users which may be important to the execution of their duties or their own professional development. End-users are held accountable for knowing this information and acting accordingly. Hence, as described by the interviewees, implementors must fully understand the technology and its compatibility with the organization's methods of communication.

An intranet is a pull technology. Attempting to use a pull technology to push information throughout the organization is challenging. For instance, voice-mail, also a pull technology, as a method to broadcast information required for users can be ineffective. A voice-mail system is designed to allow users to access their accounts when they feel the need to do so. The messages can be forwarded and saved for future use, allowing the end-user the opportunity to review messages that may have been missed. Broadcasting information from this medium, making periodic announcements in place of the initial dial in menu, does not allow for full benefit of the system and

almost ensures that some personnel will miss important information. Missing important information can slow the productivity of the organization and yield disgruntled personnel. E-mail, a push technology, would be more effective for this purpose. This example points to the importance of considering how the use of a pull technology, such as an intranet, will facilitate the transmission of information for which users are held accountable. Thus, a special consideration exists for dealing with the information accountability requirements inherent to most DoD organizations.

Implementors must be very careful in how they attempt to ensure that information is shared and the users are accountable. As pointed out in the voice-mail example, users can and will rebel against technology if it is not properly fit to the mission it is to achieve. The best way to satisfy accountability requirements is to do as the sample suggests and gain users cooperative support. Although, an organization could mandate the use of its intranet, it is likely that this approach would fail.

D. SUMMARY

This chapter presents special considerations for the implementation of intranets specific to the DoD. The special considerations are associated with the phases of the implementation process model that they impact most. Although there are no considerations listed under the final phase, Intranet Refinement, it is not the intention of the authors to insinuate that there are no obstacles to this phase. In actuality, the final phase is affected by all of the considerations because it refers to modifications of any of the activities in previous phases.

Implementors of intranets must be adept at implementing intranets that are compatible with all aspects of the organizational environment. Specifically, DoD implementors must:

- Understand its interdependencies and define the limits and boundaries of the intranet accordingly.
- Consider all stakeholders, policies, and standards that may impact the implementation of the intranet.
- Ensure that implementation plans incorporate possible setbacks caused by acquisition rules and regulations.
- Leverage the acquisition of an intranet with the mission of the organization. Be aware of the limitations of an intranet to support organizational needs if the mission involves deployment.
- Fully understand the security needs of the organization prior to implementation of an intranet. Make informed decisions about connections to the Internet and other networks.
- Plan changes in personnel around the implementation of intranets to ensure the life and success of the project.
- Establish policy that ensures that end-users understand their responsibilities in relation to the chain of command and standards of conduct.
- Be flexible and creative in developing applications that develop the critical mass necessary to make the intranet a successful communications tool.

VI. CONCLUSION

A. SUMMARY

Intranets, internal networks based on the same technology and protocol as the World Wide Web, have emerged in the past two years as a very popular medium for communication and information exchange within organizations. Organizations are flocking to this new tool in order to preserve, maintain or improve their market share. Although the mission of the Department of Defense (DoD) is not focused on profit, it does seek to enhance communications and productivity. The purpose of this thesis is give the DoD some guidance in handling special considerations for the DoD that may develop during an intranet implementation process.

A qualitative approach was used in obtaining the data for this thesis. The primary assumption of this research is that the introduction of an intranet is similar to the introduction of any information system. Therefore, a sample of information technology professionals with at least five years experience in planning, developing, managing, and implementing information systems within DoD or large, bureaucratic, and hierarchical organizations were interviewed. The authors were able to collect data from the sample, collate the information into common themes, and organize the results to answer the primary research question of whether or not special considerations exist for the implementation of intranets in the DoD.

The interviews revealed a process of implementation that is heavily dependent on variables such as culture, structure, and size of the organization. The process has four major phases: leadership

buy-in, prototype introduction, attainment of critical mass, and intranet refinement. The phases are explained in detail and supported with a discussion of the associated activities and success variables for each phase.

The analysis of the interviews yields special considerations that are associated with the phases of the implementation process model. Specifically, DoD implementors must:

- Understand its interdependencies and define the limits and boundaries of the intranet.
- Consider all stakeholders, policies, and standards that may impact the implementation of the intranet.
- Ensure that implementation plans incorporate possible setbacks caused by acquisition rules and regulations.
- Leverage the acquisition of an intranet with the mission of the organization. Be aware of the limitations of an intranet to support organizational needs if the mission involves deployment.
- Fully understand the security needs of the organization prior to implementation of an intranet. Make informed decisions about connections to the Internet and other networks.
- Plan changes in personnel around the implementation of intranets to ensure the life and success of the project.
- Establish policy that ensures that end-users understand their responsibilities in relation to the chain of command and standards of conduct.

- Be flexible and creative in developing applications that develop the critical mass necessary to make the intranet a successful communications tool.

In conclusion, the authors sought to answer the question of whether or not there are special considerations necessary for implementation of an intranet within a DoD organization. Further, the authors looked at special managerial challenges facing DoD organizations willing to build intranets and documented some of the lessons learned from organizations that had already gained experience in the implementation and management of this technology.

The authors found that the real test for DoD implementors is in the application of the technology. The research revealed that implementors must be savvy by incorporating solutions that intranets offer into the vision, mission and strategy of the organization. Also, implementors must masterfully manage change in the organization to smoothly transition into an organization compatible with the new technology. It follows that this thinking provides a backdrop for an organization that understands the technology and can successfully evolve with it.

B. LIMITATIONS OF THE STUDY

Although the topic was thoroughly researched and the interviewees had a considerable amount of experience in the field of Management Information Systems, the study has some limitations. The limitations are timing of the literature review and size of the sample.

The timing of the research is significant to the relevance of the information presented. Information that is relevant today can easily be considered obsolete in a matter of months due to rapidly changing technology. In an effort to give readers some point of reference for the relevance

of the material, the authors chose January 1997 as an end date for the completion of the literature review.

The sample size is a limitation because a larger sample could possibly present a wider range of experiences. Further, a larger sample could have further supplemented the research by adding more creative uses for the technology and other solutions to challenges addressed in the special considerations for the DoD.

C. RECOMMENDATIONS

The research cautions implementors to do considerable analysis of their organization. This analysis is important to the success of the intranet because it forces implementors to look at both managerial and technical aspects of intranet implementation. In implementing intranets, the authors recommend that implementors:

- Establish the IS vision and strategy as an integral part of the organizational vision and strategy.
- Align the IS strategy with the organizational mission ensuring IS is understood as an enabler for the organizational business.
- Employ IS personnel who have skills in organizational analysis, management, and business.
- Plan and design intranets that support a vision and strategy that allows complete interoperability with all DoD organizations.

APPENDIX A. GLOSSARY OF TERMS

CGI (Common Gateway Interface)

An interface standard that allows web servers to run external applications.

Firewall

A hardware or software barrier between a private network and the Internet or other networks.

HTML (Hypertext Markup Language)

The document formatting language that underlies most World Wide Web (WWW) pages. It can be used to format text and link to images, audio, video, and other programs such as Java and CGI applications

HTTP (Hypertext Transport Protocol)

The Internet based protocol that negotiates the delivery of WWW documents and applications.

Intranet

An organizational network that uses WWW technology and standards.

JOINTNESS

The united activity of all US Armed Services.

TCP/IP (Transmission Control Protocol/Internet Protocol)

The collection of transport and application protocols used to communicate on the Internet and other networks.

APPENDIX B. INTERVIEW PROFILE

1. Objective: To describe the special considerations necessary for DoD in implementing intranets.
2. Overview:

    1. General briefing of our objectives to interviewees.

    2. Conduct at least 8-10 interviews with people representing a cross section of DoD and private sector information technology professionals with experience in the planning and implementation of information systems within bureaucratic organizations.

    3. Review discussion with interviewees and answer their questions, if any.

3. Interview Phases:

Phase I	Informal discussion intended to open up interviewee to our questions
	Discuss the focus of our interview
	Develop trust and ensure confidentiality

We are students working on a thesis at the Naval Postgraduate School on the topic of the introduction and implementation of intranets into large, bureaucratic organizations like the Department of Defense (DoD). As a part of our research, we are interviewing professionals with backgrounds in planning, developing, managing, and implementing information systems. We would like to be able to take any lessons learned from the implementation of intranets in private sector organizations and apply them to new systems in DoD. We feel that the introduction and implementation of an intranet are much like that of most information systems. We are particularly interested in any experiences or case studies involving large, bureaucratic organizations. We anticipate that the implementation of any system has political and social implications, all of which we are very interested in hearing about. In divulging this information, we want to assure you that all of the information that you share with us is confidential. We will not use the names of persons are institutions to which you may refer. Also, we want to assure you that this will be made available to you upon completion of our research. We will be taping this interview, do you have any objections? Before we begin, do you have any questions for us?

Phase 2	Begin interview
	Discuss areas where the interviewee exhibits the most comfort
Phase 3	Obtain basic information

Refer to questions
Refer to probe questions where possible
Get a clear and precise picture of the interviewee's perceptions

Phase 4 Ask the difficult questions
Discuss the community culture
Go for the provocative issues

Phase 5 Return to earlier subjects
Allow time for the interviewee's questions
Leave the door open for future discussions

4. Specific Questions:

1. Main question should cover items:

Level of intervention
Censorship
Security
Steps of implementation
Acquisition of systems
Training
Impact of the information system
Organizational characteristics

2. Please name the significant projects in which you have been involved?
Please describe the organization (i.e. structure, culture, size, geographical dispersement).

STRUCTURE					
TECHNICAL		SIZE	OPEN	PARTICIPATIVE	HIERARCHICAL
	HI	I<500			
		<5K			
		>5K+			
	MED	<500			
		<5K			
		>5K+			
	LO	<500			
		<5K			
		>5K+			

3. How did you get involved with each of the organization?
Who called you?
What was their position in the company?

4. What steps did you take to implement the project?
Did you meet any resistance? When? Where?
In retrospect, what things would you have done differently?

5. What was successful about the projects?
What was unsuccessful about the projects?

6. What's your perception of intranets? What experiences have you had with this technology?
Would implementation been different for a different type of organization? How?

7. If your task was to implement an intranet in an organization such as DoD, what would you consider? What steps would you take?
Would there be concerns about who has access to the data? What concerns?
Would there be concerns about what data is published? What concerns?
How would you ensure that there would be successful use of the intranet?

8. Are there any similarities and differences in any of the cases you mentioned? How do you account for the similarities and differences?

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