AN EVALUATION OF INFORMATION TECHNOLOGY

(IT) OUTSOURCING DETERMINANTS WITHIN THE

DEPARTMENT OF DEFENSE (DoD)

THESIS

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Abstract

Each year the Department of Defense (DoD) spends billions of dollars on information technology (IT) outsourcing. However, little formal or academic guidance has appeared that explains how, why, or even when this occurs. This study presents and evaluates several determinants that may impact a decision to outsource information technology systems in the Department of Defense.

It begins with the development of a conceptual model, which was created using semi-structured interviews and an extensive literature search. This model was then matured into an analytic version by using the Delphi method, which is an accepted methodology to use when insufficient or no applicable data exists, the required data is too expensive to obtain and analyze, or the problem variables and their interaction are not clearly known.

The results seem to suggest that while some determinants are more important than others, the decision to outsource IT in the DoD is a multifaceted one. This is consistent with similar research done in the private sector. The results also seem to suggest that in the area of IT outsourcing, the DoD seems to be experiencing much the same evolution the private sector did and that each organization has a slightly different focus and requirement set.

AN EVALUATION OF INFORMATION TECHNOLOGY (IT) OUTSOURCING DETERMINANTS WITHIN THE DEPARTMENT OF DEFENSE (DoD)

I. Introduction

General Information

In the year 2000 total military spending will top approximately $289.8B (in constant fiscal year 2001 dollars) and total military active duty manning will hover around 1.383M. This is down 40% and 36.2% respectively since 1986 (Budgets, 2000; People, 2000; USAF, 1990). Over the same 14-year period, our society has seen an explosion in the number, type and capability of telecommunication and information systems. As one of the most pronounced examples, the Internet has grown from a small research project into one of the largest revolutions in information sharing and commerce. It is therefore not surprising that the importance of information and information technology in the military has also grown. Retired General and former Air Force Chief of Staff, Ronald R. Fogleman has characterized the increased importance of information as having an "ascending and transcending influence on military forces" (Fogleman, 1995). As such, he has labeled it the fifth dimension of warfare, following land, sea, air, and space (Fogleman, 1995). In addition, Joint Vision 2010, the conceptual template for future US warfighting, states "the emerging importance for information superiority will dramatically impact how well our Armed Forces can perform it duties in 2010" (CJCS, 1996:8).

However, ensuring information superiority may not simply be a matter of developing and fielding superior communications and computer equipment. Former

Deputy Secretary of Defense Dr. John Hamre states that, "security in the virtual world is as much a process of management approach and attention as it is of technology" (Hamre, 1998). Therefore, it's important that leaders not only concentrate on the technology that drives these systems, but also on the management that controls them. Of course, this must all be done in an environment where military outlays and personnel levels continue to shrink.

One strategy the Department of Defense is currently investigating as a means to provide the required level of information services to its members while decreasing the overall cost of information systems is outsourcing.

Definitions

There are numerous perspectives for, and definitions of outsourcing. As an example, it has been considered using labor market economics (Slaughter, 1996), management perspectives (Keene, 1998b) resource dependency perspectives (Pfeffer, 1978), and agency theory (Hancox, 1999) just to name a few. This multifaceted nature of outsourcing has lead to the development of several different and sometimes conflicting definitions. In fact, a 1991 America survey of chief information officers concluded, "There is little precision in the term *outsourcing*." Much of this ambiguity can be attributed to the constant change in the scope of IT outsourcing. In the early 1960's, organizations would hire outside firms to simply batch process large amounts of data, or manage small inexpensive systems. As time progressed, these arrangements grew into the mega-deals, such as the Kodak/IBM arrangement that have become familiar today (Lacity, 1993).

However, despite the differences and contradictions in the definition, there does appear to be an agreed upon core in almost everyone's version. This core will be the working definition used for this research:

> "Information technology (IT) outsourcing is the third party provision of IT products and services" (Hancox, 1999).

A third party can be considered the agent in a principle-agent relationship (Carlton, 2000). The reference to services includes management and control functions. If these services are excluded, the relationship tends to be more of a traditional contracting out arrangement (Keene, 1998b).

Outsourcing and Department of Defense

Almost all firms outsource to some degree. For many years businesses have been outsourcing their systems development efforts to software houses. (Earl, 1996) Even military organizations traditionally considered *in-house* work centers, such as the Air Force Research Laboratory and other military run research and developmental centers, perform a certain degree of outsourcing. In today's environment of reduced military personnel and contractor partnerships, it is difficult to conceive of a situation where a single Department of Defense (DoD) organization would have a sufficient number of Government personnel with the correct skill set and experience to design and build the advanced intelligence and weapon systems required by today's military. At a minimum, the Government would need to hire civilian experts and consultants when, in the planning stages, their skill set was incorrectly not thought to be significant.

Due to lower DoD budgets and subsequent manpower drawdowns, the DoD currently performs even less in-house developmental work than it once did (Brower, 1996). No longer are external vendors used to simply execute large-scale fabrication efforts (Bryce, 1996). Rather, they are now being used for research and development as well transitional management activities. Therefore, any remaining questions regarding whether outsourcing, or its derivative arrangements, should be used usually revolves around the operations and maintenance (O&M) services it offers. Consequently, this study will focus on this area.

Research Questions

This study is an inductive examination of a proposed theory regarding information technology determinates in the Department of Defense. It will be conducted using the Delphi Method which is "a method to systematically collect, evaluate, and tabulate independent opinion without group discussion." (Tersine, 1976:51). The Delphi experts used to support the study were primarily Chief, or deputy Chief, Information Officers chosen from Department of Defense or intelligence community agencies. The final output of this study will be an evaluation of the proposed theory. The research focuses on outsourcing arrangements that have a direct impact on the entire organization, not just a specific portion of it. Therefore, only monetarily large outsourcing arrangements will be considered. Typically these deals run in excess of one million dollars. It should be emphasized that this research focuses on the determinants that affect a decision to outsource, not the determinants that affect the amount of outsourcing. A decision to

outsource will precede any decision to determine the level of outsourcing to be used. Consequently, the primary research question (dependant variable) being addressed is:

1. What determinants affect an outsourcing decision in the Department of Defense, Air Force or Intelligence Community agencies.

A sub-question is:

1a. Whether the proposed determinants have a positive or negative relationship on the dependant variable.

This study does not focus on any one particular model, but rather considers all pre-event IT outsourcing determinants. It draws upon a number of existing theoretical models from the outsourcing literature that attempt to describe the IT outsourcing decision process. Presently however, none of these models focus on the DoD. This is a difficult topic to capture since these issues are "often murky, hidden behind euphemisms, perceived differently by different stakeholder groups, and generally not easily analyzed" (Hirschheim, 2000:100). However, without this information it is difficult to make any predictions about the outcome of future outsourcing decisions, except in the most general case of lessons learned. It is hoped that by providing a comprehensive framework for why these decision are first made, future decisions can be analyzed using it, which will hopefully lead to a better forecast of the outcome.

This is similar to the strategy behind any information systems planning (ISP) process. ISP is "an orderly means of assessing the information needs of an organization and defining the systems, databases, and technologies that will best satisfy those needs" (Hoffer, 1999:168).

The first step in ISP is to describe the current situation. If you don't know where you are it is difficult to get to where you want to be. The crux of this research will be to develop a theory that explains this for Department of Defense IT outsourcing. The next ISP step is to describe the target situation, trends and constraints. This will usually lead to a better understanding of a firm's desired IT outsourcing end-state and therefore, will help determine what requirements are needed to satisfy using an outsourcing strategy. The last step is to develop a transition strategy and plan. Once you know where you are and where you want to go, formulating of a path to get from one to the other should be straightforward. The transition plan should be a detailed as possible and provide sufficient guidance to all "levels of management concerning what needs doing, how, when and by whom in the organization" (Hoffer, 1999: 176). It is hoped that flow-up research in this area will lead to the development of the last two items.

Potential Benefits

By creating a theory for the IT outsourcing determinants in the military, it is hoped that a better understanding will be gained of what direction this method of IT governance should head and how the goals created for it can be attained.

Additionally, the theory could potentially have a more immediate benefit. Since the final result will essentially be a list of validated determinants, benefits, and risks associated with IT outsourcing, it could be used to guide future IT outsourcing decision makers. Also, with slight modifications, it might be able to serve as the basic evaluation criteria for an IT outsourcing source selection committee.

Thesis Overview

The next chapter will detail the development of a conceptual model. This model was created from the literature and interviews. Chapter 3 will describe how this research was conducted and focuses on the Delphi process used to verify the conceptual model. Chapter 4 will provide the results from the Delphi experiment. Finally, chapter 5 will provide any insight into why the results showed what they did, list limitations of the research and provide suggestions on follow-up activities.

II. Literature Review

Types of Outsourcing

As briefly discussed in Chapter 1, outsourcing can be viewed from a variety of perspectives. From the point of view of labor market economics, outsourcing can be a firm's response to the costs and disadvantages associated with the traditional permanent work arrangement that arise from changes in technology and the environment (Slaughter, 1996). Such a response provides flexibility to the firm since they do not have to make a full and permanent investment to obtain additional personnel to solve what might be a temporary problem.

According to the General Accounting Office (GAO) outsourcing is:

> When a government entity remains fully responsible for the provision of affected services and maintains control over management decisions, while another entity operates the functions or performs the service. This approach includes contracting out, the granting of franchises to private firms, and the use of volunteers to deliver public services. (GAO, 1997)

In this definition, the outsourcing customer retains management functions and control while the provider simply supplements the performance of the firm. However, some argue that this is not a complete definition. They contend that assets and staff members need to be transferred from the principal to the agent before outsourcing can occur (Willcocks, 1993). Others are not so radical in their approach, but still propose that outsourcing includes the partial or full transfer of management to the vendor (Keene, 1998b).

Recently, the terms *Smart sourcing*, *selective sourcing* and *right sourcing* have been introduced to describe the selective use of outsourcing as opposed to a complete

transfer of the work to a vendor. The optimism attached to this idea is a hope from firms that outsourcing works best when only selected systems are outsourced (Lacity, 1996).

Still other firms have investigated cooperative outsourcing. In this arrangement the vendors profits are based on agreed to improvements in the customer's basic corporate performance, such as earnings, performance against budget, and competitive position (Scott, 1995).

Additionally, some firms that choose to outsource their IT are now even re-internalizing these services under the heading of *insourcing* (Meyer, 1994). They feel that the expected benefits of outsourcing never really materialized and that having more control over their IT assets is better than having less.

It should also be noted that outsourcing and privatization are usually considered different arrangements. Typically, privatization is used as a catch-all phrase used to describe any new use of the private sector such as the divestiture of government facilities (Tighe, 1997). Therefore, outsourcing can be considered a type of privatization.

Interest in IT Outsourcing

Recently, information technology (IT) outsourcing has been riding a wave of popularity in the private sector since many companies are now considering IT as a utility or commodity and therefore able to be performed by any number of firms. (Lacity, 1993). Consequently, IT outsourcing has became a serious strategic choice for firms (Loh, 1992). Lower costs and higher performance have become mantras of this movement.

However, firms are learning that IT is different from other business functions because it permeates an entire organization. It touches nearly every aspect of a business

and therefore cannot be treated as a discrete entity like, security, logistics or advertising. Therefore, they are discovering that IT outsourcing presents different legal and commercial issues when compared to more traditional outsourcing arrangements. It's been argued that the complexity and changing nature of IT, as well as the legal framework governing its uses typically cause these differences (Antonucci, 1998).

Due to these different qualities, numerous methods have been applied to describe IT outsourcing. Some research has used popular conceptual models such as principal agent theory, transaction cost economics, core competencies, agency theory, partnerships and organizational factors (Brown, 1999; Kim 1998, Hancox, 1999). Some have described IT outsourcing agreements as being either facilities management, applications management or managed networks (Rebeiro, 1996). Others have attempted to capture differences in IT outsourcing by creating categories for each such as network services, service retention, service transfer, and asset transfer (Takac, 1994).

Difference Between the Private and Public Sector

While many studies exists that examine IT outsourcing in the private sector, almost none consider its application to the pubic realm, especially the Department of Defense (McTernan, 1997). However, significant and important differences can potentially exist between private and public sector firms with regards to IT outsourcing.

Many of these differences might exist due to the presence of inherently governmental factors that private firms do not need to consider, such as the Information Technology Management Reform Act (ITRMA) of 1996, statues, federal acquisition regulations and local requirements and guidelines issued by each agency (Keene, 1998a;

Keene, 1998b). The Balanced Budget Act and the Office of Management and Budget (OMB) scoring are just a couple of specific factors that do not need to be considered when making an IT outsourcing decision in the private arena (Keene, 1998a).

Studies in the United Kingdom (UK) have also shown fundamental differences exist between public and private sector firms with regards to IT outsourcing (Hancox, 1999). Not surprisingly, some of the largest reported differences are in the political arena. It needs to be remembered that a public sector organization is not merely a provider of goods and services, it is also a governmental and political institution constituted by local election (Hancox, 1999). Also, private sector IT outsourcing decisions are usually based on profitability and financial effects (Smith, 1998; Loh 1992). However, public sector organizations sometimes base similar decisions on more personally motivated criteria (Hancox, 1999). Other differences between public and private sector organizations that affect IT outsourcing include; stricter procedures, more required coordination, political difficulties, and policy shifts due to changing administrations (Hancox, 1999).

The type and purpose of IT systems in the government also seems to be inherently different than those in the private sector. DoD uses of IT are typically very focused, one-of-a-kind applications, such as space exploration, advanced research and development, or battlefield management. However, private sector firms use IT for broad ranging applications such as business support or administrative applications (Jones, 1999).

Consequently, it is clear that Government IT outsourcing has the potential to be inherently different from similar arrangements in the private sector. Therefore, some argue that a different perspective for IT outsourcing is required for the Government (Keene,

1998b). Gaining this perspective is even more important when it is realized that government agencies outsource over twice as many IT services as private firms (Jones, 1999).

Government Interest in IT Outsourcing

Currently, there is concern from Congress that Government Agencies are not responding to the growth of IT in an appropriate manner. Representative Sanford Bishop of Georgia has stated in congressional session that, "The telecommunications and information technology industry appears as a whirlwind with the NSA [National Security Agency], at the moment, trailing in its wake" (US House, 2000). Comments like this lead to the creation of Project Groundbreaker, a comprehensive study to outsource almost all of the NSA's non-core IT activities. While the potential funding associated with this project is unknown, it has been estimated at over $5B spread over 10 years (Verton, 2000). Given these figures and the high level attention being paid to IT and IT outsourcing, it is not surprising that the Department of Defense has increased its interest in outsourcing as a mode of IT governance.

OMB Circular A-76, Performance of Commercial Activities, directs most all of the DoD's outsourcing efforts. The motivation behind this process is to emphasize that "in the process of governing, the Government should not compete with its citizens" (OMB, 1983). Therefore, the conclusion is made that the Government relies on "commercial sources to supply products and services the Government needs" (OMB, 1983). The supplement goes even further to state that an outside source can be selected even it is more expensive, so long as it provides the best value to the government (OMB, 1996). Armed with these two

ideas, the DoD can seek outside vendors for its IT systems and work towards not only reducing costs but increasing value as well.

Proposed IT Outsourcing Theory

When considering IT determinants it is helpful to classify them into categories. Several frameworks for this purpose have been developed. Some examples of these are listed in Table 1 below.

Table 1. IT Outsourcing Frameworks

Model	Categories used in model
Loh, 1992	Business competence Business governance IT competence
Smith, 1998	Cost reduction Focus on core competence IS capability Security and Environmental
Gurbaxani, 1996	IS improvement Business impact Commercial exploitation
Lacity, 1994	Financial Business Technical Political

Flexibility seems to be an underlying goal for each of these categories. Today's business environment can change so quickly it is important to weave as much flexibility into a corporate strategy as possible. Therefore, IT systems must also be able to respond quickly to changing demands (Antonucci, 1998). Those that outsource hope it will lead to increased flexibility, yet no single category can exclusively claim this as a goal. For example, since IT evolves so quickly, by the time a firm purchases hardware and trains its

staff on how to use it, the technology may be obsolete (Rebeiro, 1996; Slaughter, 1996). In this case both business and technology categories are impacted. It is also hoped by some that IT outsourcing can enhance financial flexibility, by providing such services as guaranteed pricing (Sweeny, 1996). Consequently, it can be seen that flexibility is a goal of all IT outsourcing determinants.

It has been suggested that because of this flexibility, outsourcing is even more important in the public sector since such organizations are extremely cautions about expanding their human resource base due to work rules and implicit employment guarantees (Slaughter, 1996). Therefore, these firms might use outsourcing to temporarily hire a contractor for the same task.

Each of the frameworks presented in Table 1 has strengths and weakness to base a theory of military IT outsourcing determinants on. One notable weakness is the inclusion of determinants intrinsic to the private sector, such as cash needs and financial leverage (Loh, 1992). However, that is not to say that fiscal elements should be discounted when considering military determinants. Cost related factors could quite easily be the largest determinant for military IT outsourcing. As an example, during the development of the conceptual model, one interviewee commented that outsourcing provides budget stability (Barclay, 2000). He explained that in-house re-capitalization expenditures for IT sometimes make an easy target during budget reductions. However, if such a function were provided for in a contract, the funding would be more difficult to raid due to contracting regulations.

In addition, when compiling a list of IT outsourcing determinants, it is important to not only consider the benefits associated with the arrangement, but any potential risks as well. Few decisions will be made without considering the possible repercussions. Consequently, it is helpful to review any literature that pertains to IT outsourcing risks when attempting to compile a list of determinants. Some have categorized these risks as being either political, managerial/technical, legal, organizational, or economic (Keene, 1998b). Others believe the risks can be evaluated using a framework based on business value and the operational performance of IT (Earl, 1996). Only after considering such risks, along with any potential gains will a decision on outsourcing be arrived at. Consequently, each proposed determinant factor listed below has both benefit and risk determinants associated with it. Each benefit could be considered to have a positive influence on the research question, while a risk could be considered as having a negative effect. However, since this these relationships have not been tested, it is difficult to confirm their existence.

Based on this information, a conceptual model for IT determinants in the military was developed. As shown in Figure 1, the five categories created for these determinants are: cost, business, technical, political, security, and environmental. It is theorized that each of these factors might contribute and impact an outsourcing decision. For the remainder of the text, the terms IT outsourcing and outsourcing will be used interchangeably unless specifically differentiated.

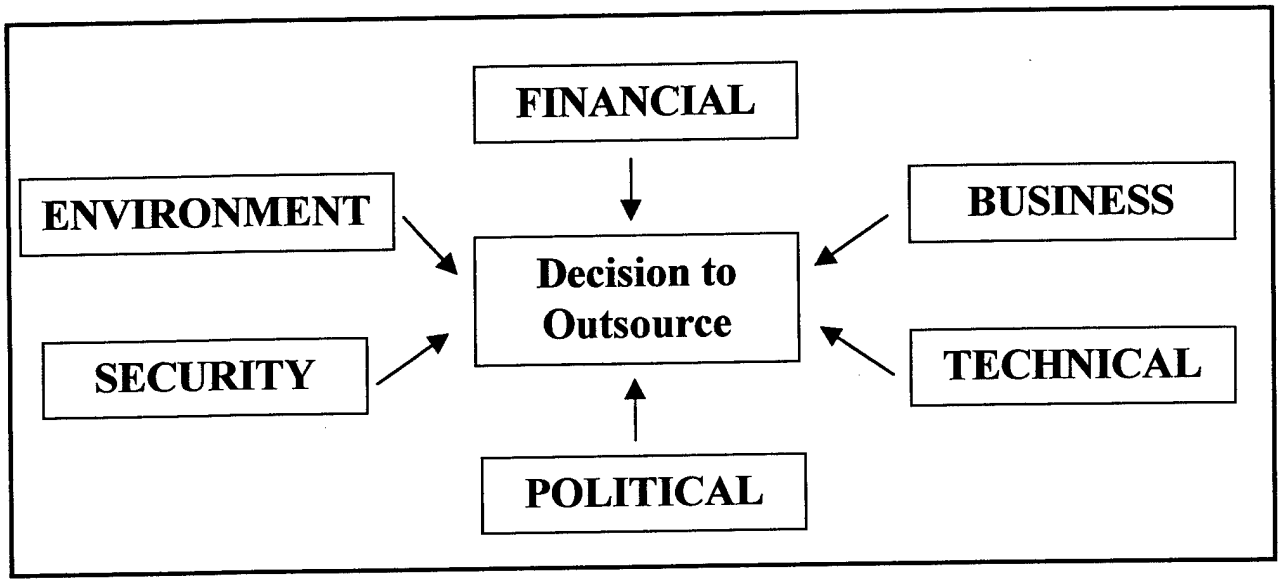

Figure 1. DoD IT Determinants Outsourcing Model

Financial Determinants

Financial determinants are those factors that relate to the fiscal aspects of IT outsourcing. They directly or indirectly impact overall costs. Some have labeled this factor the most important advantage provided by outsourcing (Rebeiro, 1996). In the DoD, these determinants seem to take on special meaning since research has shown that government agencies focus on them much more than public firms (Jones, 1999). The proposed cost sub-factors are listed in Figure 2.

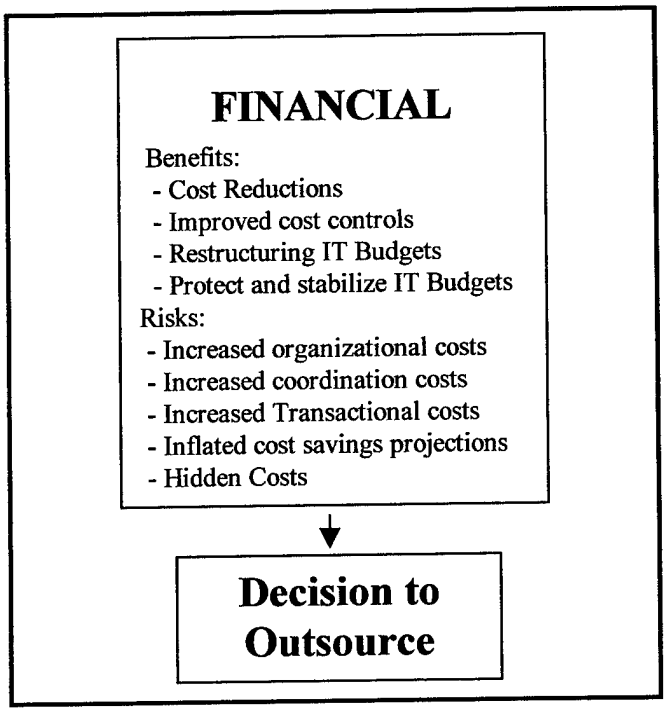

Figure 2. Cost Determinants

Benefits: Financial

Cost Reductions. Its been shown that one of the largest motivators behind the use of IT outsourcing in the government is reduced costs (Jones, 1999). During this research, cost reductions were repeatedly labeled the number one reason why outsourcing solutions should be pursued. In fact, one respondent casually remarked, "is there another reason you would outsource?" (Folsom, 2000). A government Chief Information Officer (CIO) has even been quoted that when it comes to outsourcing, "cost is *THE* driver" (Jones, 1999:29). Cost reduction mechanisms might include economies of scale, tighter control over fringe benefits, relocation of data centers to lower cost areas, and more focused expertise in managing IT. (Antonucci, 1998; Smith, 1998)

Improved cost controls. Typically IT costs are directly related to user demand. However, most organizations do not have the ability to monitor these demands. Therefore, many firms simply use general allocation systems to control their IT distributions (Venkatraman, 1997). Such systems do nothing to encourage users not to request unnecessary or excessive IT resources. However, in a cost controlled environment, users would no longer be able to call their favorite analysts to request unneeded changes, but instead would be required to submit requests through a formal cost control process. (Lacity, 1994)

Restructuring IT budgets. Sometimes it is desirable to restructure capital budgets into more flexible operating budgets (Lacity, 1994). This would substitute operations and maintenance charges for large capital expenditures. As an example, rather than purchasing large computer systems, time on a vendor's machine could be purchased on an as needed basis. For the private sector firm this helps generate cash up front, which increases the participants' cash flow. In public sector firms it might allow different appropriations to be used for computer operations (Barclay, 2000). This strategy would have an advantage when operations and maintenance (O&M) funding is easier to obtain than procurement dollars.

Protect and stabilize IT budgets. As government budgets continue to decline, IT operations, like all other activities within the government, must remain efficient and effective. Consequently, IT budgets are routinely inspected for any savings. Additionally, given the commodity like nature of IT systems, recapitalization budgets for them are programmed well in advance. These large, static budgets sometimes make an easy target

during budget reductions exercises. However, if these operations were outsourced, the funding would be more difficult to raid due in part to contracting regulations (Barclay, 2000). Additionally, long-term contracts improve the financial predictability associated with these requirements (Martinsons, 1993).

However, this strategy can backfire if the contractor attempts to extort more funding from the customer at crucial times. This is easier for them if they have become fully entrenched within a firm (Quinn, 1999).

Risk: Financial

Cost Reduction Risks. While cost savings remain one of the more attractive lures of outsourcing, some experts remain skeptical about the actual savings it provides. As an example, some believe that overall costs could actually increase when outsourcing is used since certain organizational, coordination, or transactional costs usually rise when it is implemented, especially in public organizations (Hancox, 1999). Others suggest that any benefits outsourcing actually does provide are slight. They explain that vendor discounts achieved from economies of scale can sometimes be negligible (Martinsons, 1993). They further argue that changes in software licensing agreements have greatly reduced a vendors advantage in this area (Lacity, 1993). Also, since costs are difficult to estimate, inaccurate cost saving projections may be made (Quinn, 1999). Even when IT costs can be estimated, vendors will sometimes charge for services that a customer might easily assume are covered in the contract such as supplies, office space or documentation. The vendor might also try to hide the true costs of a contract by providing a financial package whose net present value is extremely attractive. This may take the form of delayed payments or credit

for a customer's hardware (Lacity, 1993). Some argue that such hidden costs are the biggest problem associated with IT outsourcing (Willcocks, 1994). It has been proposed that to truly determine whether outsourcing will produce cost savings, senior managers must know all the current costs of their information management activities (Martinsons, 1993).

In addition, vendors typically cut service to lower costs (Hirschheim, 2000). It has been shown that if internal IT departments are allowed to decreases service by comparable amounts they could also attain similar cost savings. While such actions might appease senior management, users typically become upset when there IT service levels decrease (Lacity, 1993).

Business Determinants

Business determinants focus on elements of organizational efficiency and effectiveness. It's been proposed that when these factors are in balance, IT can be fully exploited (DiRomualdo, 1998). As seen in Figure 3, benefits associated with these factors include focus on core competency, influence of government regulations, and facilitating reorganizations. Risks include the inability to write an adequate service level agreement, inability to manage a contract, inability to fully leverage IT and loss of control.

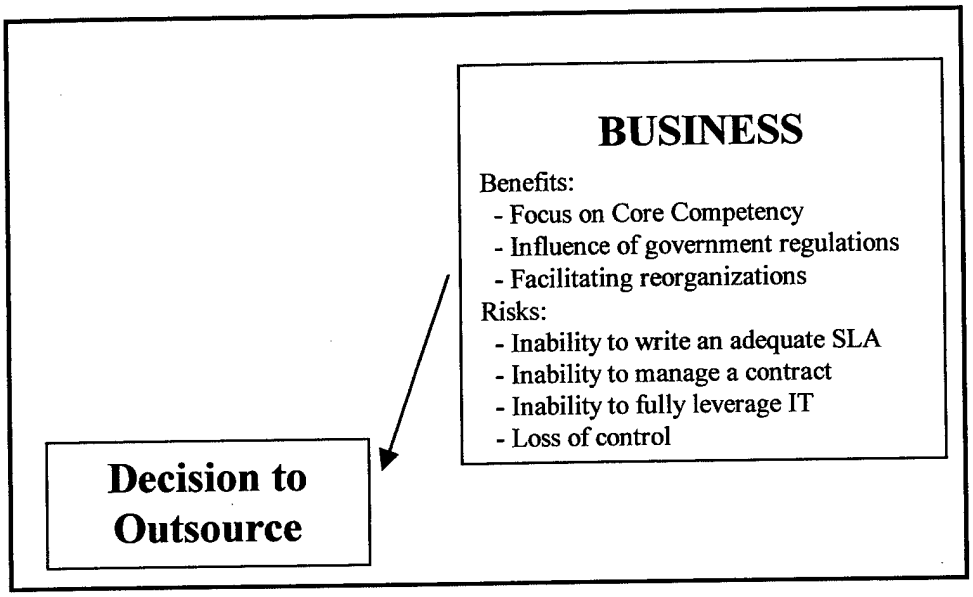

Figure 3. Business Determinants

Benefits: Business

Focus on core competency. During the 1990's several large corporations abandoned their strategy of diversification for a more focused approach. Originally, diversification was used to mediate risks but now some executives believe that a strategic focus is a more important competitive advantage (Lacity, 1994). By concentrating on core competencies it is thought that a company can focus more of its power than anyone else on the few capabilities that customers genuinely care about (Quinn, 1999). Therefore, core competencies are those things a company does better than any other. They can be both skills and systems that are considered to operate at *best in world* levels and "though which a company creates uniquely high value for customers" (Quinn, 1999: 12). As an example, both Sears and General Electric have recently divested themselves of many ancillary business units to focus on their core activities (Rumsfled, 1995; Torode, 1997).

Public companies have adopted this idea so strongly; some have listed it as the primary reason to outsource (Jones, 1999).

This refocusing has several effects including simplifying the management agenda, flattening organizations, leveraging innovation, increased employee motivation and cohesion, and freeing up resources in the form of funding and personnel to apply to more strategic activities (Lacity, 1995; Martinsons, 1993; Quinn, 1999; Smith, 1998). Other benefits in this area include increased hardware utilization, improved manufacturing yield and productivity improvements (Savage, 1998).

However, some suggest that the selection of IT as simply core or non-core is too rudimentary. They would argue that the subject needs to be decomposed even further. Consequently, frameworks have now been created that compare the contribution of an IT activity to business operations against the contribution of an IT activity to business positioning (Lacity, 1996). However, for the purposes of this research, that distinction will not be considered. Only the simple existence of the core competency variable will be examined.

Government regulations and guidelines. Several recent Congressional actions such as the Government Performance and Results Act of 1993 and the Paperwork Reduction Act of 1995 require government to work more efficiently. With the enactment of the Information Technology Management Reform Act of 1996, IT is looked at as an enabler to make this happen. However, IT itself is under the same scrutiny to maintain efficiency. Outsourcing can potentially be used as a method to demonstrate an agencies desire to maintain this efficiency. In addition, some government regulations mandate the use of

outsourcing in certain situations. Therefore, IT managers might be required to outsource regardless of other factors.

Facilitating reorganizations. Modifications to organizational structures are made for a variety of reasons. Changes in mission, tasks, reporting relationships, and coordination mechanisms are just a few (Griffen, 2000). Companies can use outsourcing as a change agent when they want to dramatically alter their overall structure (Scott, 1995).

After reorganizations occurs, IT managers can then use it to absorb and unite dissimilar systems into their firms existing IT architecture. In the private sector such actions must not only occur when a reorganizations occurs, but also after a merger or acquisition. Therefore, outsourcing can be viewed as a means to solve technical incompatibilities, absorb excess IT assets and absorb unnecessary IT employees generated by a merger (Lacity, 1994).

Risks: Business

Inability to write an adequate service level agreement. A firms' ability to establish a solid service level agreement (SLA) might also effect its decision to outsource (Lacity, 1995). SLA's provide a full and detailed description of the services, an agreed standard of service, a service level appraisal procedure and an audit provision for a contract (Rebeiro, 1996). Some feel that this is such an important document it is the only instrument that can ensure expectations will be realized after an outsourcing decision has been made (Klochko, 1994). However, it is sometimes very difficult to precisely specify what is desired (Quinn, 1999). To develop a good SLA, a firm must first understand what services are needed and then translate those needs into specific contract deliverables. Both of these actions present

several problems. First, in order to understand what services a firm needs it must first understand its own processes. Only after these processes are fully understood can the firms' information requirements be established. Gaining this understanding can be a very difficult task (Hoffer, 1999). Second, once these requirements are established they must be properly transformed into binding contractual deliverables. During this transformation, attention to detail becomes critical. Recent studies have shown that even the approach and strategy used for IT outsourcing can affect the business value (Richmond, 1993). In fact, "the price the user pays for the system depends on the form of the contract and the degree of competition among the vendors, with lower prices associated with more competition" (Richmond, 1993: 71). The contract needs to be structured so that it can change based on what is, or is not, known about the "business, the course of technology, and the capabilities of outside providers and the company's own IT department" (Lacity, 1995: 89).

However, the problems associated with this process should lessen as the DoD moves from statements of work (SOW) to performance work statements (PWS), which is the heart of the A-76 process (Paddock, 1987). Whereas a SOW might list detailed procedures and specifications associated with completing a job, a PWS only provides the general requirement and lets the vendor decide how to perform the task (Harney, 1998). This is a more dynamic vehicle since it allows the vendor to use discretion when allocating their resources and deciding how to best provide the services required (Paddock, 1987). Oftentimes the requested services are abstractions, such as pilot training, as opposed to flight simulators, as would be the case in a statement of work contract.

Further flexibility can be gained by agreeing to short-term contracts and including clauses that mandate periodic reviews. However, these items do not come cheap. In reality, they are usually accompanied by cost premiums. Additionally, any variations from the original requirements must always be funded. Therefore, some believe that even if the requirements could be accurately captured and communicated to the vendor, any savings would be negligible after they were calculated (Earl, 1996)

Inability to manage a contract. Along with the dangers associated with developing an outsourcing contract, there are several risks associated with a firm attempting to control it. Typically, members of the internal IT staff are tasked to perform this function. However, many times these individuals have not been properly trained for these duties (Lacity, 1995). They may be excellent programmers or computer maintainers, but not have the necessary skills to oversee and monitor contractual arrangements. This change can be a traumatic experience for senior IT managers who have to modify their roles from handling personnel issues to managing contract negotiations and administrative functions. As Earl asks, "if the IT activity has been badly managed in the first place, will the IT managers be any better at managing an external provider?" (Earl, 1996: 27). Some feel that it is important to consider a firms ability to perform these functions before an outsourcing decision is made (Lacity, 1995).

Inability to fully leverage IT. In the past IT was simply viewed as an overhead burden that needed to be funded. It was considered part of a firm's infrastructure, able to only support other more value added functions and roles. It was not considered an integral part of a firm since it did not create profit. Since IT was only viewed as serving non-core

functions, it was subject to outsourcing (Quinn, 1999). However, organizations are now starting to view IT as an investment and even profit center. They no longer consider it as they do office supplies, but rather are starting to understand that IT can maximize business opportunities and even generate revenue (Venkatraman, 1997).

Many times, a firm's ability to get IT to perform as a profit center is based on its experience with it (Hammer, 1994). A firm must work closely with the technology to truly understand it. In support of this, Hammer and Champy believe that firms need to start thinking about IT inductively rather than deductively (Hammer, 1994). Only after considering what IT can do for a business rather than how IT can solve a specific problem, can the true potential of it be realized.

However, if a firm outsources its IT, there is less potential that it will be able to realize and understand its true power. Many times marketable IT systems were discovered only after employees recognized that systems originally intended for internal use had potential in the marketplace. It is possible that this important organizational learning phenomenon will be lost if IT is outsourced (Earl, 1996)

Loss of control. Perhaps the greatest disadvantage to an outsourcing company is the loss of direct control over the business areas outsourced (Rebeiro, 1996). One reason why this may be such a risk are all the potential ways control can be lost. For example, if it is difficult for customers to relate IT requirements to the vendor, the vendor may simply provide the services they deem appropriate which may not necessarily be what the customer wants. Therefore, the customer can lose control of the services provided.

In addition, when services are outsourced, there is typically no longer a need for as many internal IT specialists. However, if these people leave a company they take their skills with them. When this occurs the firm can lose control over their own destiny by becoming overly dependent on the contractor. This can fuel a further loss of control over the timing and quality of outputs (Quinn, 1999). This can become important in the military when battlefield commanders halfway around the world need stateside support, but are refused because a contract does not allow for it. As some have recognized, IT outsourcing is nearly an irrevocable act. Once it is performed it is nearly impossible to repeal. (Martinsons, 1993; NSA, 1999a).

Technical Determinants

As the technology that drives modern information systems continues to evolve at breakneck speeds, a firm's ability to keep up becomes even more difficult. Companies want to ensure that the hardware and software resources driving their IT systems are as productive as possible (DiRomualdo, 1998). Consequently, organizations will sometimes consider outsourcing as a way to stay current and maintain a technical edge over their competition. As can be seen in Figure 4, improving technical services, access to technical talent and technologies are all outsourcing benefits that organizations hope will help them maintain their edge. To some in government, these determinants have been considered the second most important set of factors after reducing costs (Jones, 1999).

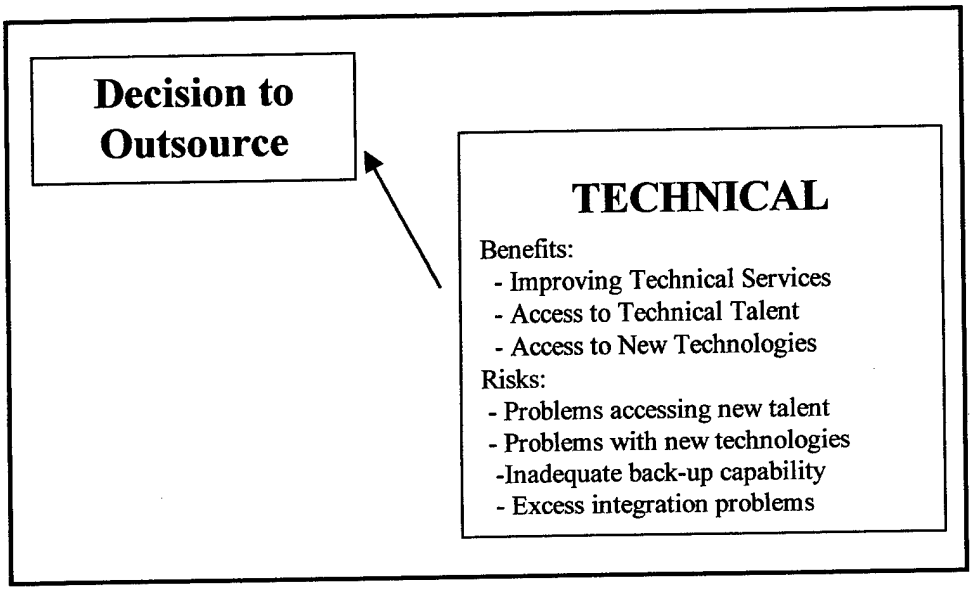

Figure 4. Technical Determinants

Benefits: Technical

Improving technical services. Many times a company will turn to outsourcing when they are dissatisfied with their own IT departments. Systems delivered late and over budget as well as delays responding to user requests are some of the problems that cause this attitude (Lacity, 1994).

Access to technical talent. As technology continues to become more complex and specialized, it is difficult to find experts that understand how to manage it. Further, even if a company does succeed in luring these individuals, many are finding it difficult to retain them. (Lacity, 1994). Some consider a firm's ability to locate and acquire these individuals crucial to their success (Slaughter, 1996).

By acquiring new talent via outsourcing a firm will not only infuse its current staff with new thoughts, ideas and experiences, but also gain the freedom to reassign their current internal staff members to higher priority activities such as the development of more strategic-level systems that can deliver a competitive advantage. Many times this personnel

redistribution can increase productivity and create a stronger foundation for future business success (Martinsons, 1993). This advantage can be considerable in the military since it costs more to develop an internal, skilled IT worker than it does in the private sector due to the additional military training a member must undergo. Consequently, it is especially important to assign these individuals to the systems and programs were the return on investment is the highest possible.

Access to new technologies. Many times outsourcing is seen as a tool that can provide a firm with emerging technology by giving them access to a vendors large research and development efforts. They feel that the vendors can help them leapfrog or catch up to the competition (Martinsons, 1993). Hardware and software systems today need to be constantly updated or replaced. It is growing increasingly difficult to stay current given the rate of change (Antonucci, 1998).

Risks: Technical

Potential problems with obtaining new technical talent. As one might expect, there are some who believe that the expectation outsourcing will provide new talent to an organization is overstated. They point out that as organizations move towards outsourcing, employees start fearing they will lose their jobs. To appease this fear agencies start considering different vertical restraints in the principle-agent relationship, such as soft-sourcing. Soft-sourcing is when a customers employees are given preferential treatment when applying for their job after it has been outsourced (NSA, 1999b). In fact, this provision can even be included as a clause to an A-76 study or an outsourcing contract. While such a clause might help minimize any personal impact caused by outsourcing, it can counteract the desired effect of introducing new technical talent into the organization.

Additionally, any above average talent hired by a vendor many times will not even be assigned to their original jobs. Instead, the vendor will use them to win new contracts and accounts (Lacity, 1994).

Also, many new companies that compete for IT contracts do not have a large pool of talent. What qualified employees they might have only posses a small amount of experience solving the specific type of problems their previous customers had. Also, how can a customer be certain that a vendor will continue to update and keep their staff current? Many times, outsourcing firms will win a contract to manage a new technology but eventually even this technology will become obsolete. Customers continually want the latest technology to increase productivity, however, if the vendor does not upgrade their staff, it will be difficult for them to respond (Earl, 1996).

Potential problems with accessing new technologies. As systems become more advanced, they also become more complex and interdependent. This makes it increasing difficult to isolate problems when they arise. It is sometimes difficult to determine if a problem is caused by a terminal, network, application, or communication system. If outsourcing is used, vendor and customer interfaces only serve to complicate this problem (Earl, 1996).

Also, some argue that the newer a technology is, the less it should be outsourced. They believe a firm will face additional risk when they outsource immature technologies because it is more difficult to adequately capture contract requirements due to a lack of understanding surrounding it (Lacity, 1996). These individuals would therefore argue that mature technologies are easier to outsource since the firm has usually overcome the initial

learning curve and reached a point were it now understands the technology and is able to adequately define requirements.

Inadequate recovery and back-up capability. Several computer dependent organizations have gone into liquidation following system disasters (Fink, 1994). Consequently, it is important that organizations ensure they are protected from such blows or can recover from them should they occur. If a firm's management does not feel that a vendor could adequately guarantee the protection of its information, it might be less likely to outsource.

Excess integration and interoperability problems. When considering whether to outsource IT, integration issues can also become a major concern (Lacity, 1996). When the required amount of integration between an outsourced activity and other business processes or technical systems is high, the risks associated with outsourcing increase. If two different contractors control separate but interrelated activities, finger pointing can arise between them when the entire system is not working correctly. This leaves the organization caught in the middle with little information as to where the real problem lies.

Some suggest that this problem is even more of an issue in the government due to its passion with interoperability. Some federal CIO's have even "acknowledged that their number one priority is interoperability among the division in the enterprise" (Jones, 1999).

Political Determinants

As one might expect the political aspects of outsourcing might be most powerful within a public sector firm. The political dimension involves "the behavior of the various parties involved in the decision-making process and how they shape senior management's

perception about IT and its value" (Lacity, 1994). For the purposes of this research these determinants focus on the satisfaction of personal needs. As seen in Figure 5, there are several potential political determinants including: proving efficiency, justifying new resources, exposing exaggerated claims, eliminating a troublesome function, breaking the so-called glass ceiling and lack of trust.

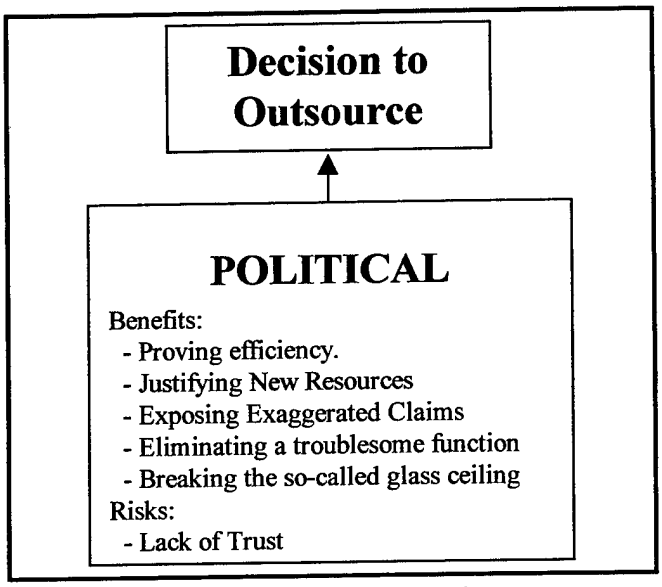

Figure 5. Political Determinants

Benefits: Political

Proving efficiency. Many times organizations will account for IT expenditures simply as an overhead expense and evaluate them based on cost efficiency. When this is done however, it is difficult to develop any concrete measures of efficiency. Therefore, some IT managers will support obtaining outsourcing proposals in the hopes that it will prove the efficiency of the internal IT departments and justify its continued existence. It has been shown that after an outsourcing evaluation was conducted IT managers have successful convinced senior managers and users that their internal IT departments could

perform the same services an outside vendor could perform for the same amount or less (Hirschheim, 2000).

A potential drawback to this strategy is the chance senior managers might view the results with skepticism. This could occur if they believe that IT managers biased the results by selectively picking only their most efficient and best managed projects for the outsourcing evaluation. If they did not include an accurate representation of their IT department in the request for proposal, the results would not be a true reflection of the costs associated with an outsourcing solution.

Justifying new resources. Since IT is many times looked upon only as a cost center, senior managers will proceed warily when asked to dedicate additional resources to it (Venkatraman, 1997). Therefore, IT managers believe that if they can show outsourcing is not a more cost effective and efficient method to obtain new services, senior leaders will be more inclined to authorize additional funding for internal projects. (Lacity, 1994)

However, this request may also be considered biased if senior management does not view the justifications as credible. Some believe that the best way to handle a credibility issue within an IT department is to involve senior management, and outside independent experts, in the outsourcing evaluation. (Lacity, 1994)

Exposing exaggerated claims. With the explosion in IT outsourcing, many senior managers are anxious to ensure that their firms are taking full advantage of this new method of IT governance (Loh, 1992a). However, IT managers sometimes fear this zeal will seduce their leaders into an outsourcing relationship prematurely. Consequently, some

IT mangers will commission outsourcing evaluations to expose any exaggerated claims an outside firm has made (Lacity, 1994).

However, if senior management does not feel the IT department is capable of making an unbiased, rational outsourcing decision, they may commission their own outsourcing evaluation without the involvement of the IT department. Therefore, if senior managers believe that IT managers are stalling on an outsourcing decision by constantly researching the problem, they may move ahead with the decision independent of the IT group. (Lacity, 1994)

Eliminating a troublesome function. Due to the seemingly constant stream of available upgrades for information systems, its growing increasingly difficult for a firm's IT and senior mangers to understand how newer systems can be leveraged to make the organization run more efficiently. In addition, IT mangers and staff members usually receive few praises but much abuse. When the systems are working correctly few people even notice the actions of these individuals. However, when something goes wrong, everyone immediately starts to curse and disparage them. This has caused several individuals to re-evaluate whether the constant flow of problems associated with the work is truly worth any compensation (Lacity, 1994).

Breaking the so-called glass ceiling. Many IT directors see themselves as not being fully appreciated and valued by senior management. Few IT managers break into the upper echelons of management within a firm (Lacity, 1994). Therefore, they might turn to outsourcing as a way to appear more corporate and creditable in the hopes of enhancing

their own career. Research has shown that several IT managers have initiated outsourcing evaluations to help alleviate any misconceptions that they are myopic (Lacity, 1994).

Risks: Political

Lack of trust between government and contractors. It is important that in any contracting action, trust exists between the principal and agent. Trust can be defined as "a confidence that the behavior of another will conform to one's expectations and in the goodwill of another" (Hart, 1997:24). When IT work is performed in-house the participants typically know one another and therefore have a certain degree of trust in each other (Sabherwal, 1999). In this situation, unexpected problems associated with the work are easier to deal with. However, due to project center elements, structural mechanisms and unique reporting arrangements, trust is sometimes more difficult to obtain in IT outsourcing arrangements. Trust stems from a psychological contract between the principal and agent. This contract consists of unwritten expectations held by both parties regarding each other's prerogatives and obligations. When trust is present a "virtuous cycle" (Sabherwal, 1999: 83) is present between the psychological contract, the written contract and performance. This leads to a high quality product in a timely manner. If trust is not present a "vicious cycle" (Sabherwal, 1999: 83) can exist between the same three elements and lead to a poor quality product and multiple delays.

Security Determinants

Security is a factor that some might think could be placed in the business, technical, or even political category. However, due to several unique features associated with the subject, it was thought that making it a separate category was warranted. Additionally,

security, and security implications, were a common theme and source of uncertainty for individuals interviewed during the development of the conceptual model.

Security issues are common to all IT contracts; however, in outsourcing agreements they hold special meaning. (Rebeiro, 1996). As an example, some have proposed that the security framework used when IT work is outsourced is different than if the work is kept in-house. The key reasons given for this are a shift in emphasis from physical protection to recovery, changes in the roles of application controls, and the need to place a greater reliance on general controls (Fink, 1994). Also, others feel that a different organizational security structure is needed when IT work is outsourced (Sherwood, 1997). It is important that both the customer and vendor create appropriate jobs to deal with potential security issues. It is equally important to formalize communication channels between the parties. Communication is repeatedly listed as the principal factor necessary to create and maintain a healthy security IT outsourcing relationship (Caldwell, 1997; Sherwood, 1997; Ryan, 1999).

Another feature unique to the security of DoD systems is the critical nature and special importance of the national security data contained in them. Little doubt exists that the DoD has special security requirements. These requirements are to maintain national security and ensure mission accomplishment (DoAF, 1996; DoD, 1996). Consequently, any information contained in a classified IT system must be controlled as stringently as if it were in hardcopy form. In fact, more precautions must sometimes be taken when dealing with classified IT systems due to the inherent vulnerabilities of a computer system that do not exist for hardcopy documents such as emanations and mass storage capability

(Denning, 1999). Therefore, it is no surprise that government agencies invest more in security than public firms (Jones, 1999).

However, several commercial industries such as banking, telecommunications, and online commerce also have very high security requirements. It then becomes important to determine how additionally significant security is to DoD outsourcing decisions? As has been asked before, "is the need for enhanced security for military operations a factor to maintain a *blue suit* or in-house IT capability and are military security requirements greater than those in the commercial sector?" (McTernan, 1997).

Due to the nature of security, it is something that can only be diminished or lost. The greatest amount is achieved when only one person knows the information and does not tell anyone else. In fact, in this situation, very little if any security is required. However, as the number of people with access to the information grows, so does the need for security. As the amount of required security increases, primary work process tend to slow (Gips, 2000). Security checks, special procedures, and locked rooms all impede work requirements. Additionally, when extra processes are added to any situation, the chances of something going wrong increase. In the military, when something goes wrong with security, the work is usually halted. Consequently, it is difficult to conceive of a situation where security is a benefit; it will almost always be a risk.

As can be seen in Figure 6, the three proposed security risks are, controlling access to the information, overall vendor security procedures, and release of competitive advantage.

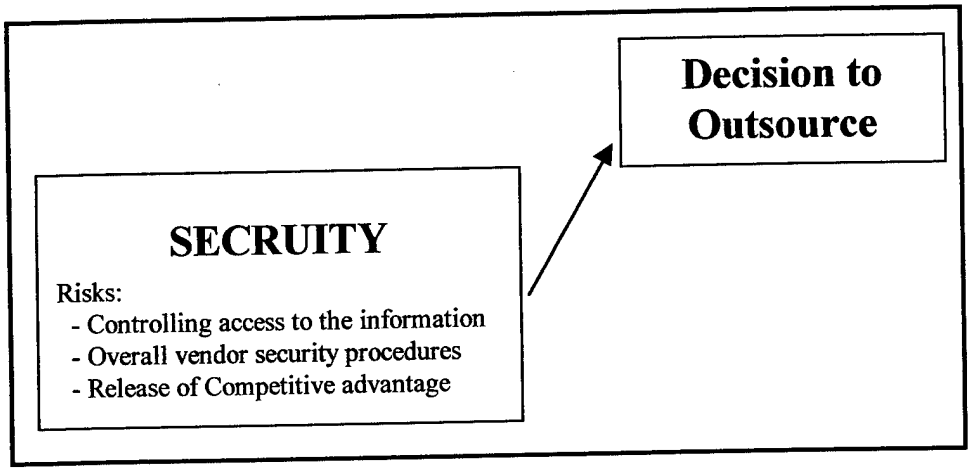

Figure 6. Security Determinants

Risks: Security

Controlling access to the information. One type of security risk concerns a vendor's employees and the access they have to information. Typically, computer programmers and maintenance personnel from an outsourcing firm require detailed knowledge of a customers IT infrastructure to do their job. However, by granting this level of access, a fair amount of network control is being given to them (Talley, 1998). Even when something as innocuous as secretarial and administrative functions are outsourced, the data housed in a customers system are put at risk. This risk is even more pronounced when external security specialists are used to inspect and audit a customers system.

Given the rate of change in IT along with the size and complexity of many corporate systems, its difficult for internal computer security personnel to ensure that every network is secure. Consequently, many large companies are turning to external security personnel to diagnose and test their systems (Caton, 1999; Talley, 1998). Yet these consultants typically need full and complete access to an organizations system when conducting an audit. This helps ensure that the results are as comprehensive as possible.

However, since an external firm will be analyzing the vulnerabilities of a customers network, they could potentially use that information against them. If the DoD were the customer, it would be very easy for the consultant to sell any information it collected to a potential adversary (Martinsons, 1993; Quinn, 1999). Additionally, since background checks in the private sector are sometimes not as thorough as they could be, foreign agents might be able to infiltrate a critical DoD IT system simply by posing as an employee of the consulting firm.

Another issue relating to network access revolves around *double sourcing*. This is the practice of a prime contractor using subcontractors to fulfill customer requirements (Caldwell, 1997). Some experts believe that an average of 36% of all work performed on IT contracts is done using double sourcing (Caldwell, 1997). However, since most subcontractors are typically not as large as prime contractors, it is harder for them to perform in depth background checks on each employee. Consequently, someone who might not pass the original customers security check could still end up working on their IT systems without them ever knowing. One potential solution to this problem is to provide the prime contractor with a list of pre-approved vendors. In the DoD, this practice is known as using directed subcontractors. By using directed subcontractors, the DoD might decrease its exposure to any potential security problems caused by an unfamiliar firm. The problem with this arrangement is that the DoD assumes most risks associated with that subcontractor. Therefore, if the subcontractor defaults for any reason, the Government does not have recourse back to the prime contractor. Consequently, any cost or schedule impacts caused by such problems would be the sole burden of the DoD.

Overall vendor security procedures. Another risk is a potentially weak vendor security plan. How vendors handle customer data on their own systems, correspond with each other via e-mail, and simply dispose of a customers information after it is no longer needed, are questions that might need to be considered by a firm before it decides to contract with a vendor (Ryan, 1999). In addition, vendors typically supply services to several companies including competitors and adversaries. Given the critical nature of the national security information contained in DoD IT systems, the benefits of outsourcing may not outweigh the risks.

Release of competitive advantage. In today's military, technology plays a key role. Our forces can dominate the battlespace because of their access to the latest technology and equipment. However, this advantage assumes our systems are more advanced than the enemy's. To ensure the United States preserves this advantage, the DoD funds research and development projects so that its future systems will always be more current and capable than those of its adversaries. Currently, the military is not only using IT to transmit information, but also to deny, disrupt, disable or even destroy an enemy's infrastructure (CJCS, 1996). In a similar manner, corporations are starting to understand the benefit of using IT systems to gain competitive advantages. No longer are they viewed as cost centers. Today, IT is being looked at as a profit maker (Venkatraman, 1997).

However, in both of these situations, if outsourcing were used, there is the potential that the technical data associated with these systems could become compromised. If this occurred, an adversary might be able to determine how to defeat such a system, or build a similar system. This would negate any advantage (Martinsons, 1993). The potential

information released in this determinant differs from the information that might be compromised in the *controlling access to the information* determinant since that factor considers only the information contained in the system, whereas this determinant focuses on the release of system design information. Typically, even security specialists will not have access to this type of information, only designers or specialized maintenance personnel.

Environmental Determinants

Like security, environmental factors could be considered part of another categories. However, none of the previously mentioned factors captures the multifaceted nature of environmental determinants. As an example, diffusion theory has been advanced as a mechanism for the increased use of IT outsourcing. This theory has business aspects attached to it such as maintaining efficiency and effectiveness as well as political overtones such as making a business choice based on the behavior of others.

Since there is a reduced emphasis placed on producing a profit within a public sector organization (Hancox, 1999) many of the reasons why private sector firms outsource IT are minimized (Smith, 1999; Loh, 1992a). Therefore, given the political nature of public sector firms, environmental factors may be even more important than in the private sector. As seen in Figure 7, examples include length of service, imitative behavior among firms, and internal resistance.

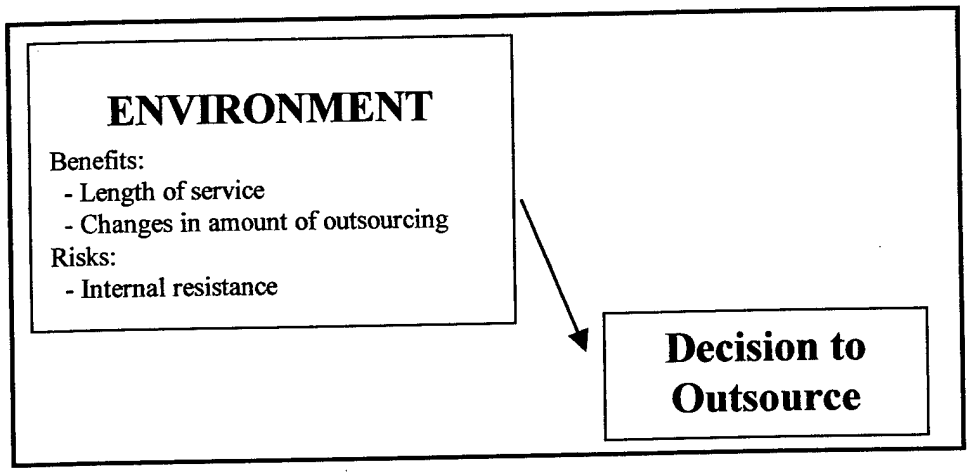

Figure 7. Environment Determinants

Benefits: Enviornmental

Length of service remaining for outsource decision makers. Using agency theory it's been shown that the amount of time IT executives feel they will be in a particular position or role can potentially effect the outcome of an outsourcing decision (Loh, 1993). The time horizon is "a crucial dimension affecting managerial decision making with respect to IT projects" (Loh, 1993:223).

Therefore, the amount of outsourcing in DoD organizations might be dependent on the fact that Military members fill a particular position only temporarily. As programs continue to grow in complexity, scope, and time required for completion, it is inevitable that individuals associated with such programs begin to realize that their position will have a successor. This might help an incumbent feel less responsible for their actions and any potential derogatory outcomes. It is therefore conceivable that if they feel they will be changing jobs in the near future, they will be more likely to outsource. On the other hand, it is equally possible that the longer they know they will be in a position the more likely they will outsource. This could be due in part to their desire to rid themselves of what they

might consider the small repetitive problems IT operations present and focus their effort on more strategic related issues.

Changes in the amount of IT outsourcing within the DoD. In 1989 Kodak outsourced most of its IT infrastructure requirements to IBM. When this occurred, some felt a great deal of interest was generated in the business community regarding the potential competitive advantage that such a move would create (Loh, 1992b).

This advantage stems from the fact that IT outsourcing can be considered a fundamental shift in the business strategy (Henderson, 1992). Specifically it represents a significant shift in the IT strategy and mode of governance. IT governance includes the choices of structural mechanism (e.g., joint ventures long-term contracts, equity partnerships, joint R&D) a firm makes to obtain the required IT capabilities, involving issues such as the deployment of proprietary versus common networks as well as strategic choices pertaining to development of partnerships to exploit IT capabilities and services. In addition, it radically changes the internal processes and routines of the user organization. As such it can be considered as an administrative innovation. Once a firm adopts an innovation, it is diffused or communicated through certain channels over time among the members of the firms social system.

Studies have shown that when Kodak, a respected firm within a social system, outsourced its IT systems, other firms in the system followed (Loh, 1992b). This has been labeled the "Kodak effect." This might explain why some firms continue to outsource even after they have been warned against it. Evidence supports that this diffusion of innovation

among government agencies might be one of the strongest determinants behind IT outsourcing (Kim, 1998).

However, others feel that the evidence does not support the "Kodak effect" (Hu, 1997). They feel the parameters used to prove the existence of the effect where not properly estimated or implemented. However, like the original study, they also claim that the diffusion of IT outsourcing is not a random process. Yet, they feel a mixed influence model rather than the internal-influence model used in the first study best describes the process.

Risks: Environmental

Internal resistance. Concern over displaced IT staff members can effect a firms decision to outsource its IT (Lacity, 1995). Many times a backlash of fear among IT staff members is generated when outsourcing is considered (Quinn, 1999). When IT employees hear their jobs are in jeopardy of being outsourced they may feel demoralized and decide to leave a company (Antonucci, 1998). Even if they stay and are not laid-off, they may feel that outsourcing has decreased the visibility of their jobs and decide to quit (Martinsons, 1993). It could be very important for a firm to consider these thoughts before they outsource. Such a decision may cause serious, unwanted repercussions.

This conceptual model represents an attempt to capture all the reasons why a DoD or IC agency might outsource their IT. It was developed using interviews and an extensive literature search. The next chapter will focus on the process that was used to validate it and convert it into more of an analytic form.

III. Methodology

Introduction

As shown, there are a number of potential determinants for IT outsourcing in the DoD, which help form a conceptual model. The goal in this stage of the research was to inductively determine, using quantitative measures, the validity of this conceptual model by attempting to form a consensus among experts in several Government agencies regarding the validity of the determinates in each factor. The result was an analytic model that can be analyzed used in further research.

Development of the Conceptual Model

Development of the conceptual model began by interviewing several individuals working in IT outsourcing within the DoD. These interviews lead to a number of possible determinants, which were then used to initially guide a literature search. This search was then expanded to include as many aspects of IT outsourcing as possible in the hopes of providing additional insight into what IT outsourcing determinants are present in the DoD. Since most of the literature pertained to private sector firms, it was obvious that some determinants, such as debt and equity financing (Loh, 1992a), had no place in an outsourcing theory centered on public organizations. Therefore, such determinants were ultimately dropped from further consideration.

While most of the literature used to develop the conceptual model was based on validated findings, some was notional information based on the experiences of different authors. Consequently, the final conceptual model could be considered as a combination of expert and academic opinion along with grounded theories. Since anecdotal evidence

comprised part of the theory, the entire model needed to be validated. Once this was completed it could be considered to be in analytic form.

The Delphi Technique

The Delphi technique was chosen to validate the conceptual model since it is well suited to developing a consensus of expert opinion. The basic premise behind this method is that two (or many) minds are better than one. It was originally developed by the RAND Corporation in the 1960's to help decision makers formulate broad or long-range policy. It is a formalized process to determine the best answer or solution to a problem whenever insufficient or no applicable data exists, the required data is too expensive to obtain and analyze, or the problem variables and their interaction are not clearly known. Consequently, it is intended to work in the regime of opinion between mere speculation and knowledge. It should be noted that while the traditional purpose of the Delphi method is to make predictions about the future, this study uses it to define critical issues in information technology. However, its use for this purpose is well supported (Dickson, 1984; Brancheau, 1987; Niederman, 1991; Brancheau, 1996; Westbrook, 1997).

Basically, the Delphi approach "solicits input from a panel of experts who contribute individually" (Griffin, 1999:280). It is based on an iterative set of questionnaires that attempt to capture the thoughts and feelings of a group on a particular subject. At the end of each round, input obtained from the experts is averaged and the results broadcast back to the group. The same questions are then asked again, the results analyzed, and the conclusions modified. This cycle of questions, feedback, questions continue until the prediction stabilizes. The final conclusion is considered to be the decision of the experts. (Clayton, 1997)

The Delphi method can be considered a complement to the panel approach. However, unlike the panel, it provides more information regarding "uncertainties or disagreements about the subject and quantitatively evaluates the degree of uncertainty which exists within a large group of experts." (Goldstein, 1971:225).

Advantages of Delphi

Anonymity and controlled feedback.

A notable characteristic of the Delphi method is that it masks the identities of the participants, which helps lower the amount of group discussion (Tersine, 1976). This is desirable since it has been shown that such discussion tends to produce less reliable results than when contact between participants is controlled (Dalkey, 1969).

Less Confrontational.

Since the identities of the participants are not revealed, the input provided by a specific group member is not directly linked to them. All feedback given is an aggregate of member responses. This allows other group members to respond to comments without regard to their personal feelings about the originator. In addition, since interaction is anonymous, members can feel free to change their minds without feeling self-conscious. Therefore, many of the usual problems associated with group dynamics are eliminated (Martino, 1978). These benefits are similar to those offered by computerized group support systems (Laudon, 1999)

Fewer constraints.

Many times, due to funding or scheduling constraints, the members of a group cannot meet. The Delphi technique allows individuals to interact with each other who cannot be brought together for a face-to-face discussion (Linstone, 1978).

Statistical Response.

It allows a qualitative measurement to be made of an inherently qualitative response. The Delphi attempts to measure the opinions of others by attaching a numerical result to the response. These numbers help guide the study and show when consensus has been reached (Martino, 1978).

Multiple Uses.

The Delphi method is well suited for multiple applications. It has been used in both the commercial and public sector for numerous reasons including, "exposing priorities of personal values and social goals, explaining the pros and cons associated with potential policy options, evaluating budget allocation, examining the significance of historical events, and distinguishing or clarifying perceived and real human motivations" (Linstone, 1978).

Weaknesses of Delphi

Selection of experts.

Each member selected to participate in the Delphi must be qualified and motivated. It is critical to the process that the responses generated come from knowledgeable individuals. These individuals must also be committed to the study until the end. Due to the iterative nature of Delphi, it can last for months, therefore, it is critical that all individuals are available for the entire duration. This became a large problem during this study as will be discussed later.

Discounting the future.

Many times a discount rate is applied to distant future forecasts. This occurs since individuals perceive potential near-term crisis situations as more significant than those several years away. However, this rate is different for each individual and therefore, may skew the final results (Linstone, 1978). However, it was thought that this would not be a

problem for this study since the data being collected revolved around near future or even current events facing the experts. Consequently, there was less potential for any discount rate to be applied to the responses.

Urge to simplify.

When considering the future, people tend to focus on a small number of potential innovations and overlay them onto a familiar structure context from the past or present. This leads to a visualized future situation that does not consider the pervasive influence of change. Therefore, "intuitive procedures such as Delphi depend heavily on subjective probability assessments" (Linstone, 1978). This subjective element can lead to experts confusing desirability and familiarity with probability, which translates into them selecting options with recognizable elements even though there is very little evidence to support such a forecast (Tversky, 1974).

Illusory expertise.

This problem occurs when the selected experts are unable to escape from their current thinking paradigm. Any forecast they provide might only be a view of incremental improvements made in their area of expertise and not potentially dramatic or fundamental improvements in the overall process (Linstone, 1978). This problem can be intensified through the use of inbreeding, which occurs when a panel member is asked to suggest the names of other possible participants. For this study, experts were selected from a variety of sources. Therefore, it was hoped that this effect was minimized.

Questionnaire Construction

Construction problems are present in almost any data collection process based on questionnaires (Dooley, 1995). One of these problems is format bias, which is the assumption that everyone completing the survey has a certain cultural background.

Therefore, those with significantly different backgrounds find it more difficult to respond. However, for this study it was thought that due to the homogeneity of the selected experts and the narrowly defined population, this bias was not a significant factor.

Item construction is another problem that can be introduced when questions are unclear or badly worded, when compound items are used or when the options of a closed-ended question become confusing. This problem was addressed by having research committee members review and comment on the survey. In addition, a questionnaire examination was performed to help ensure that all questions were properly worded, easy to understand, and had only one possible interpretation.

Order effects can also taint the result of a questionnaire. These are introduced when earlier items bias the responses to later ones. One method to help combat this problem, is to randomize the order of the questions. However, "this does not guarantee true responses to the items in their different orders" (Dooley, 1995). Therefore, this study applied the results of previous research, which shows it is best to start with more general, less threatening questions that are more interesting to the respondents and progress slowly into the more specific areas. This ordering was based on the author's subjective opinion of each question. Care was taken to ensure that questions, which tested the same factor, were not located next to each other. This was accomplished by coding each question based on the item it tested, listing the questions in the order presented and verifying that similarly coded questions were not adjacent to each other.

Guiding the results.

This problem is encountered when the responses to the previous round are altered by the administrators in the hope of herding the next round in a desired direction. This

problem was minimized by the active participation of committee members in selecting the questions for each successive round. It can also be said that the authors had no stake in the results of the study.

Selection of Organziations

For this study, the population of interest was the Department of Defense, Department of the Air Force and Department of Defense intelligence community agencies. For the purpose of this paper the term "agency" will be used as a global reference to each entity.

A sampling frame was generated from this population using a two-stage approach. First, participation was limited to agencies within 40 miles of the metropolitan Washington D.C. area. This population reduction helped keep the data collection convenient and minimized travel costs. The next sample was drawn by personally contacting the office of the CIO, or other IT outsourcing decision authority, for each participating agency. A brief explanation of the study and its purpose was then given followed by a request to participate. Since the concentration of Government agencies within the selected locales is so high, there was little concern that the desired number of participating agencies would not be realized.

As with other Delphi studies, the desired number of participating agencies for this study was seven for two reasons (Linstone, 1978). First, as shown in Figure 8, groups smaller than this exhibit quickly decreasing exponential effects on average group error rate, but higher values show only a shallow monotonic like decrease.

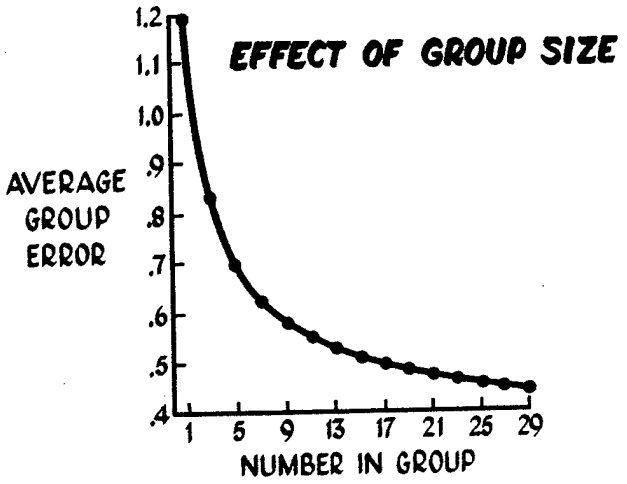

Figure 8. Group Size vs. Error Rate (Dalkey, 1969:11)

Second, as seen in Figure 8, any group of seven or greater has a sufficiently high reliability measure. Reliability refers to the degree to which observed scores are free from errors of measurement (Dooley, 1999). It can be considered how consistent the scores on parallel forms of a test are or how different items in an instrument test the same measure. "For example, two sets of measurements on the same variable for the same individual may not have exactly the same value; however, repeated measurements of a series of individuals will show some consistency" (Courtois, 1994,37). Measurement theory suggests that the higher number of items, the more reliable the measure (Dooley, 1999). However, this is true only if the items have consistency and high inter-item reliability. For the purpose of a Delphi study, reliability is the likelihood that two different groups, comprised of similarly qualified participants, will arrive at the same conclusion. Figure 9, was developed by randomly selecting pairs of variously sized groups and "correlating the median responses of the pairs on twenty questions" (Dalkey, 1969).

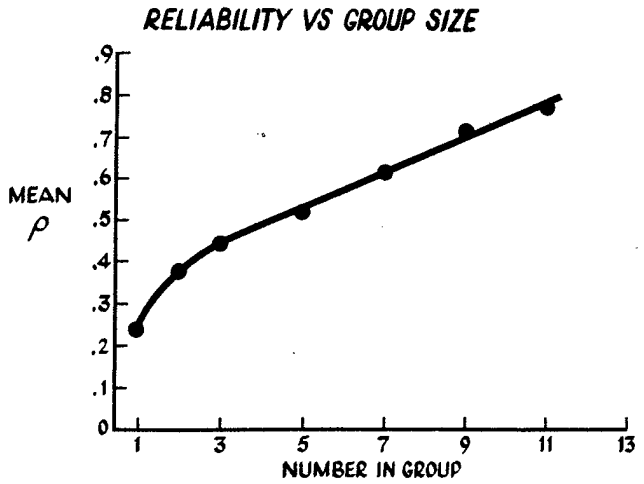

Figure 9. Reliability vs. Group Size (Dalkey, 1969:13)

Selection of Experts

The selection of the experts in a Delphi study is critical and varies among application. It is especially important when considering IT outsourcing issues since research has shown that different groups within an organization can view IT outsourcing differently (Gefen, 1998). As listed above, these experts were selected using a stratification approach. At the beginning of the study, ten members had agreed to participate. Table 2 below lists them along with each round they contributed to.

Table 2. Study Participants

Position	Agency	Expert #	Participated in:		
			Round #1	Round #2	Round #3
CIO	IC agency #1	3	X		
CIO	IC agency #2	4	X	X	X
CIO	Federally Funded Research and Development Center (FFRDC)	9	X	X	X
Deputy CIO	IC agency #3	7	X	X	X
Deputy CIO	IC agency #4	1	X		
Deputy CIO	IC agency #5	2	X	X	X
Deputy CIO	Office of the Secretary of the Air Force	5	X		
CIO Advisor	FFRDC / IC agency #1	10	X	X	X
Deputy director of Communications Acquisition	IC agency #1	8	X	X	X
Operations Director	Office of the Secretary of Defense	6	X	X	X

As can be seen, each participant was assigned a number. This helped keep the responses confidential. To re-enforce the strategic flavor of this study, the two FFRDC participants were at the chief scientist and vice president level, two participants were general management (GM)-15's, one was a an Air Force Lieutenant Colonel, two were senior executive service/senior intelligence service (SES/SIS)-3's, two were SES/SIS-4's and one was an SES/SIS-5.

It is conceivable that by agreeing to participate in this study a sampling bias could have been introduced. This would occur if one potential expert accepted or declined to participate for reasons not applicable to other members. Examples of these reasons

include over tasking, prior commitments, and disinterest in the study. However, it was believed that these reasons are the same for each agency and therefore, uniform throughout the sampling frame. Consequently, the chances of an agency not participating can be considered random.

The optimum mix of experts included the proper number of stakeholders, experts and facilitators. Stakeholders are those who are directly affected by the decisions, experts are those who have an applicable specialty or relevant experience, and facilitators are those who have skills in clarifying, organizing, and synthesizing. While there are no heuristics for determining the proper ratio of these individuals in a Delphi group, each application can help drive the proper balance. For this study the "options and interests are clear but acceptance of direction and action is fractionated." (Scheele, 1975,68). Research has shown that in this situation it is not inappropriate for stakeholders to dominate a group (Scheele, 1975). For this research, stakeholders are usually the CIO of an agency. However, since expert and facilitator opinion was still welcomed, if a CIO wished to send a technical representative in their stead, it was not declined.

Development of the Data Gathering Instrument

Each instrument was a questionnaire developed to determine (in order of priority) 1) if the proposed theory was accurate; 2) if it was not, where; 3) offer a refined version of the theory. Each questionnaire had two portions. The first was a set of closed-ended descriptive and prescriptive questions that satisfied the first and second objectives. The descriptive questions used a five-point Likert scale ranging from *strongly disagree* to *strongly agree* for the question; amount of consideration given. The prescriptive questions used the same scale for the question; level of agreement. All the questions were

structured to mirror the proposed relationship that exists between the determinants they were testing for and the dependent variable; amount of outsourcing

The second portion helped satisfy the third objective of the questionnaire by providing open-ended questions that allowed the experts to propose different ideas or explain any anomalous responses.

Round One Questionnaire

The first survey helped form a baseline consensus of the working theory. As shown in Appendix A, the closed-ended questions helped to quantitatively establish the acceptance of the theory, while the open-ended questions helped guide the development of new questions for the second round. If for instance, a determinant was omitted in the first round instrument, but listed as an important factor by one of the experts, it was included in the next round.

Results and Formulation of the Second Questionnaire

The second survey was based on the responses obtained from the first. This progression, as defined by Delphi procedures, helped further define what the strengths and weakness of the theory were and proposed new ideas based on the responses to the open-ended questions.

The second questionnaire was exactly the same as the first except for the inclusion of new factors suggested by the participants and the removal of the lower scoring items. Determining which factors had the lowest score was done by averaging the answers for each item and establishing a threshold value. In this case, the value selected was 3.00. While the selection of this number was somewhat arbitrary, it is consistent with pervious

studies (Scheffler, 1999). Additionally, it allowed for a convenient reduction of approximately 50% in the total number of questions.

It should be noted that all calculations were performed at an item level. Therefore, the removal of any questions was conducted independent of the factors they were associated with. Consequently, it was possible for one item from a factor to remain in subsequent rounds, even though all other questions associated with that category might have been deleted. Of course if this occurred, it might suggest that such factors were less important than factors that retained most of their items through the rounds. This process was used to prevent the deletion of an important category or item simply because they may have been incorrectly associated with each other.

Round Two Questionnaire

During the second round, each participant was given statistical feedback based on the previous survey. As shown in Appendix B, the mean of each remaining closed-ended question was provided as well as the respondents previous score.

Also each member that provided a response greater than 1.25 standard deviation away from the group average was asked to comment on it. It was hoped that this would help determine if these answers were based on information the entire group should be aware of, or if it was an issue applicable only to a specific agency. Any information this process uncovered that was deemed appropriate to bring to the attention of the entire group, was included in the third questionnaire

Round Three Questionnaire

Research and empiricism has show that after three iterations any additional consensus obtained within an expert group will be negligible (Dickson, 1984). Therefore,

it was expected that this round would capture the final analytical theory. However, since additional consensus is negligible after three rounds, it is difficult to determine a priori when consensus will be reached.

For this reason, some have proposed that consensus in a Delphi should not necessarily be measured by the percentage of votes that fall within a prescribed range, but rather the stability of the respondents' vote distribution curve over successive rounds (Scheibe, 1975). A marginal change of less than 15 percent offers a useful definition of stability. It has been noted that if a round provides less than a 15 percent change from the preceding round, the exercise should be stopped (Scheibe, 1975).

For this study, consensus will be measured by the standard deviation and interquartile range (IQR) of the responses. These statistics will be plotted to show the trend towards perfect consensus (standard deviation = 0)

Testing of the Data collection Instrument

Faculty Review

Each questionnaire was assessed by the academic advisor of this research to determine if the item's were clear and focused and whether the instrument possessed content validity. This individual was familiar with the domain and able to help edit the questions to help avoid misinterpretations by the respondents.

Questionnaire Examination

To help ensure that the instrument would function as intended, it was the subject of a comprehensive review. The main purpose of this assessment was to determine if the instrument exhibited proper item construction. The questions and instructions were inspected for typographical errors, readability, multiple interpretations, order effect, and

whether they were understandable. The participants for this review included members of the March 2001 graduate information management (GIR)/graduate information systems (GIS) class at the Air Force Institute of Technology (AFIT).

The review used a two-phased approach. During the first phase, two students were asked to examine the instrument. Once their comments were considered and included, the procedure was repeated with two different students.

Distribution of Data Gathering Instrument

To help minimize inadvertent transfer of information outside of the expert group (Dalkey, 1969) the first questionnaire was hand delivered to each participant along with a cover letter and specific instructions on how to complete it. These items are included in Appendix A. The last two surveys were delivered via electronic facsimile transmission (fax) or electronic message (e-mail) with updated cover letters and instructions. These are shown in Appendix B and C respectively. It was requested that all completed questionnaires either be faxed to the study's dedicated fax number, mailed, or e-mailed back.

Data Processing

Data processing was performed using Microsoft Excel. Immediately after a survey was returned, the results were entered into an Excel spreadsheet. One main area of analysis was the summation of the Likert data into mean, standard deviation and IQR data.

IV. Data Descriptions and Analysis

Introduction

The objective of this chapter is to provide the results of the Delphi study. An overview of each round will be presented along with examples of the data. A complete listing of all the raw data for each of the three rounds can be found in Appendix D, E, and F.

Round One

The first objective for the round one was to roughly determine which of the proposed determinants from the literature search were most applicable. The second was to use open-ended questions to obtain any additional items from the experts, not specified in the literature. Typically, in the first round of a Delphi experiment the participants will list items that they feel are most important to the research questions. However, since round one started with the list generated by the literature search, open-ended questions were included in the survey to allow the respondents to include any other items they thought were important. The scale for this, and all subsequent rounds, was a five-point Likert scale.

Results

After a participant submitted a completed questionnaire, the responses were entered into a Microsoft Excel spreadsheet. An average and standard deviation were then calculated for each item. Table 3 below shows an example of the spreadsheet used for this. Here, the first four responses from experts #1 and #2 are displayed along with the resulting average and standard deviation for those items. The naming convention used to identify study questions in the surveys, is table number followed by question number. As

an example, T1-01 is table one, question one and T2-01 is table two, question one. However, since there are a different number of questions in each round, most items will have a different number assigned to them for each. Therefore, for ease of reading, all questions have been re-coded to a universal numbering scheme for presentation in the text. However, it should be noted that the survey's themselves will retain their original number convention. For clarification purposes, Appendix G contains an inter-round question numbering map that matches any question in the surveys to its universal code.

Table 3. Example of Raw Data

Question #	Expert #1	Expert #2		Avg	Std Dev
1	4	3		3.8	1.135
2	5	2		3.8	1.398
3	5	5	...	4.1	1.197
4	4	3		3.667	0.866
...	...	...		...	...

Following the mean and standard deviation calculations, the data were reordered based on the sub-factors to make the results easier to work with. To accomplish this, each sub-factor was assigned an alphanumeric designator based on its associated factor. For example, the first cost sub-factor, *cost reduction*, was given the designator C1, the second, *improved cost controls*, was given C2, and so on. The data were then sorted based on these designators. An example for expert #1 and #2 is listed in Table 4.

Table 4. Example of Data Sorted Based on Item Type

Question #	Item Type	Expert #1	Expert #2	...	Avg	Std Dev
29	T6	3	1		2.111	0.928
44	T6	4	1		2.889	1.364
28	T7	2	4	...	3.100	1.197
35	T7	4	3		3.889	1.167
...	...	...	...		...	...

During the analysis it was determined that questions associated with the business factors *inability to write an adequate service level agreement* and *inability to manage a contract* had been incorrectly phrased. Both of these factors are a risk. However, the questions were worded as if they were benefits. The average responses to these questions were high, consequently they should have been retained. Yet, when it is considered that they should have been phrased to elicit the opposite response, an argument is formed that the responses should have been low, which would have caused their average scores to fall below the threshold value and result in the item being removed from future rounds. To be conservative, all questions associated with these two factors were re-worded in a negative manner to reflect the risk factor they were testing for. These questions were then included in the second questionnaire.

A complete listing of the remaining data ranked by mean is presented in Table 5. Figure 10 is a plot of each of the mean scores based on the rank of the question. As shown by the r-squared value of 0.97, the continuum of these values is very linear.

Table 5. First Round Data Sorted Based on Mean

Question #	Avg	Item Type	Questions
26	4.500	B1	Productivity improvements
23	4.300	B1	Improve quantity or quality of agency outputs
21	4.200	B1	Reassign current internal IT resources to higher priority activities
81	4.200	E2	I believe the more other government agencies outsource their IT, the more mine might
40	4.111	T2	Locate competent IT professionals
03	4.100	T1	Improve technical services (e.g. dissatisfaction with current, in-house IT support)
14	4.000	F2	Improve cost controls (e.g. develop standardized processes for all agency members to follow)
43	4.000	S2	Security concerns over how vendors handle agency data on their own systems
07	4.000	T1	Increase customer satisfaction of IT related services
35	3.889	T7	Large number of integration and system dependencies
02	3.800	B1	Ability of IT outsourcing to simplify management agenda (decreases management workload)
10	3.800	B1	Ability of IT outsourcing to leverage innovation
01	3.800	F1	Lower cost due to a vendors economies of scale
11	3.800	F1	Lower costs due to a vendor's more focused expertise in managing IT
80	3.800	P4	I believe some IT managers outsource IT to simply eliminate a problematic function
46	3.778	B7	Loss of critical IT skills base
77	3.700	P1	I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less
04	3.667	P6	High confidence that the contractor will perform to government expectations
67	3.600	E3	I believe decisions to start outsourcing are influenced by peoples perceptions on how it affects them
73	3.600	P4	I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"
36	3.444	S1	Security concerns over granting an IT vendor's maintenance personnel access to a DoD IT systems
12	3.400	F4	Improve the long-term financial predictability of IT budgets
42	3.400	S1	Security concerns over allowing outside security specialists access to IT systems
55	3.375	S1	Possibility that vendor will disclose classified data
41	3.333	B7	Lose control over IT services
66	3.300	E1	I believe the longer an IT manager is in a position, the more it will affect their decision to outsource
37	3.222	F5	Increased transactional costs (contract processing, administration, coordination, etc.)
15	3.200	B3	Act as a change agent for reorganization
83	3.200	E2	I believe some IT managers are interested in IT outsourcing only because other IT managers in the government are
33	3.200	F4	Protect and stabilize IT budgets (e.g. placing IT on contract to protect funding)

Question #	Avg	Item Type	Questions
31	3.200	T5	Complications between vendor and customer technical IT interfaces
25	3.125	F5	Potential for hidden costs (e.g. unexpected costs for assumed IT services)
27	3.125	T2	Retain competent IT professionals
38	3.111	T4	Feelings that vendor will not be able to solve agency specific IT requirements
28	3.100	T7	Inability of a vendor to guarantee interoperability with system they don't control
18	3.100	F3	Convert large IT capital budgets into more flexible operating budgets
08	3.100	T3	Access to a vendor's large research and development efforts
49	3.000	B7	Becoming overly dependent on contractors
53	3.000	B7	Loss of control over timing and quality of outputs
61	3.000	E1	I believe the length of time an IT manager knows they will be in a position affects their decision to outsource
39	3.000	F2	Record all costs incurred by the users
50	3.000	S1	Security concerns about subcontractors
47	3.000	S2	Concerns over a vendors e-mail security procedures when discussing agency issues
51	3.000	S2	Concerns over how a vendor disposes agency information after it is no longer needed
70	2.900	P1	I believe some IT managers solicit outsourcing proposals in the hopes it will prove the efficiency and continued existence of the internal IT department.
74	2.900	P5	I believe some IT managers outsource to appear more corporate and credible in the hopes of enhancing their own career
30	2.900	T4	Vendor not upgrading or keeping staff proficient
44	2.889	T6	Inability to meet recovery and back-up requirements
48	2.889	F5	Potential for inflated cost savings projections
19	2.800	B1	Increase hardware utilization
79	2.800	P3	I believe some IT managers will start outsourcing evaluations to prove to senior leadership that outsourcing might not meet their expectations
82	2.800	P5	I believe some IT managers outsource in the hopes that senior management will appreciate and value them more
13	2.700	B1	Increase employee motivation and cohesion
24	2.700	B3	Solve technical incompatibilities after reorganization
54	2.667	S3	Security risk that technical design information will be compromised
52	2.625	P6	Lack of trust between Government and contractors
06	2.600	B1	Ability of IT outsourcing to flatten organizations
62	2.600	E3	I believe concern over displaced IT staff members affects my decision to outsource
05	2.600	F1	Lower costs due to a vendor's tighter control over fringe benefits
72	2.600	P3	I believe some IT managers consider outsourcing to expose exaggerated claims made by vendors, thereby working

Question #	Avg	Item Type	Questions
			to ensure senior leaders do not enter an outsourcing relationship prematurely
32	2.444	F3	Restructuring IT budgets to allow different appropriations to be used
71	2.400	P2	I believe some IT managers solicit outsourcing proposals so that they can get senior leaders to authorize additional funding for an IT program by showing them outsourcing is not more cost effective
22	2.300	B3	Absorb excess IT assets after reorganization
45	2.222	S3	Potential release of system design information
29	2.111	T6	Inability of the vendor to meet system availability requirements
20	2.111	B2	Comply with Government requirements to outsource
65	2.100	B6	I believe IT outsourcing decreases my agency's ability to fully leverage IT
16	2.000	B2	Demonstrate compliance with government guidelines
78	2.000	P2	I believe some IT managers justify new resources by starting an IT source selection knowing that vendors will not be competitive against the internal department
34	2.000	T4	Potential that poor performing agency personnel, whose jobs have been outsourced, will be employed by the vendor
17	1.900	B3	Absorb unnecessary IT employees generated by agency merger
09	1.900	F1	Lower costs by vendors relocating data centers to cheaper areas
60	1.800	B6	I believe IT outsourcing lowers my agency's ability to maximize its business opportunities

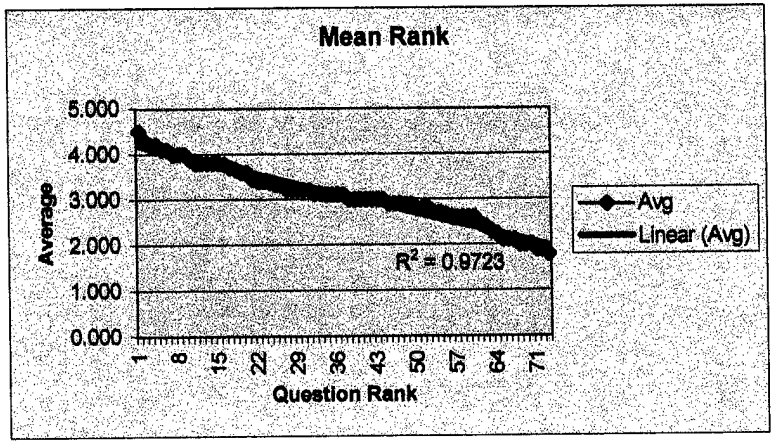

Figure 10. Plot of Question Means

Formulation of Second Questionnaire

Before beginning the process of determining which questions would be retained for the second questionnaire, each response was first tested to determine if it fell 1.25 standard deviations from the mean. These results would later be combined with the final set of retained questions so a respondent would have an opportunity to comment on why they felt their response might have been exceptionally high or low. This number was selected since it was the lowest value that still allowed each participant at least one opportunity to provide feedback.

Following this, a threshold value of 3.00 was applied to each items average. All averages above the threshold were retained for the next round, while all those below were deleted. As mentioned earlier, while the selection of this number was somewhat arbitrary, it is consistent with pervious studies (Scheffler, 1999). Additionally, it allowed for a convenient reduction of approximately 50% in the total number of questions, retaining 43 out of the original 83. The retained questions were then automatically combined along with each participants previous response and whether it was above or below the defined number of deviations. Table 6, lists the first 7 questions retained for the second survey along with their alphanumeric designators (Type), averages (Avg), standard deviations (Std D), boundaries for selected minimum and maximum standard deviations (1.25), respondent #1, round one answers (1-Ans), indicator of whether respondent #1's answers were above or below the preset minimum and maximum standard deviation value of 1.25 (1-Out), respondent #2, round one answers (2-Ans), and finally an indicator of whether

respondent #2's answers were above or below the preset minimum and maximum standard deviation value of 1.25 (2-Out).

Table 6. Sub-set of Questions Selected for Second Survey

Question #	Type	Avg	Std D	1.25	1.25	1-Ans	1-Out	2-Ans	2-Out	...
01	F1	3.800	1.135	5.219	2.381	4		3		...
11	F1	3.800	1.229	5.337	2.263	3		4		...
14	F2	4.000	0.471	4.589	3.411	4		3	Low	...
39	F2	3.000	0.866	4.083	1.917	3		3		...
18	F3	3.100	0.876	4.194	2.006	3		2	Low	...
12	F4	3.400	1.075	4.744	2.056	3		3		...
33	F4	3.200	1.135	4.619	1.781	2		4		...
...	...	...	...	...	...	...	...	...	...	...

To ensure that the spreadsheet was calculating the correct values, over 20% of the final 43 questions were selected at random and verified by hand calculations.

Informal feedback from the first questionnaire showed that some participants thought the flow of the instrument was rough. They thought it did not read well and was therefore difficult to follow and respond to. This was anticipated due to the tight adherence to guidelines used to minimize order effect. However, for the second survey it was thought that these guidelines could be relaxed. Consequently, the questions were reordered to present those testing for benefits first followed by those testing for risks. These categories were further ordered based on the presentation of the theory in chapter two. It was hoped that this would produce a smoother flowing instrument.

As previously mentioned, open ended questions were included in the survey to allow each participant to add additional factors they thought were important to an outsourcing decision. When an individual provided a response to one of these questions, it was entered into a separate file and if necessary, edited so that it was easier to

understand. Each new question was then categorized as either having a positive or negative relationship on the decision to outsourcing. As previously mentioned, those with a positive relationship were labeled as a benefit and those with a negative relationship were labeled as a risk. This allowed the questions to be ordered using the new process listed above.

Following this, an attempt was made to match each of the new items to an already theorized sub-factor. This was done to more easily track the questions through future rounds. If the question was able to matched, the appropriate alphanumeric designator was simply assigned to the new item. If a new question could not be easily mapped to an existing factor, a new factor was created. An *N* precedes the designator for any new sub-factor. This process was then reviewed by advisors to ensure that it any mis-categorizations were minimized. Each new item was then assigned a number based on the universal code previously described. For these new items the numbering was simply continued from the last item. However, to denote that these were new questions, an *N* precedes each of their assigned numbers. Table 7 presents a complete listing of the 14 new items added to the second questionnaire along with their assigned alphanumeric designators and numbers. The only item that could not be assigned to an already theorized factor was a suggestion regarding best industry practices and improved process. For this item a category labeled as *additional* was developed. Since this was a new category, this item was given the designator *NA1* as shown.

Table 7. New Questions

Question #	New question	Item Type
	Table #1:	
N84	Congressional Interest	B2
N85	Create agency wide business practice	F2
N86	Ability of IT outsourcing to make interoperability between systems LANs better	T3
N87	Quality of Intra-agency relationships (between IT and business units)	NE1
N88	Lack of a clearly delineated set of systems, costs and service levels	B4
N89	Controlling different security levels of data without security incident	S2
	Table #2:	
N90	I believe that many agencies feel that outsourcing is either mandated or so strongly encouraged as to be, in essence mandated	B2
N91	I believe that many senior IT managers see outsourcing as an end in itself rather than a strategy to achieve a goal	B2
N92	I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions	NE2
N93	I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes	NA1
N94	I believe some IT managers view outsourcing as a means to mitigate the inability of government to remove incompetent IT workers	B4
N95	I believe the cost of outsourcing is not clearly understood	F5
N96	I believe outsourcing should not be done without a comprehensive business assessment to establish value	F5
N97	I believe managers do not determine best value prior to outsourcing	F5

A complete list of all factors, sub-factors, and associated alphanumeric designators are presented in Appendix H.

Round Two

The second round had five objectives. The first was to retest the subset of questions developed from round one in the hopes of gaining consensus. The second was to retest the business related items that were reworded. The third was to test any new questions developed as a result of the responses to the open ended questions in the first round. The fourth objective was to obtain comments from the experts if their previous response fell more than 1.25 standard deviations from the mean and the fifth was to obtain

any new items from open-ended questions. The scale used on this survey was the same five point Likert Scale used in the first round.

Results

The raw data collected from this questionnaire was entered and reduced in nearly the same manner as the first survey. The only difference was that the data did not need to be reordered, since it was already grouped based on sub-factors.

Also, as anticipated, the newly worded version of the questions relating to the *inability to write an adequate service level agreement* and *inability to manage a contract* almost all had an average value substantially lower than even the first survey's threshold of 3.0. Yet, it should be noted that three of these items did score at or above the threshold. However, these items did not directly test the relationship between the proposed sub-factors and the dependent variable, but rather simply tested for the existence of the sub-factor as it relates to the dependent variable. While this may prove useful for future research, it was decided that since the proposed relationship between these sub-factors and the dependent variable had already been rejected, no further investigation in this area was warranted.

A listing of the 57 questions asked in round two are presented in a rank order format in Table 8. This table includes the 43 question retained from the first round along with the 14 new items suggested by the experts. Table 9 displays the same information for the re-worded questions described above.

Table 8. Original Second Round Data Sorted Based on Mean

Question #	Avg	Item Type	Questions
26	4.429	B1	Productivity improvements
7	4.429	F5	I believe outsourcing should not be done without a comprehensive business assessment to establish value
23	4.286	B1	Improve quantity or quality of agency outputs
3	4.143	T1	Improve technical services (e.g. dissatisfaction with current, in-house IT support)
N85	4.143	F2	Create agency wide business practice
77	4.143	P1	I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less
73	4.143	P4	I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"
N88	4.000	B4	Lack of a clearly delineated set of systems, costs and service levels
81	4.000	E2	I believe the more other government agencies outsource their IT, the more mine might
N95	4.000	F5	I believe the cost of outsourcing is not clearly understood
7	3.857	T1	Increase customer satisfaction of IT related services
40	3.857	T2	Locate competent IT professionals
43	3.857	S2	Security concerns over how vendors handle agency data on their own systems
N89	3.857	S2	Controlling different security levels of data without security incident
80	3.857	P4	I believe some IT managers outsource IT to simply eliminate a problematic function
N93	3.857	NA1	I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes
1	3.714	F1	Lower cost due to a vendors economies of scale
11	3.714	F1	Lower costs due to a vendor's more focused expertise in managing IT
14	3.714	F2	Improve cost controls (e.g. develop standardized processes for all agency members to follow)
19	3.714	B1	Increase hardware utilization
66	3.714	E1	I believe the longer an IT manager is in a position, the more it will affect their decision to outsource
N92	3.714	NE2	I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions
N97	3.714	F5	I believe managers do not determine best value prior to outsourcing
2	3.571	B1	Ability of IT outsourcing to simplify management agenda (decreases management workload)
10	3.571	B1	Ability of IT outsourcing to leverage innovation
36	3.571	S1	Security concerns over granting an IT vendor's maintenance personnel access to a DoD IT systems
35	3.571	T7	Large number of integration and system dependencies
67	3.571	E3	I believe decisions to start outsourcing are influenced by peoples perceptions on how it affects them
N94	3.571	B4	I believe some IT managers view outsourcing as a means to mitigate the inability of government to remove incompetent IT workers

Question #	Avg	Item Type	Questions
12	3.429	F4	Improve the long-term financial predictability of IT budgets
46	3.429	B7	Loss of critical IT skills base
42	3.429	S1	Security concerns over allowing outside security specialists access to IT systems
N84	3.429	B2	Congressional Interest
N86	3.429	T3	Ability of IT outsourcing to make interoperability between systems LANs better
N90	3.429	B2	I believe that many agencies feel that outsourcing is either mandated or so strongly encouraged as to be, in essence mandated
55	3.333	S1	Possibility that vendor will disclose classified data
50	3.286	S1	Security concerns about subcontractors
28	3.286	T7	Inability of a vendor to guarantee interoperability with system they don't control
N87	3.286	NE1	Quality of Intra-agency relationships (between IT and business units)
83	3.286	E2	I believe some IT managers are interested in IT outsourcing only because other IT managers in the government are
27	3.143	T2	Retain competent IT professionals
49	3.143	B7	Becoming overly dependent on contractors
38	3.143	T4	Feelings that vendor will not be able to solve agency specific IT requirements
39	3.000	F2	Record all costs incurred by the users
33	3.000	F4	Protect and stabilize IT budgets (e.g. placing IT on contract to protect funding)
15	3.000	B3	Act as a change agent for reorganization
25	3.000	F5	Potential for hidden costs (e.g. unexpected costs for assumed IT services)
37	3.000	F5	Increased transactional costs (contract processing, administration, coordination, etc.)
53	3.000	B7	Loss of control over timing and quality of outputs
47	3.000	S2	Concerns over a vendors e-mail security procedures when discussing agency issues
N91	3.000	B2	I believe that many senior IT managers see outsourcing as an end in itself rather than a strategy to achieve a goal
18	2.857	F3	Convert large IT capital budgets into more flexible operating budgets
8	2.857	T3	Access to a vendor's large research and development efforts
41	2.857	B7	Lose control over IT services
31	2.857	T5	Complications between vendor and customer technical IT interfaces
51	2.857	S2	Concerns over how a vendor disposes agency information after it is no longer needed
61	2.857	E1	I believe the length of time an IT manager knows they will be in a position affects their decision to outsource

Table 9. Re-worded Second Round Data Sorted Based on Mean

Question #	Avg	Item Type	Questions
57	3.286	B4	I believe my response to the question above impacts my decision to outsource
59	3.000	B5	I believe my response to the question above impacts my decision to outsource
69	3.000	B4	I believe my response to the question above impacts my decision to outsource
76	2.714	B4	I believe my response to the question above impacts my decision to outsource
75	2.429	B4	I believe my agency can not develop a proper acquisition strategy for its information requirements
63	2.286	B4	I believe my agency is not capable of establishing its information requirements
56	2.000	B4	I believe my agency has a low ability to write an adequate IT service level agreement
68	2.000	B4	I believe my agency can not adequately establish contract deliverables from its information requirements
58	1.857	B5	I believe my agency does not have the ability to properly manage an IT contract
64	1.857	B5	I believe IT contracts can not be adequately managed by my agency's current personnel

Formulation of Third Questionnaire

The responses were again tested to determine if responses fell outside a defined number of standard deviations. The selected number of standard deviations was again 1.250. When this was performed, a much smaller number of them fell outside the range as compared to the first round and many of those that did were for the same questions that were previously out of the range. Therefore, for these reasons, it was decided that in the next round the respondent would not be asked to comment on why their response may have been exceptionally high or low.

Once the means, standard deviations, and IQRs were calculated, a threshold of 3.714 was applied. This forced a reduction in the number of questions from 43 to 23. When this was performed, eight of the 14 new questions produced from responses to the first rounds open-ended questions remained.

To determine if consensus was being achieved, the change in standard deviations for the remaining questions that were asked in both the first and second rounds were plotted as shown in Figure 11. In this plot, consensus would display itself as a decrease in the standard deviations for each item with perfect consensus being represented by a standard deviation of zero (Dickson, 1984).

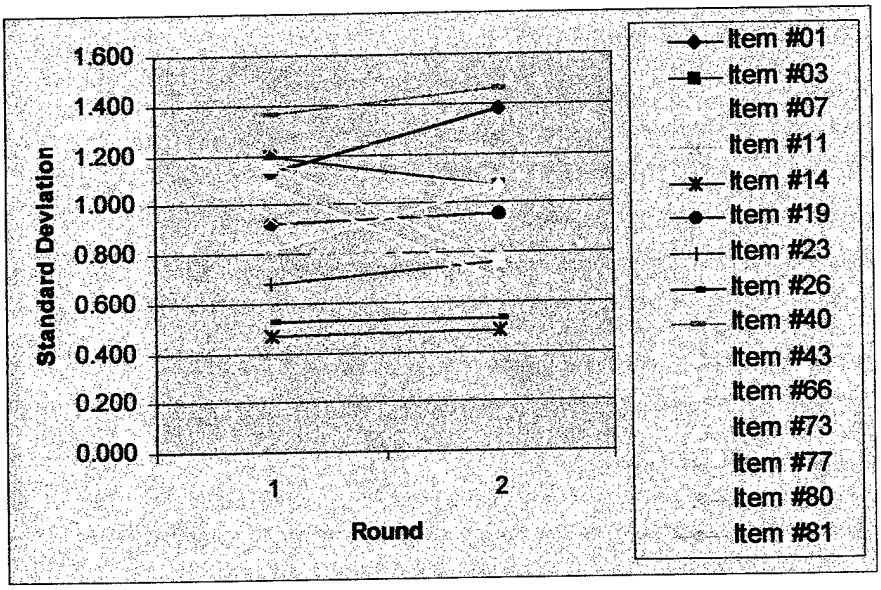

Figure 11. Standard Deviations for Rounds 1-2

It can be seen, however, that the standard deviation for 10 of the 15 questions went up. These results were even more confounding when the interquatile range (IQR) was plotted for the same items. IQR is the difference between the third quartile rank score and the first quartile rank score and can be used as another measure of consensus (Dickson, 1984). Figure 12 shows that the IQR for many items went down even when their corresponding standard deviations went up.

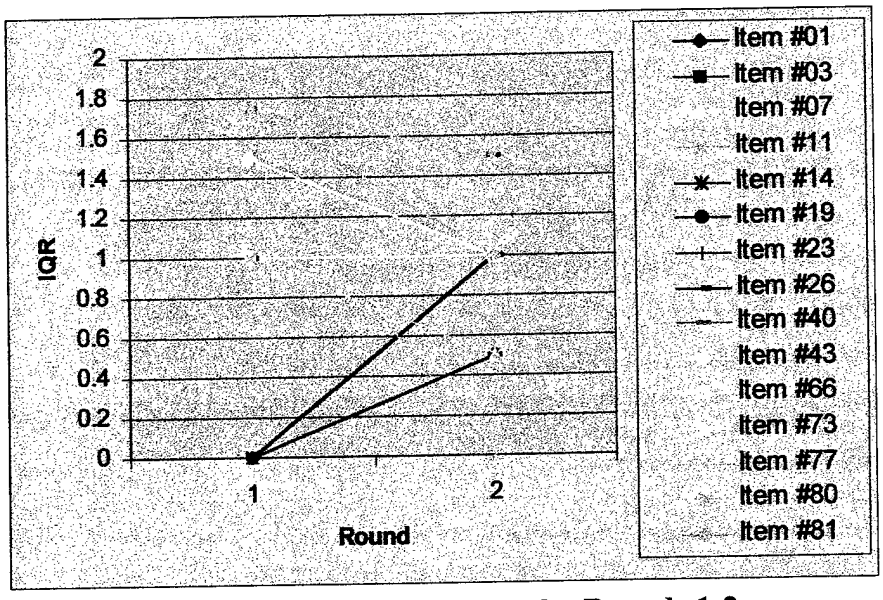

Figure 12. Interquartile Range for Rounds 1-2

In an attempt to explain this phenomenon, the stability of each item was analyzed. This measurement attempts to maximize the utility of the voting results by determining the constancy of each individual's responses over successive rounds (Scheibe, 1975). If stability exists without consensus being formed, it might be an indicator that unconsensual distributions or other anomalies exist that would preclude consensus from being formed further. To calculate the stability, the histograms were subtracted columnwise and the absolute value of the result taken. Table 10 shows this calculation for item number 1 and 7.

Table 10. Example of Stability Measurement Calculation in Round Two

Item #1

	Expert Response						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Questionnaire #1 response	3	4	4	5	4	5	1
Questionnaire #2 response	3	4	4	4	4	5	1

	Bins				
Histograms	**1**	**2**	**3**	**4**	**5**
Questionnaire #1	1	0	1	3	2
Questionnaire #2	1	0	1	4	1
Absolute difference between rounds 1-2	0	0	0	1	1

Rating	
Total units of change	2
Net person-changes	1
Number of participants	7
Percent change	14.29%

Item #7

	Expert Response						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Questionnaire #1 response	3	4	5	4	4	5	2
Questionnaire #2 response	2	5	5	4	5	5	2

	Bins				
Histograms	**1**	**2**	**3**	**4**	**5**
Questionnaire #1	0	1	1	3	2
Questionnaire #2	0	2	0	1	4
Absolute difference between rounds 1-2	0	1	1	2	2

Rating	
Total units of change	6
Net person-changes	3
Number of participants	7
Percent change	42.86%

As shown, the absolute values of the difference between histograms are added to determine the total units of change. Since any one participant's change of opinion is reflected in the histogram difference by two units of change, net person-changes are computed by dividing total units of change by two. Finally, the percentage change is

determined by dividing net changes by the number of participants (Scheibe, 1975). Typically, a change of less than 15% represents a state of equilibrium. "Any two distribution that show marginal changes of less than 15% may be said to have reached stability" (Sheibe, 1975; 278). With only 7 respondents, this becomes a very rigorous test since only items with net-person changes of one or below will pass.

The results of these calculations for each of the 15 questions asked in the first two rounds, and retained for the third, are present below in Table 11. This table also annotates if the standard deviation of the question went up or down between the rounds.

Table 11. Stability Measurements for Questions Retained for Survey Three

Question	Stability	Std Dev (up or down)
1	14.29%	Up
3	14.29%	Up
7	42.86%	Down
11	28.57%	Up
14	14.29%	Up
19	14.29%	Up
23	0.00%	Up
26	14.29%	Up
40	14.29%	Up
43	14.29%	Up
66	28.57%	Down
73	28.57%	Down
77	28.57%	Down
80	14.29%	Down
81	14.29%	Up

As shown, all but one of the questions whose standard deviation went up (11) exhibited a stability less than 15%. Additionally, four out of the five questions whose standard deviation went down had a stability of greater than 15%. From these results, its evident that those questions whose standard deviations went up between rounds one and two had reached stability. Further, those questions whose standard deviation went down had not stabilized. Therefore, based on the fact that stability had not been achieved in five items

and that eight out of 14 questions selected for the third questionnaire were new to the second round and therefore had only been asked once, it was decided to proceed with the third round.

All comments provided by the experts, if their previous response to a question was above or below 1.25 standard deviations, were then typed into a separate list. The specific comment, expert, and whether their previous answer was above or below the prescribed range, was annotated on the list. This made it easier to group similar ideas and find common themes.

As previously mentioned, the last objective of round two was to again use open-ended questions to obtain from the experts any additional items they thought might be important to include in the model. However, during this round only one respondent provided any suggestions. After faculty review, these were deemed to already be part of the model and had been already been tested for. Consequently, no additional consideration was given to this issue.

Round Three

The third round had three objectives. The first was to gain further consensus or stability on items previously tested in rounds one and two. The second was to show consensus or stability on items added to the instruments as a result of expert feedback in round two and the third objective was to determine the highest rated items. The scale used on this survey was the same five point Likert Scale used in the first two rounds.

Results

The raw data collected from this questionnaire was entered and reduced in the same manner as the second survey. However, since another questionnaire was not planned, any

calculations used to determine the items for the next questionnaire were not required. A listing of the 23 questions asked in round three is presented in a rank order format in Table 12.

Table 12. Third Round Data Sorted Based on Mean

Question #	Avg	Item Type	Questions
23	4.571	B1	Improve quantity or quality of agency outputs
26	4.571	B1	Productivity improvements
N96	4.571	F5	I believe outsourcing should not be done without a comprehensive business assessment to establish value
73	4.429	P4	I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"
3	4.286	T1	Improve technical services (e.g. dissatisfaction with current, in-house IT support)
77	4.286	P1	I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less
N95	4.286	F5	I believe the cost of outsourcing is not clearly understood
43	4.143	S2	Security concerns over how vendors handle agency data on their own systems
81	4.143	E2	I believe the more other government agencies outsource their IT, the more mine might
N92	4.143	NE2	I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions
14	4.000	F2	Improve cost controls (e.g. develop standardized processes for all agency members to follow)
7	4.000	T1	Increase customer satisfaction of IT related services
N85	4.000	F2	Create agency wide business practice
N88	4.000	B4	Lack of a clearly delineated set of systems, costs and service levels
80	4.000	P4	I believe some IT managers outsource IT to simply eliminate a problematic function
N97	4.000	F5	I believe managers do not determine best value prior to outsourcing
1	3.857	F1	Lower cost due to a vendors economies of scale
11	3.857	F1	Lower costs due to a vendor's more focused expertise in managing IT
66	3.857	E1	I believe the longer an IT manager is in a position, the more it will affect their decision to outsource
40	3.714	T2	Locate competent IT professionals
N89	3.714	S2	Controlling different security levels of data without security incident
N93	3.714	NA1	I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes
19	3.571	B1	Increase hardware utilization

Analysis and Findings

As previously mentioned, standard deviation and IQR are two common measures of consensus. Consequently, these statistics were computed for each of the items in this round and plotted along with the same data from round one and two as shown in Figure 11 and 12. As seen in Figure 13 below, the general trend for the standard deviations from round two to three did not increase as they did from round one to two. However, they only exhibited a slight decrease.

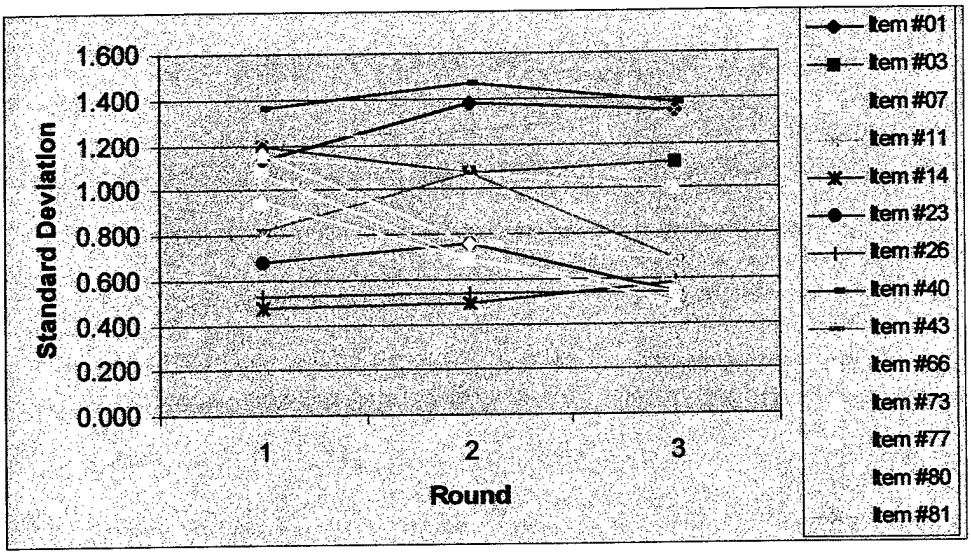

Figure 13. Standard Deviations for Rounds 1-3

In an attempt to explain this, the stability of each item was again considered to determine if the predictions had solidified. Similar to Table 11, Table 13 displays the stability trends from round one to two and two to three. Note that item 19 is no longer listed. During final review it was determined that the wrong question was attached to this items feedback statistics in the second and third round questionnaires. Therefore, it was discarded. A closer analysis of this issue, however, did suggest that the Delphi process was at work. This issue will be discussed more fully in the next chapter.

Table 13. Stability Measurements for Survey Three Questions

Question	Stability between Rounds 1 and 2	Std Dev (up or down) between rounds 1 and 2	Stability between Rounds 2 and 3	Std Dev (up or down) between rounds 2 and 3
1	14.29%	Up	14.29%	Down
3	14.29%	Up	14.29%	Up
7	14.29%	Up	14.29%	Down
11	28.57%	Up	14.29%	Up
14	14.29%	Up	0.00%	Up
23	14.29%	Up	14.29%	Down
26	0.00%	Up	14.29%	Equal
40	42.86%	Down	14.29%	Down
43	14.29%	Up	14.29%	Down
66	28.57%	Down	14.29%	Down
73	28.57%	Down	14.29%	Down
77	28.57%	Down	14.29%	Down
80	14.29%	Down	42.86%	Down
81	14.29%	Up	14.29%	Down

As shown in Table 13, eight out of nine items whose standard deviation went down, all three items whose standard deviations went up, and one item whose standard deviation remained the same all had stabilities lower than 15%. These results help show that the responses from the expert group had stabilized and that consensus had been achieved. This argument is reinforced by the fact that all interquartile range values were one or lower in round three, as seen if Figure 14.

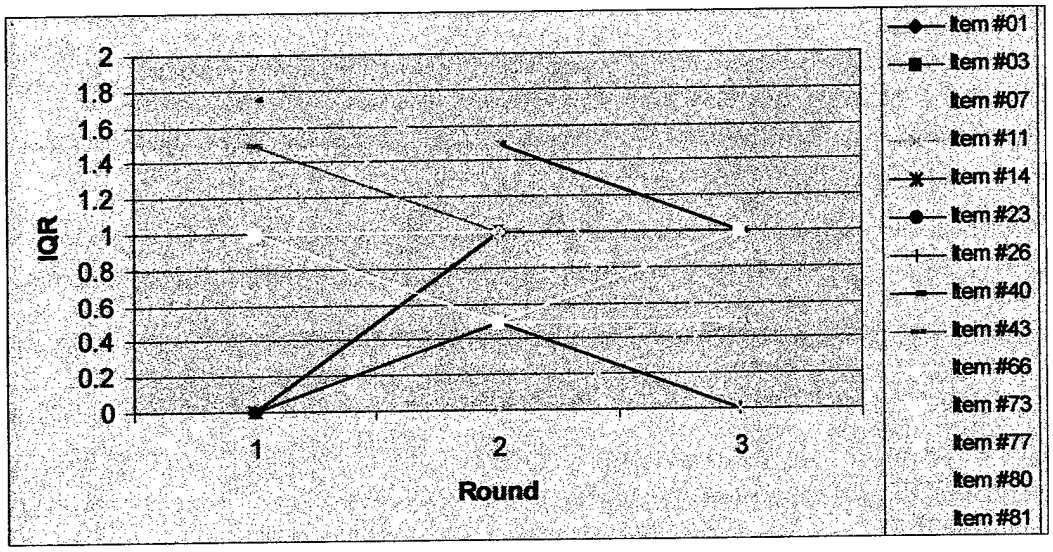

Figure 14. Interquartile Range for Rounds 1-3

This decrease also signifies that consensus has been reached for these items (Schiebe, 1975).

As previously mentioned, the second objective of round three was to show consensus or stability for items added to the instruments as a result of expert feedback in round two. Figure 15 shows the standard deviation of these items from round two to three.

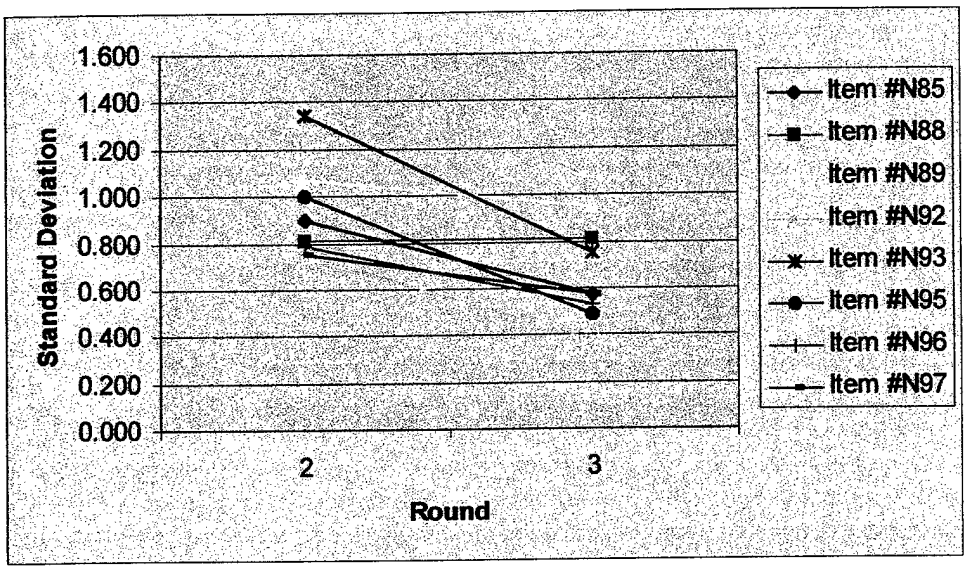

Figure 15. Standard Deviations for New Items between Rounds 2-3

Clearly, the trend for these items is downward, again, showing the drive towards a perfect consensus number of zero (Dickson, 1984). This assessment is reinforced by the changes in the interquartile ranges for these items as shown in Figure 16 below.

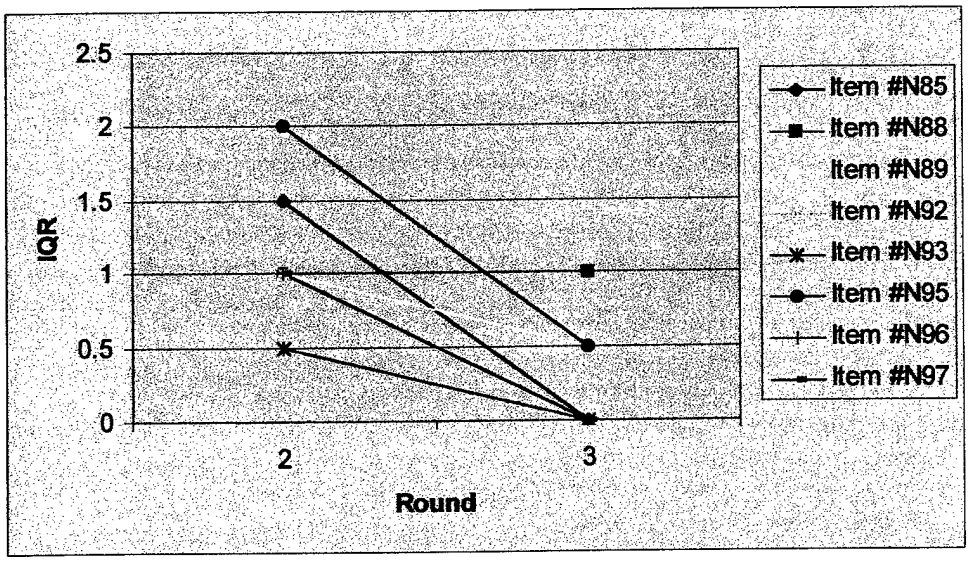

Figure 16. Interquartile Range for New Items between Rounds 2-3

Again, this plot also shows a downward trend. In fact, all these items have an IQR of less than one, which could indicate consensus had already been formed. However, the stability numbers for these items listed in Table 14 do not support that viewpoint.

Table 14. Stability of New Questions

New Question	Stability
N85	42.86%
N88	0.00%
N89	14.29%
N92	42.86%
N93	42.86%
N95	57.14%
N96	14.29%
N97	28.57%

With five out of eight stability measurements about 15%, it is difficult to state that stability has been achieved for these items.

Round three's final objective was to determine the highest rated items in the study. The top ten highest rated items are shown in Table 15. These items were generated by applying a threshold value of 4.142 to the results from round three. Only ten were selected since it is a small, convenient sample which most people are accustomed to dealing with.

Table 15. Top Ten Highest Rated Items

Question Number	Rank	Question	Average	Item Type
23	1	Improve quantity or quality of agency outputs	4.571	B1
26	1	Productivity improvements	4.571	B1
N96	1	I believe outsourcing should not be done without a comprehensive business assessment to establish value	4.571	F5
73	4	I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"	4.429	P4
N95	5	I believe the cost of outsourcing is not clearly understood	4.286	F5
77	5	I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less	4.286	P1
3	5	Improve technical services (e.g. dissatisfaction with current, in-house IT support)	4.286	T1
43	8	Security concerns over how vendors handle agency data on their own systems	4.143	S2
81	8	I believe the more other government agencies outsource their IT, the more mine might	4.143	E2
N92	8	I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions	4.143	NE2

Summary

This chapter has detailed what the highest ranked items in the question were, how they where determined and whether consensus on them was achieved. The next chapter will use these results to investigate any relationships between, and within the factors.

V. Findings and Conclusions

Introduction

This chapter is broken into three sections. The first provides a macro perspective of the results by discussing how each factor relates to the others. The second portion provides a micro perspective by focusing within individual factors and attempts to explain and reconcile the results based on the comments received from the expert group in the second survey. The third section lists any limitations of the research and suggests possible follow on activities.

Macro Perspective

When considering the importance of the factors relative to each other, it is helpful to consider the percentage of questions retained from the first round to the last. This measure gives a crude estimate of what factors are most important. Table 16 summarizes this information by presenting how many questions were associated with each factor and how many were retained for the last round. The percentages for each were then calculated and ranked. The total number of questions listed was determined by adding the total number of original questions plus any additional items suggested by the experts. It should be noted that the entirely new factor *best practices and improved process* (NA1) was not considered in this table. For clarification purposes, Table 17 lists the number of first round questions along with the specific questions added and their assigned alphanumeric designator.

Table 16. Number of Questions Retained from Round One to Three

FACTORS	First to Third Round		
	Number of Questions	Retained (Percentage retained)	Ranking of % retained
Financial	17	7 (41%)	1
Business	35	4 (13%)	6
Technical	14	3 (21%)	4
Political	12	3 (25%)	3
Security	10	2 (20%)	5
Environmental	8	3 (38%)	2

Table 17. Number of Questions

Factor	Number of questions in round 1	Additional questions included in round 2	Final total number of questions asked
Financial	13	1. Create agency wide business practice (F2) 2. I believe the cost of outsourcing is not clearly understood (F5) 3. I believe outsourcing should not be done without a comprehensive business assessment to establish value (F5) 4. I believe managers do not determine best value prior to outsourcing (F5)	17
Business	30	1. Congressional Interest (B2) 2. Lack of a clearly delineated set of systems, costs and service levels (B4) 3. I believe that many agencies feel that outsourcing is either mandated or so strongly encouraged as to be, in essence mandated (B2) 4. I believe that many senior IT managers see outsourcing as an end in itself rather than a strategy to achieve a goal (B2) 5. I believe some IT managers view outsourcing as a means to mitigate the inability of government to remove incompetent IT workers (B4)	35
Technical	13	1. Ability of IT outsourcing to make interoperability between systems LANs better (T3)	14
Political	12	No questions added	12
Security	9	1. Controlling different security levels of data without security incident (S2)	10
Environmental	6	1. Quality of Intra-agency relationships (between IT and business units) (NE1) 2. I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions (NE2)	8
***The question "I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes (NA1)" was not included ***			

From Table 16, it seems that financial factors were the most important determinants to the population. This result is not surprising considering some have labeled this factor the most important advantage provided by outsourcing (Rebeiro, 1996). Additionally, its been shown that reduced costs are one of the largest motivators behind the use of IT outsourcing in the government (Jones, 1999). As mentioned in chapter two, cost reductions were repeatedly labeled the number one reason why outsourcing solutions should be pursued during the interviews conducted for this research. In fact, one respondent casually remarked, "is there another reason you would outsource?" (Folsom, 2000). A government Chief Information Officer (CIO) has even been quoted that when it comes to outsourcing, "cost is *THE* driver" (Jones, 1999:29).

The second most important factor seemed to be environmental determinants, while the third were the political items. Considering the political nature of any public firm, this result is not surprising. Additionally, the fact that these two factors were ranked successively might suggest that they are closely related. It is possible that since the environment that public firms operate in is inherently political, there might be a correlation between these two factors. In a close tie for four and fifth place are technical and security items respectively. However, the lower rankings of these items should probably not be viewed as a lack of concern for such issues. As an example, expert #6 expressed his organizations technical focus by commenting, "our concern is with providing availability of IT services – we seek 99.975% network availability. We also want to increase overall desktop availability to 99.975% for average users and 99.99% for executive users." Such goals seem to be consistent with the wishes and desires of many other DoD organizations

(AFIT, 2000). These users seem to feel that the first priority of any DoD IT organization should be to provide network service that is as reliable as a telephone.

The least important factor seemed to be business. If this result seems surprising, one could argue that it was simply because the business factor had more sub-factors to test for and consequently had more that could be rejected. A good example of this are the 10 re-tested items that were all rejected in the second round. However, Table 18 shows that even when these 10 items are not considered, the business factor did not rate much higher. Also, as will be shown later, while the business factor as a whole did not rate very high, several individual business sub-factors did.

Table 18 presents a more detailed look of the same data by delineating how many questions were originally associated with each factor in the first and second round as well as how many were retained for the next. The percentages for each were then calculated and ranked. As in Table 16, the number of questions listed in the second to third round includes any additional items or sub-factors added by the experts. Also, as noted in the chapter four, the 10 Business related questions that needed to be rephrased and retested from the first to second rounds are not included since there is difficulty determining which round to assign them to. This table also does not include the single additional factor tested for in the second round relating to best practices and policies.

Table 18. Number of Questions Retained from Round One to Two and Two to Three

FACTORS	First to Second Round			Second to Third Round		
	Number of Questions	Retained (Percentage retained)	Ranking of % retained	Number of Questions	Retained (Percentage retained)	Ranking of % retained
Financial	13	9(69%)	3(tie)	13	7 (54%)	1
Business	20	10 (50%)	5	15	4 (27%)	5
Technical	13	9 (69%)	3(tie)	10	3 (30%)	4
Political	12	3 (25%)	6	3	3 (50%)	2
Security	9	7 (78%)	2	8	2 (25%)	6
Environmental	6	5 (83%)	1	7	3 (43%)	3
	* 10 Business factors retested			*All retested business factors were rejected		

As shown, while the rankings vary slightly from Table 16, they are consistent with the results presented there. Business determinants still rank among the lowest items. However, it should be noted that the last three determinants all fall within 5% of each other, helping to show that they are equally important.

Another reason why business determinants may have ranked so low is because firms seem worried they might lose critical skill sets and therefore a competitive edge over their adversaries. As stated by expert #2, "It is absurd to believe future/long term issues will not require understanding and recognition that IT is an essential tool for the company's future well being." He also seems to believe that IT will not simplify the management agenda since any difficult decision regarding IT will still need to be made internal to the firm. As he states:

> Handing it [IT] over to an outsourcing firm does not absolve the company from making tough decisions. I don't think the head of an outsourced firm will be able to simplify key decision making issues any easier than a good internal IT manager who is respected by, and embraced as part of the senior management team.

Expert #10 echoes this feeling when he states, "The level of management that manages the IT organization (whether in-house or outsourced) would likely remain the same. Why would someone else doing the work change the management agenda?"

It is also interesting to note, that all factors are strongly represented in Table 16. This might suggest that while some determinants are more important than others, the decision to outsource IT in the DoD is a multifaceted one. This viewpoint is even supported when only the ten highest rated determinants are considered. As seen in Table 15, at least one item from each factor was represented in this list, again demonstrating the convoluted nature of this decision. The multidimensional character of these results is also consistent with previous studies. As mentioned in chapter two, most of the existing IT outsourcing frameworks for the private sector also have a multidimensional flavor (Loh, 1992; Smith, 1998; Gurbaxani, 1996; Lacity, 1994). Perhaps the results of this study are an indication that private and public sector organizations tend to have similar IT outsourcing determinants.

Micro Perspective

Each factor was also examined internally for any trends. By focusing on each factor individually, patterns begin to emerge that provide clues as to why certain experts may have voted they way they did. In addition, it allows a more comprehensive analysis of the issues and concerns surrounding each factor. Expert comments were used to help illustrate these issues and results.

Financial

Table 19 shows the average for each of the questions in the last round along with their ranking in each. As shown, two of the final top rated items were financial

determinants. These were *I believe outsourcing should not be done without a comprehensive business assessment to establish value* (N96) and *I believe the cost of outsourcing is not clearly understood* (N95). Both of these items had consistently high averages throughout the entire study. It is interesting to note that both came from the same sub-factor, *potential problems with cost reductions* (F5).

Table 19. Ranking of Final Items in Each Round

Final Question #	Item Type	Question	#3 Avg	#3 Rank	#2 Avg	#2 Rank	#1 Avg	#1 Rank
01	F1	Lower cost due to a vendors economies of scale	3.86	17	3.71	17	3.80	10
03	T1	Improve technical services (e.g. dissatisfaction with current, in-house IT support)	4.00	11	3.86	11	4.00	7
07	T2	Increase customer satisfaction of IT related services	3.71	20	3.86	11	4.11	5
11	F1	Lower costs due to a vendor's more focused expertise in managing IT	3.86	17	3.71	17	3.80	10
14	F2	Improve cost controls (e.g. develop standardized processes for all agency members to follow)	4.00	11	3.71	17	4.00	7
19	B1	Increase hardware utilization	4.57	1	4.29	3	4.30	2
23	B1	Improve quantity or quality of agency outputs	4.57	1	4.43	1	4.50	1
26	T1	Productivity improvements	4.29	5	4.14	4	4.10	6
40	S2	Locate competent IT professionals	4.14	8	3.86	11	4.00	7
43	F2	Security concerns over how vendors handle agency data on their own systems	4.00	11	4.14	4	NA	16
66	E1	I believe the longer an IT manager is in a position, the more it will affect their decision to outsource	3.86	17	3.71	17	3.30	15
73	P4	I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"	4.43	4	4.14	4	3.60	14
77	P1	I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less	4.29	5	4.14	4	3.70	13
80	P4	I believe some IT managers outsource IT to simply eliminate a problematic function	4.00	11	3.86	11	3.80	10
81	E2	I believe the more other government agencies outsource their IT, the more mine might	4.14	8	4.00	8	4.20	3
N85	B4	Create agency wide business practice	4.00	11	4.00	8	NA	16
N88	S2	Lack of a clearly delineated set of systems, costs and service levels	3.71	20	3.86	11	NA	16
N92	NE2	I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions	4.14	8	3.71	17	NA	16
N93	NA1	I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes	3.71	20	3.86	11	NA	16
N95	F5	I believe the cost of outsourcing is not clearly understood	4.29	5	4.00	8	NA	16
N96	F5	I believe outsourcing should not be done without a comprehensive business assessment to establish value	4.57	1	4.43	1	NA	16
N97	F5	I believe managers do not determine the best value prior to outsourcing	4.00	11	3.71	17	NA	16

Based on this, it seems that DoD IT officials are cautious about the potential for any cost savings from outsourcing. This seems to be inconsistent with previous studies, which seemed to suggest that IT outsourcing was performed in the Government almost exclusively for cost related reasons (Jones, 1999). This apparent contradiction might be explained by the timing of each of the studies. As a comparison, many private firms also tended to focus on cost-related determinants early on in their experiences with IT outsourcing (Rebeiro, 1996). However, as their familiarity with it grew they seemed to become more skeptical over any potential savings. (Lacity, 1993; Quinn, 1999; Willcocks, 1994). The DoD might simply be experiencing the same evolution. Recent IT outsourcing studies in the Federal Government show that cost savings occurred for only the first year or two and that no evidence exists for savings due to economies of scale (Jones, 1999). This idea is corroborated by the fact that many DoD agencies now seem to be performing Total Cost of Ownership (TCO) studies, which will hopefully help prove any potential cost saving before a decision is made to outsource (Cooper, 2000; NSA, 1999). This approach is also being endorsed by the senior managers in several private firms who believe that to truly determine whether outsourcing will produce cost savings, all information management activities costs must be known (Martinsons, 1993).

Identifying IT costs is not the only financial objective sought by organizations. They also seem to be starving for any process that will provide some predictability to their IT budgets. Some feel that outsourcing can provide this. As expert #6 writes:

> In our organization, the true cost of operating our IT is often masked by various business units using mission money for IT activities. Applications are stood up by functional users and turned over for maintenance to the IT shop. The IT shop had no knowledge of this activity and had not budgeted for maintenance of the servers, software licenses, etc. In a similar vein,

> business units have bought PDA software, and other equipment, not on configuration but with the expectation of help supporting these items. Outsourcing would require all IT functions to be procured and supported through the contractor. These costs would no longer be a surprise to the IT staff. Business units would have to bear the financial burden of their IT decisions.

However, there are those who seem to feel that outsourcing is only treating the symptoms and not curing this disease. As expert #10 suggests, "it is really the internal organization that has to change." To support this position expert #2 states:

> Improving cost controls MAY be an outcome of outsourcing, but it is not the most important consideration for making an outsourcing decision. If an organization does not understand how outsourcing will REQUIRE change to established business practices first, costs may not be controlled any better than before the outsourcing. In fact, this has been the case for some corporations who did not first consider the more essential question: will you allow an outsourced firm to discipline your workforce's IT consumption?

Expert #9 also seems to express this opinion by stating, "This objective should be accommodated via fiscal means and not through outsourcing."

Business

As mentioned earlier, the business factor as a *whole* did not rank very high. However, as seen in Table 15, two of the three highest rated *items* were business determinants. In fact, as shown in Table 19, these two items remained at or near the top of the ranking in all three rounds. It is also interesting to note that both were from the *focus on core competency* (F1) business sub-factor, suggesting that while business factors are not considered very much as a whole, this sub-factor is considered heavily when making a decision to outsource.

It is interesting to note that previous research has shown that DoD organizations do not consider business determinants much at all when making an IT outsourcing

decision, but focus exclusively on financial determinants (Jones, 1999). After all, the financial factor did rank highest. Yet these results would tend to suggest otherwise. As in the similar financial situation above, this apparent discrepancy might be explained by the fact that many private firms also tended to focus on financial determinants early on in their experiences with outsourcing (Rebeiro, 1996). But, as their familiarity with it grew, they seemed to start thinking more about the business related aspects of the arrangement (Venkatraman, 1997). Again, the DoD might simply be experiencing this same evolution. This idea is further strengthened when it is considered that focusing on core competencies was among the first business determinants considered by private industry.

Based on the comments, there also seems to be a deep concern with a potential loss of control over IT services. As expert #2 states:

> This is a big issue for US Intelligence. There is a real possibility that the government may lose the expertise to understand technology and related insight into security issues. The government may lose key expertise of how other nations may use technology, and thereby, what vulnerabilities exist for US and foreign systems. This factor demands up front consideration over what to outsource and what not to outsource; what the legal aspects may be as related to national security if a company owns aspects of the IT infrastructure (what are the government's rights to control data); what happens when a foreign company buys out an outsourcing firm that has access to national security information; how the government will retain key skills, etc.

Yet, there are some who feel that this is only a temporary concern, as expert #10 states, "It's a competitive market now, but it ebbs and flows. This may be the case now but not a year or two from now."

Technical

Improving technical services also rated high in the survey. As seen in Table 19, question 26, *Productivity improvements*, ranked fairly high throughout in all three surveys.

This item concentrates on improving technical services. However, some feel that improving services is not the issue. Rather, the issue is improving them within the budget allotted. As expert #10 wrote, "Our main headache is finding quality IT workers that we can afford." Consequently, it seems that qualified workers that can increase customer satisfaction are available, although, paying for them is another issue.

Yet, there are some who feel that any increased service levels provided by outsourcing are overstated. As expert #10 wrote, "Frequently these are beliefs not based on actual data. [It is] tough to change beliefs." Based on this, it seems that some managers and users may simply trust what they have heard about IT outsourcing rather than investigating it themselves. Expert #2 echoed this position by stating, "Customers may not be any happier, possibly less so, when an outsourcing firm has total control over their IT environment and begins to discipline IT customers. They may have less recourse, other than to grumble."

Additionally, some seemed concerned that vendors don't have the ability to solve many agency specific requirements. As expert #7 writes, "One of the key issues that would inhibit one from outsourcing would be concern that a vendor could not meet the unique requirements (often security related) of my organization." As he points out, many of these special requirements are security related. This is not surprising given the classified nature of the data these organizations sometimes handle. Others seem to counter this claim by proposing that a properly written contract can help minimize these issues. As expert # 9 writes, "many of the [technical] complications can be mitigated via contract provisions." In the end, it seems that some are unconvinced that outsourcing IT can increase user satisfaction.

It also seems that the influence these issues have on a decision to outsource depends in large measure as to whether the organization making it is a policy or operational group. As expert #6 states, "We are a policy shop. We do not have the large number of integration and system dependencies that an operational environment such as Army Personnel Command would have."

Political

There were also several political questions that seemed important to the expert group. As seen in Table 19, questions 77, *I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less*, and 73, *I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"*, both ranked high in all three rounds. The first question centers on using IT outsourcing proposals to prove to senior managers that when compared directly, the internal team can perform just as good if not better than an outside vendor. As expert #10 wrote:

> The fact of outsourcing being better AND cheaper may hold true for a short period of time. Constraints on the existing organization will also constrain an outsourced organization. So, if you reduce the constraints, internal organizations can perform better.

As mentioned, many times the internal team is handicapped by not being allowed to compete using the same requirement set. As the literature has pointed out, "many IT departments have equally sophisticated technology and adequate economies of scale but aren't allowed to adopt the best practices that would help them match or beat a supplier's bid" (Lacity, 1995: 90). It goes on to state that if a company allows its own IT

department to compete with outsourcing vendors, they not only might win the contract but can also "gain a much deeper understanding of the costs of a given service and the best way to provide it. If they decide to outsource in the future, they will be in a stronger position to evaluate bids and to write a contract that serves their own interests" (Lacity, 1995: 91)

Question 73, *I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches",* also rated high. This items focuses on an IT managers desire to simply rid themselves of a difficult and problematic activity. This issue is anchored to the idea that IT can be a very demanding and sometimes unrewarding activity. Many times IT administrators do not adequately feel compensated either emotionally or financially when they have success. In addition, they feel overly targeted by users when something goes wrong (Lacity, 1994). This can lead to IT managers simply outsourcing the problem to someone else. Some feel that this approach can also have the added benefit of focusing the attention of an organizations senior leadership on IT. As expert #2 wrote,

> Some managers, both in IT and at the corporate level would rather toss the problem over the fence. Have you heard the term, "IT is not part of our core mission?" This also happens when an IT manager cannot get corporate support for making tough decisions. By outsourcing the issue, they force the organization to recognize "troublesome" functions can be tough to resolve whether run by the government or contractors.

The viewpoint expressed by expert #10 on this issue seems even more basic when he writes, "I see outsourcing as a management strategy-which would include eliminating a troublesome function." From this it seems he believes that eliminating a troublesome function is simply a beneficial by-product of the proper overall management strategy.

During the initial interviews it also became clear that exposing exaggerated claims was a potential reason to outsource. In one interview, the CIO of a DoD agency mentioned that there is big push towards outsourcing IT within the government (Cooper, 2000). This is not surprising considering Congressional language exists stating that Government agencies shall outsource. However, some agency CIOs have not been convinced that outsourcing is the panacea others might think it is. Some of these individuals have been successful at convincing Congressional staffers to allow their organization to perform outsourcing evaluations to determine exactly how much might truly be saved if outsourcing were pursued.

Security

As theorized, security was also represented in the top ten list of determinants. Several experts emphasized the fact that security was an important factor in making a decision to outsourcing their IT. Expert #6 wrote, "We operate in a highly sensitive and political environment. Who has access to our data is a concern." Expert #8 echoed this sentiment by stating, "[We] operate in a high security environment. Every vendor/contractor must be cleared to this level." Expert #6's comment is also interesting because it points out that the environment is not just sensitive, but political as well. This reveals that enemies of the state may not be the only adversaries individuals attempt to conceal information from. As mentioned in chapter two, individuals in public sector organizations can sometimes base decisions on more personally motivated criteria (Hancox, 1999).

Yet when it comes to protecting sensitive information, other experts feel that contract provisions and existing policy are adequate safeguards. As expert #2 writes,

> Not a key decision factor. Rules are written into any contract that will specify how government information is to be treated. This may require a company to change their practices. Put the onus on the vendor, make the vendor support the government's requirement for privacy and security as part of a selection process. Do not make this an up-front decision—the extent they currently support adequate privacy.

Expert #2 follows this by stating, "the security screening mitigates this concern; once they have passed" and expert #9 wrote, "We maintain the highest level of integrity. Any security concern would be given the utmost attention."

This reliance on contract clauses to minimize security problems is endorsed by the literature. As mentioned in chapter two, there are those who have proposed that the security framework used when IT work is outsourced, is different than when the work is kept in-house (Fink, 1994) and that security issues for IT outsourcing agreements are different than for most other *normal* commercial contracts (Rebeiro, 1996). Therefore, it is important that those negotiating the contracts understand this so they can structure the contract to best support an organizations security requirements. To help assist them, a systems approach is sometimes advocated, whereby, the entire security framework is first defined and analyzed. Following this, appropriate contract provisions can be written to support the overall strategy (Rebeiro, 1996). These provisions might include specific performance measures that can be assessed and tested including response times, systems availability, data security and privacy/user authorization (Fink, 1994).

Environmental

When considering the influence of the environment on IT outsourcing decisions, diffusion theory and external actors seem to take center stage. As mentioned in chapter two, IT outsourcing can be considered an administrative innovation. As such, it is

diffused or communicated through certain channels over time among the members of the firm's social system. Of the two types of diffusion models, internal and external, the internal version seems most applicable in this situation since it applies when organizations are making their sourcing decision based on other organizations that have already outsourced (Loh, 1992). This model is based on the coefficient of internal influence, which is the likelihood that somebody who is not yet using the process will start using it because of word-of-mouth or other influence from those already using the process (Mahajan, 1989; Neilson, 1995). Based on this, the closer the channels of communication are linked, and the more homogenous the group is, the quicker and more powerful the diffusion will be. Since military related organizations are usually considered very homogenous and well connected, it is not surprising internal diffusion theory can thrive within it. Therefore, it is not surprising that diffusion was rated as a top determinant to IT outsourcing. This entire idea is captured by expert #10 who commented, "there is a 'what is everyone doing-let's follow' mentality in government." However, there are others who felt the opposite. They believed that diffusion theory has only a small affect in their organizations because IT managers showed resistance to outsourcing. As expert # 6 wrote, "resistance to our outsourcing has come from IT managers trying to protect their fiefdom." Expert #10 reinforces this idea by stating, "human nature is to resist change. Change usually occurs when motivated by an outside source."

The second top-rated environmental item was a new one submitted by an expert in round one. This question revolved around the affect of external actors on a decision to outsource. Since in this situation, information on the innovation is not obtained through interorganizational communication but comes from outside the system, some might argue

that it could be represented by the external influence model (Loh, 1992). However, it seems more likely that it is simply an effect of the hierarchical structure inside the Government. Since no comments were solicited in the third round for this item, it is difficult to determine exactly what was meant by *external actors*, but seems reasonable, based on in the interviews conducted at the beginning of this research, that the actors being referenced are senior to the stakeholders. Examples might include Congressional members or senior leadership within the executive branch.

Additional Factors

One additional factor created by the expert group also made it into the top ten highest ranked items. The ability of outsourcing to provide a method to adopt industry *best practices and improved processes* (NA1) was listed. Again, since no comments were solicited in the third round, it is difficult to determine exactly what was meant by it. However, one possible interpretation is that IT outsourcing allows public firms the ability to leverage the experiences and success of private firms while learning from their mistakes. Based on this it could be considered as a business related sub-factor. However, when the diffusion of these process among the members of a firm is considered, it could be considered an environmental determinant.

Limitation and Follow on Research

Perhaps the biggest limitation of this research was expert mortality. It has been said that one of the largest problems associated with the Delphi approach is mortality and this seems no truer than when studying IT related topics using senior leaders. The mortality in this study was 30%, and while high, could have been even higher. During this

research two experts retired and two others took new jobs yet one of the retirees still participated in the final round. This turnover, while high, is not surprising considering that the average duration each expert in this study had held his position was less than one year. Two potential reasons for this high turnover and inability to retain qualified senior IT executives in the government might be the current climate in the IT community and the strength of the economy. It is difficult for the Government to compete with lucrative offers from the labor hungry private sector (Matthews, 2000). In an attempt to combat these forces and lure IT workers into government service, special program and pay scales have even been created for them (Brewin, 2000; Robb, 2000).

Another limitation was the availability and accessibility of each of the experts. As previously mentioned, each of the experts selected were all senior executive IT leaders within their organization. Gaining access to these individuals can be difficult enough without trying to convince them to fill out three questionnaires, including one with 83 questions and another that required a substantial amount of writing for some. Most all of the selected experts were very helpful and accommodating. However, given the time constraints coupled with a change of administration, conducting another round would not have been feasible.

Also, as mentioned in chapter four, item 19, was deleted because during the final review it was determined that the wrong question had been attached to this items feedback statistics in the second and third round surveys. The question that was accidentally substituted in its place was *Increase hardware utilization,* which had a true average of 2.80. The original question was *Reassign current internal IT resources to higher priority activities* and had the advertised average of 4.20. Therefore, if that value had remained

constant, this item would have been included in the final top ten determinates. However, this error, while unfortunate, lends some credibility to the Delphi process employed in this study. Closer examination of the results shows that after the second round the average for this question had dropped to 3.71 and a ranking of 17. After the third round it fell even further to 3.57 and a ranking of 23. This trend is evidence that the group was working to lower this question to its original value of 2.80.

Another potential limitation concerns the feedback provided to the group members. As previously mentioned, the mean response of each item in the previous questionnaire was used as feedback. However, this statistic assumes normality for each items histogram. While a check of normality was performed after the first round on the total number of each response, the same was not done on an item basis. Therefore, if a bimodal distribution existed for a particular question it is conceivable that any outliers might have been overly weighted. Also, since the threshold at the end of each round was applied to the mean values, it is possible that some items were incorrectly deleted because of the potential over emphasis on outliers. A review of the histograms for each item in each round did show a bimodal distribution for a certain percentage of the items. Table 20 below summarizes these findings.

Table 20. Percentage of Questions with Bimodal Distributions

Question Set	% with Bimodal Distributions
Round 1 – All Questions	39.8%
Round 1 – Sub set (43 Questions)	46.5%
Round 2 – All questions (43 Questions)	34%
Round 2 – Subset (23 Questions)	26%
Round 3 – All Questions	26%

As observed the percentage of questions with a bimodal distribution was larger in the beginning. However, the quick decrease in this number was expected as consensus started to build. Also, the fact that the final 23 questions in the last two rounds had the same percentage is perhaps another indicator that stability had been achieved.

Suggestions for Future Research

Now that an investigation has been made as to why the DoD outsources its IT, new studies can use it as a foundation to build upon. One possible idea for future research might be to determine if these determinants are the best set for the DoD. During my interviews it was painfully obvious that many senior IT executives were desperately trying to ascertain the best set of reasons to outsource. Now that a determination has been made as to what outsourcing determinants are currently used, a study could be undertaken to determine what set of determinants are best. Implicit in this decision is an evaluation of whether the current set is working or not. One possible methodology to use for such a study might be to analyze expectations versus actual results. Another approach might be to compare figures of merit before and after outsourcing such as cost, service, or technical ability. One benefit for these approaches is that templates already exist (Lacity, 1994; Smith, 1998).

Another potential research question might be to determine if IT outsourcing should even be pursued in the DoD and if so, how much. As previously stressed, the DoD seems to have several unique organizational requirements. However, as this research suggests, the differences between public and private firms seems to be narrowing. Therefore, it might be beneficial to understand if these differences are strong enough to warrant

abandoning outsourcing and re-internalizing all IT functions or if outsourcing should be considered in the DoD as much as it is in the private sector.

Conclusions

One interesting feature of this research is that it reveals, in the area of IT outsourcing, the DoD seems to be experiencing much the same evolution the private sector did. Currently, it seems that public firms seem to be lagging behind many private organizations. During interviews conducted for this study, their were many who commented that when it came to IT outsourcing, the DoD was about three too four years behind the private sector (Barclay, 2000; Cooper, 2000). This realization might have been motivation for inclusion of the only new factor suggested by the group, *best practices and improved processes* (NA1). Perhaps including this factor is a realization by the DoD that they have something to learn from private firms in this area. Additionally, even though DoD outsourcing requirements might be unique, organizational attitudes and behaviors towards outsourcing seems to be following the same evolution they did in the private sector. There seems to be less of an emphasis now being placed on cost related factors and more being placed on business related factors. Again, this seems to be much the same evolution that private sector firms experienced.

Another thing that appears obvious is that each organization has a slightly different focus and requirement set. Therefore, each of their uses of IT outsourcing will be different. This is consistent with previous research that has shown that population selection for any IT related research is particularly delicate (Gefen, 1998). Consequently, it might be true that when considering IT outsourcing, it is most important to look within a firm to determine if it is appropriate. This seems to be consistent with a new wave of

research and interest in this area that focuses on *right* or *smart* sourcing (Lacity, 1996). This research stream focuses on ensuring that a firm uses IT outsourcing in a manner consistent with its needs and requirements, rather than applying some cookie cutter approach to the problem.

With less emphasis being placed on the military in the national agenda, budgets will probably continue to fall. However, at the same time, it has almost become a truism that IT in any organization will become more important. Clearly, a process to lower overall IT costs while providing the required level of information services to DoD members is required. Many in the DoD are hoping that outsourcing will provide the solution. Hopefully, this research has provided a better understanding of this mode of IT governance so that what direction and goals it should take can now be considered.

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Appendix A: Questionnaire #1 and Cover Letter

This appendix contains the first questionnaire used in round #1 and the accompanying cover letter. Please note that the numbering scheme used in this survey is different than the one presented in the text. To match the two schemes, please refer to Appendix G for the inter-round question numbering map.

DEPARTMENT OF THE AIR FORCE

AIR UNIVERSITY
AIR FORCE INSTITUE OF TECHNOLOGY

25 Sep 00

Dear study participant

Thank you very much for contributing to this research. It is hoped that the results will explain why Department of Defense agencies outsource their information technology (IT) systems. Your support helps ensure that the final product will have the highest reliability and validity possible.

This study is based on the Delphi method. The Delphi method was developed by the RAND Corporation and is a formalized process to determine the best answer or solution to a problem whenever insufficient or no applicable data exists. It uses a process of iterative questionnaires to help form consensus from a panel of experts. After each round, the statistical results of the last questionnaire are presented to the group, along with another shorter questionnaire. It's been shown that as this process continues, individual results will converge into a final group solution. The first questionnaire should take approximately 20 minutes to complete, the next 15 minutes and the last one 10 minutes. You can expect each questionnaire to arrive four weeks after the previous one.

To protect your privacy, the integrity of the process, and allow you the freedom to provide unbiased feedback, your name, organization, and responses will be kept strictly confidential. If any specific responses you provided need to be published, your identity will be completely masked.

Again, thank you very much for you input. If you have any questions please feel free to contact me at (937)235-9946 or via email at alexander.barelka@afit.af.mil

Sincerely

Alex J. Barelka, Capt, USAF
Graduate Student, AFIT

Attachment:
1. Questionnaire
2. Return envelope

Information Technology (IT) outsourcing -- Questionnaire #1

Numerous studies have considered IT outsourcing in the private sector, but few have focused on the Department of Defense (DoD). Consequently, there is no standard framework for why IT outsourcing decisions are made by DoD agencies. Without this information it is difficult to make any predictions about the outcome of future outsourcing decisions.

This study attempts to create a validated list of determinants for why DoD agencies outsource their IT systems. By providing a comprehensive framework for why outsourcing decisions are initially made, it is hoped that future decisions can be made with less uncertainty.

By completing the following survey, you will be helping to develop this framework. If there are any factors not present in the survey which you think are important to an IT outsourcing decision, please write them down in the spaces provided on pages 6 and 10.

Please remember your name, organization, and responses will be kept anonymous. The specific information requested below is only for internal tracking purposes. Prompt return of the survey will help maintain the integrity of this study. Therefore, please try your best to return the completed questionnaire via fax no later than seven calendar days after receipt. The dedicated fax number for the study is (208) 575-6528. You may also mail the survey back in the self-addressed envelope provided.

If you have any questions regarding this effort please don't hesitate to contact me at (937) 235-9946 (h), or via e-mail at alexander.barelka@afit.af.mil. Thank you again for your time and assistance.

General Information: Please print legibly

Name:_____

Grade/Rank: :_____

Current organization:_____

Current position:_____

Months in current position:_____

Mailing Address:_____

_____

_____

Fax number:_____

Primary duties: _____

_____

_____

Have you ever been a member of an outsourcing event? If so, what role did you play?

_____

_____

_____

Listed below are several potential reasons why an organization might or might not outsource its IT systems. Please indicate the amount of consideration **you** feel is appropriate for each reason when making an IT outsourcing decision for your agency. The scale ranges from a low of 1 to a high of 5. Please note the question is whether you consider these factors now, not if you should in the future.

Reason	**Amount of Consideration**				
	Low				High
1. Lower cost due to a vendors economies of scale	1	2	3	4	5
2. Ability of IT outsourcing to simplify management agenda (decreases management workload)	1	2	3	4	5
3. Improve technical services (e.g. dissatisfaction with current, in-house IT support)	1	2	3	4	5
4. High confidence that the contractor will perform to government expectations	1	2	3	4	5
5. Lower costs due to a vendor's tighter control over fringe benefits	1	2	3	4	5
6. Ability of IT outsourcing to flatten organizations	1	2	3	4	5
7. Increase customer satisfaction of IT related services	1	2	3	4	5
8. Access to a vendor's large research and development efforts	1	2	3	4	5
9. Lower costs by vendors relocating data centers to cheaper areas	1	2	3	4	5
10. Ability of IT outsourcing to leverage innovation	1	2	3	4	5
11. Lower costs due to a vendor's more focused expertise in managing IT	1	2	3	4	5
12. Improve the long-term financial predictability of IT budgets	1	2	3	4	5

	Amount of Consideration				
13. Increase employee motivation and cohesion	1	2	3	4	5
14. Improve cost controls (e.g. develop standardized processes for all agency members to follow)	1	2	3	4	5
15. Act as a change agent for reorganization	1	2	3	4	5
16. Demonstrate compliance with government guidelines	1	2	3	4	5
17. Absorb unnecessary IT employees generated by agency merger	1	2	3	4	5
18. Convert large IT capital budgets into more flexible operating budgets	1	2	3	4	5
19. Increase hardware utilization	1	2	3	4	5
20. Comply with Government requirements to outsource	1	2	3	4	5
21. Reassign current internal IT resources to higher priority activities	1	2	3	4	5
22. Absorb excess IT assets after reorganization	1	2	3	4	5
23. Improve quantity or quality of agency outputs	1	2	3	4	5
24. Solve technical incompatibilities after reorganization	1	2	3	4	5
25. Potential for hidden costs (e.g. unexpected costs for assumed IT services)	1	2	3	4	5
26. Productivity improvements	1	2	3	4	5
27. Retain competent IT professionals	1	2	3	4	5
28. Inability of a vendor to guarantee interoperability with system they don't control	1	2	3	4	5
29. Inability of the vendor to meet system availability requirements	1	2	3	4	5

	Amount of Consideration				
30. Vendor not upgrading or keeping staff proficient	1	2	3	4	5
31. Complications between vendor and customer technical IT interfaces	1	2	3	4	5
32. Restructuring IT budgets to allow different appropriations to be used	1	2	3	4	5
33. Protect and stabilize IT budgets (e.g. placing IT on contract to protect funding)	1	2	3	4	5
34. Potential that poor performing agency personnel, whose jobs have been outsourced, will be employed by the vendor	1	2	3	4	5
35. Large number of integration and system dependencies	1	2	3	4	5
36. Security concerns over granting an IT vendor's maintenance personnel access to a DoD IT systems	1	2	3	4	5
37. Increased transactional costs (contract processing, administration, coordination, etc.)	1	2	3	4	5
38. Feelings that vendor will not be able to solve agency specific IT requirements	1	2	3	4	5
39. Record all costs incurred by the users	1	2	3	4	5
40. Locate competent IT professionals	1	2	3	4	5
41. Lose control over IT services	1	2	3	4	5
42. Security concerns over allowing outside security specialists access to IT systems	1	2	3	4	5
43. Security concerns over how vendors handle agency data on their own systems	1	2	3	4	5
44. Inability to meet recovery and back-up requirements	1	2	3	4	5
45. Potential release of system design information	1	2	3	4	5

	Amount of Consideration				
46. Loss of critical IT skills base	1	2	3	4	5
47. Concerns over a vendors e-mail security procedures when discussing agency issues	1	2	3	4	5
48. Potential for inflated cost savings projections	1	2	3	4	5
49. Becoming overly dependent on contractors	1	2	3	4	5
50. Security concerns about subcontractors	1	2	3	4	5
51. Concerns over how a vendor disposes agency information after it is no longer needed	1	2	3	4	5
52. Lack of trust between Government and contractors	1	2	3	4	5
53. Loss of control over timing and quality of outputs	1	2	3	4	5
54. Security risk that technical design information will be compromised	1	2	3	4	5
55. Possibility that vendor will disclose classified data	1	2	3	4	5

Please list and rate any other important reasons why you think an agency might or might not outsource its IT systems.

Statement	Level of Comfort				
	Low				High
	1	2	3	4	5
	1	2	3	4	5

	Level of Comfort				
	1	2	3	4	5

Listed below are several statements related to your agency and IT outsourcing. Please rate your level of agreement for each statement. The scale ranges from a low of 1 to a high of 5.

Statement	Level of Agreement				
	Low				High
1. I believe my agency has a high ability to write an adequate IT service level agreement	1	2	3	4	5
2. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5
3. I believe my agency has the ability to properly manage an IT contract	1	2	3	4	5
4. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5
5. I believe IT outsourcing lowers my agency's ability to maximize its business opportunities	1	2	3	4	5
6. I believe the length of time an IT manager knows they will be in a position affects their decision to outsource	1	2	3	4	5
7. I believe concern over displaced IT staff members affects my decision to outsource	1	2	3	4	5
8. I believe my agency is capable of establishing its information requirements	1	2	3	4	5
9. I believe IT contracts can be adequately managed by my agency's current personnel	1	2	3	4	5

	Level of Agreement				
10. I believe IT outsourcing decreases my agency's ability to fully leverage IT	1	2	3	4	5
11. I believe the longer an IT manager is in a position, the more it will affect their decision to outsource	1	2	3	4	5
12. I believe decisions to start outsourcing are influenced by peoples perceptions on how it affects them	1	2	3	4	5
13. I believe my agency can adequately establish contract deliverables from its information requirements	1	2	3	4	5
14. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5
15. I believe some IT managers solicit outsourcing proposals in the hopes it will prove the efficiency and continued existence of the internal IT department.	1	2	3	4	5
16. I believe some IT managers solicit outsourcing proposals so that they can get senior leaders to authorize additional funding for an IT program by showing them outsourcing is not more cost effective	1	2	3	4	5
17. I believe some IT managers consider outsourcing to expose exaggerated claims made by vendors, thereby working to ensure senior leaders do not enter an outsourcing relationship prematurely	1	2	3	4	5
18. I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"	1	2	3	4	5
19. I believe some IT managers outsource to appear more corporate and credible in the hopes of enhancing their own career	1	2	3	4	5
20. I believe my agency can develop a proper acquisition strategy for its information requirements	1	2	3	4	5
21. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5

	Level of Agreement				
22. I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less	1	2	3	4	5
23. I believe some IT managers justify new resources by starting an IT source selection knowing that vendors will not be competitive against the internal department	1	2	3	4	5
24. I believe some IT managers will start outsourcing evaluations to prove to senior leadership that outsourcing might not meet their expectations	1	2	3	4	5
25. I believe some IT managers outsource IT to simply eliminate a problematic function	1	2	3	4	5
26. I believe the more other government agencies outsource their IT, the more mine might	1	2	3	4	5
27. I believe some IT managers outsource in the hopes that senior management will appreciate and value them more	1	2	3	4	5
28. I believe some IT managers are interested in IT outsourcing only because other IT managers in the government are	1	2	3	4	5

Please list and rate any other statements you feel are important to IT outsourcing.

Statement	**Level of Comfort**				
	Low				High
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5

Please list any additional comments you have about this survey or its subject matter:

_____

_____

_____

_____

_____

Thank you for your time

Appendix B: Questionnaire #2 and Cover Letter

This appendix contains the first questionnaire used in round #2 and the accompanying cover letter. Please note that the numbering scheme used in this survey is different than the one presented in the text. To match the two schemes, please refer to Appendix G for the inter-round question numbering map.

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
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29 Nov 00

Dear study participant

Thank you very much for your responses to the first round of this study. The input has been great and so far the results look very interesting. Based on the scores provided in the last round by the group, each question that had an average value below 3.0 has been dropped. This represents a total reduction of about 50%. However, due to technical difficulties, another table, with ten new questions needed to be included.

During the last round, some study participants correctly pointed out that the instructions did not specify what type of outsourcing is being examined. This was an oversight. This research primarily confines itself to the examination of operations and maintenance related functions and high dollar value contracts such as large support and services agreements. Examples of items that would not be considered in such a definition are software or hardware development, or IT research.

Some have also expressed an opinion that the first questionnaire did not flow well. This was anticipated due to the adherence to a strict interpretation of survey administration guidelines. However, these guidelines have since been relaxed, so you will hopefully find this version easier to follow. I have also attempted to format the survey in an easy to read layout. However, I have noticed that for whatever reason, some printers do not faithfully reproduce the intended product.

Again, thank you very much for you input. If you have any questions please feel free to contact me at (937) 235-9946 or via email at alexander.barelka@afit.af.mil

Sincerely

Alex J. Barelka, Capt, USAF
Graduate Student, AFIT

Attachment:
1. Questionnaire

Information Technology (IT) outsourcing -- Questionnaire #2

Participant Name:

As you know, this study is attempting to create a validated list of determinants for why DoD agencies outsource their IT systems. By developing a comprehensive framework for why outsourcing decisions are initially made, it is hoped that future decisions can be made with less uncertainty. While the purpose of the first round was to identify the top rated determinants, the purpose of this second round is to provide you with feedback and to further define the list.

Please notice that next to each of the following questions is your previous score and the group average. Please consider this information and re-score each item as you see fit. Also, for those questions which indicate that your previous response fell more than 1.25 standard deviations away from the mean, please comment on why you think this might have occurred in the space provided.

Also, several additional factors provided by group members have also been incorporated. Again, if there are still any factors not present in the survey which you think are important to an IT outsourcing decision, please write them down in the spaces provided.

Prompt return of the survey will help maintain the integrity of this study. Therefore, please try your best to return the completed questionnaire via fax no later than seven calendar days after receipt. The dedicated fax number for the study is (208) 575-6528. You may also e-mail your reply after simply highlighting your selections with a different color. Or, you can mail the survey to:

AFIT/ENV BLDG 640
2950 P STREET
WRIGHT-PATTTERSON AFB OH 45433-7765

If you have any questions regarding this effort please don't hesitate to contact me at (937) 235-9946 (h), or via e-mail at alexander.barelka@afit.af.mil. Thank you again for your time and assistance.

Listed below are several potential reasons why an organization might or might not outsource its IT systems. Please indicate the amount of consideration **you** feel is appropriate for each reason when making an IT outsourcing decision for your agency. The scale ranges from a low of 1 to a high of 5. Please note the question is whether you consider these factors now, not if you should in the future.

Group Average	Your Last Answer	Reason	Amount of Consideration				
			Low				High
3.8		1. Lower cost due to a vendors economies of scale	1	2	3	4	5
3.8		2. Lower costs due to a vendor's more focused expertise in managing IT	1	2	3	4	5
4		3. Improve cost controls (e.g. develop standardized processes for all agency members to follow)	1	2	3	4	5
3		4. Record all costs incurred by the users	1	2	3	4	5
3.1		5. Convert large IT capital budgets into more flexible operating budgets	1	2	3	4	5
3.4		6. Improve the long-term financial predictability of IT budgets	1	2	3	4	5
3.200		7. Protect and stabilize IT budgets (e.g. placing IT on contract to protect funding)	1	2	3	4	5
3.8		8. Ability of IT outsourcing to simplify management agenda (decreases management workload)	1	2	3	4	5
3.8		9. Ability of IT outsourcing to leverage innovation	1	2	3	4	5
4.2		10. Increase hardware utilization	1	2	3	4	5

			Amount of Consideration
4.3		11. Improve quantity or quality of agency outputs	1 2 3 4 5
4.5		12. Productivity improvements	1 2 3 4 5
3.2		13. Act as a change agent for reorganization	1 2 3 4 5
4.1		14. Improve technical services (e.g. dissatisfaction with current, in-house IT support)	1 2 3 4 5
4		15. Increase customer satisfaction of IT related services	1 2 3 4 5
3.125		16. Retain competent IT professionals	1 2 3 4 5
4.111		17. Locate competent IT professionals	1 2 3 4 5
3.1		18. Access to a vendor's large research and development efforts	1 2 3 4 5
3.125		19. Potential for hidden costs (e.g. unexpected costs for assumed IT services)	1 2 3 4 5
3.222		20. Increased transactional costs (contract processing, administration, coordination, etc.)	1 2 3 4 5
3.333		21. Lose control over IT services	1 2 3 4 5
3.778		22. Loss of critical IT skills base	1 2 3 4 5
3		23. Becoming overly dependent on contractors	1 2 3 4 5
3		24. Loss of control over timing and quality of outputs	1 2 3 4 5

			Amount of Consideration				
3.111		25. Feelings that vendor will not be able to solve agency specific IT requirements	1	2	3	4	5
3.2		26. Complications between vendor and customer technical IT interfaces	1	2	3	4	5
3.444		27. Security concerns over granting an IT vendor's maintenance personnel access to a DoD IT systems	1	2	3	4	5
3.4		28. Security concerns over allowing outside security specialists access to IT systems	1	2	3	4	5
3		29. Security concerns about subcontractors	1	2	3	4	5
3.375		30. Possibility that vendor will disclose classified data	1	2	3	4	5
4		31. Security concerns over how vendors handle agency data on their own systems	1	2	3	4	5
3		32. Concerns over a vendors e-mail security procedures when discussing agency issues	1	2	3	4	5
3		33. Concerns over how a vendor disposes agency information after it is no longer needed	1	2	3	4	5
3.1		34. Inability of a vendor to guarantee interoperability with system they don't control	1	2	3	4	5
3.889		35. Large number of integration and system dependencies	1	2	3	4	5
Below are new questions submitted by group members during the last round							
36. Congressional Interest			1	2	3	4	5

			Amount of Consideration				
37. Create agency wide business practice			1	2	3	4	5
38. Ability of IT outsourcing to make interoperability between systems LANs better			1	2	3	4	5
39. Quality of Intra-agency relationships (between IT and business units)			1	2	3	4	5
40. Lack of a clearly delineated set of systems, costs and service levels			1	2	3	4	5
41. Controlling different security levels of data without security incident			1	2	3	4	5

Please list and rate any other important reasons why you think an agency might or might not outsource its IT systems.

Statement	Level of Comfort				
	Low				High
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5

Listed below are several statements related to your agency and IT outsourcing. Please rate your level of agreement for each statement. The scale ranges from a low of 1 to a high of 5.

Group Average	Your Last Answer	Statement	Level of Agreement				
			Low				High
3.7		1. I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less	1	2	3	4	5
3.6		2. I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"	1	2	3	4	5
3.8		3. I believe some IT managers outsource IT to simply eliminate a problematic function	1	2	3	4	5
3		4. I believe the length of time an IT manager knows they will be in a position affects their decision to outsource	1	2	3	4	5
3.3		5. I believe the longer an IT manager is in a position, the more it will affect their decision to outsource	1	2	3	4	5
4.2		6. I believe the more other government agencies outsource their IT, the more mine might	1	2	3	4	5
3.2		7. I believe some IT managers are interested in IT outsourcing only because other IT managers in the government are	1	2	3	4	5
3.6		8. I believe decisions to start outsourcing are influenced by peoples perceptions on how it affects them	1	2	3	4	5

			Level of Agreement				
Below are new questions submitted by group members during the last round							
9. I believe that many agencies feel that outsourcing is either mandated or so strongly encouraged as to be, in essence mandated			1	2	3	4	5
10. I believe that many senior IT managers see outsourcing as an end in itself rather than a strategy to achieve a goal			1	2	3	4	5
11. I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions			1	2	3	4	5
12. I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes			1	2	3	4	5
13. I believe some IT managers view outsourcing as a means to mitigate the inability of government to remove incompetent IT workers			1	2	3	4	5
14. I believe the cost of outsourcing is not clearly understood			1	2	3	4	5
15. I believe outsourcing should not be done without a comprehensive business assessment to establish value			1	2	3	4	5
16. I believe managers do not determine best value prior to outsourcing			1	2	3	4	5

Please list and rate any other statements you feel are important to IT outsourcing.

Statement	**Level of Comfort**				
	Low				High
	1	2	3	4	5

	Level of Comfort
	1 2 3 4 5
	1 2 3 4 5

Below are similar questions from the first round that needed to be re-worded to better comply with survey administration procedures.

Statement	Level of Agreement				
	Low				High
1. I believe my agency has a low ability to write an adequate IT service level agreement	1	2	3	4	5
2. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5
3. I believe my agency does not have the ability to properly manage an IT contract	1	2	3	4	5
4. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5
5. I believe my agency is not capable of establishing its information requirements	1	2	3	4	5
6. I believe IT contracts can not be adequately managed by my agency's current personnel	1	2	3	4	5
7. I believe my agency can not adequately establish contract deliverables from its information requirements	1	2	3	4	5

	Level of Agreement				
8. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5
9. I believe my agency can not develop a proper acquisition strategy for its information requirements	1	2	3	4	5
10. I believe my response to the question above impacts my decision to outsource	1	2	3	4	5

Please list any additional comments you have about this survey or its subject matter:

_____

_____

_____

_____

_____

Thank you for your time…

Appendix C: Questionnaire #3 and Cover Letter

This appendix contains the first questionnaire used in round #3 and the accompanying cover letter. Please note that the numbering scheme used in this survey is different than the one presented in the text. To match the two schemes, please refer to Appendix G for the inter-round question numbering map.

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUE OF TECHNOLOGY

11 Jan 01

Dear study participant

Let me begin by again thanking everyone for their continued support during this study. I realize that all of you have very important matters to attend to and that finding time to fill out these questionnaire was sometimes difficult. However, your efforts do not appear to have been in vain. So far the results look very interesting and will hopefully provide direct and immediate benefits to all DoD CIO offices.

Once the study is concluded, I will be developing an executive overview of the results for your review. If you would like, I can personally brief them to you or your staff members. I will be moving back to the Washington D.C. area in April so such a meeting should not be difficult to arrange. If you want the in-person briefing simply annotate that on the questionnaire, otherwise, I will simply send you the material via e-mail.

As promised this survey is shorter; only 23 questions, no writing required. Based on the scores provided in the last round by the group, each question that had an average value below 3.714 has been dropped. This represents another reduction of about 50%.

Again, thank you very much for you input. If you have any questions please feel free to contact me at (937) 235-9946 or via email at alexander.barelka@afit.af.mil

Sincerely

Alex J. Barelka, Capt, USAF
Graduate Student, AFIT

Attachment:
1. Questionnaire

Information Technology (IT) outsourcing -- Questionnaire #3

Participant Name:

As you know, this study is attempting to create a validated list of determinants for why DoD agencies outsource their IT systems. By developing a comprehensive framework for why outsourcing decisions are initially made, it is hoped that future decisions can be made with less uncertainty. While the purpose of the first round was to identify the top rated determinants, the purpose of this second round is to provide you with feedback and to further define the list.

Prompt return of the survey will help maintain the integrity of this study. Therefore, please try your best to return the completed questionnaire via fax no later than seven calendar days after receipt. The dedicated fax number for the study is (208) 575-6528. You may also e-mail your reply after simply highlighting your selections with a different color. Or, you can mail the survey to:

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If you have any questions regarding this effort please don't hesitate to contact me at (937) 235-9946 (h), or via e-mail at alexander.barelka@afit.af.mil. Thank you again for your time and assistance.

Listed below are several potential reasons why an organization might or might not outsource its IT systems. Please indicate the amount of consideration **you** feel is appropriate for each reason when making an IT outsourcing decision for your agency. The scale ranges from a low of 1 to a high of 5. Please note the question is whether you consider these factors now, not if you should in the future.

Group Average	Your Last Answer	Reason	Amount of Consideration				
			Low				High
3.71		1. Lower cost due to a vendors economies of scale	1	2	3	4	5
3.71		2. Lower costs due to a vendor's more focused expertise in managing IT	1	2	3	4	5
3.71		3. Improve cost controls (e.g. develop standardized processes for all agency members to follow)	1	2	3	4	5
3.71		4. Increase hardware utilization	1	2	3	4	5
4.29		5. Improve quantity or quality of agency outputs	1	2	3	4	5
4.43		6. Productivity improvements	1	2	3	4	5
4.14		7. Improve technical services (e.g. dissatisfaction with current, in-house IT support)	1	2	3	4	5
3.86		8. Increase customer satisfaction of IT related services	1	2	3	4	5
3.86		9. Locate competent IT professionals	1	2	3	4	5
3.86		10. Security concerns over how vendors handle agency data on their own systems	1	2	3	4	5

			Amount of Consideration
4.14		11. Create agency wide business practice	1 2 3 4 5
4.00		12. Lack of a clearly delineated set of systems, costs and service levels	1 2 3 4 5
3.86		13. Controlling different security levels of data without security incident	1 2 3 4 5

Listed below are several statements related to your agency and IT outsourcing. Please rate your level of agreement for each statement. The scale ranges from a low of 1 to a high of 5.

Group Average	**Your Last Answer**	**Statement**	**Level of Agreement**
			Low High
4.14		1. I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less	1 2 3 4 5
4.14		2. I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"	1 2 3 4 5
3.86		3. I believe some IT managers outsource IT to simply eliminate a problematic function	1 2 3 4 5
3.71		4. I believe the longer an IT manager is in a position, the more it will affect their decision to outsource	1 2 3 4 5

			Level of Agreement				
4.00		5. I believe the more other government agencies outsource their IT, the more mine might	1	2	3	4	5
3.71		6. I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions	1	2	3	4	5
3.86		7. I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes	1	2	3	4	5
4.00		8. I believe the cost of outsourcing is not clearly understood	1	2	3	4	5
4.43		9. I believe outsourcing should not be done without a comprehensive business assessment to establish value	1	2	3	4	5
3.71		10. I believe managers do not determine best value prior to outsourcing	1	2	3	4	5

Thank you for your time…

Appendix D: Raw data from round #1

This appendix contains the raw data form the first round of the Delphi study. Please note that while the numbering scheme presented corresponds to the numbering used in the instruments themselves, they do not match to the scheme presented in the text. To match the two schemes, please refer to Appendix G for the inter-round question numbering map.

Question #	Item Type	Expert #1	Expert #2	Expert #3	Expert #4	Expert #5	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T1-01	F1	4	3	5	4	4	4	4	4	5	1
T1-02	B1	5	2	5	5	4	5	3	4	4	1
T1-03	T1	5	5	2	5	4	5	4	4	5	2
T1-04	P6	4	3	5	4	4	4	4	3		2
T1-05	F1	4	1	3	4	2	3	3	3	2	1
T1-06	B1	3	1	4	2	2	4	3	4	2	1
T1-07	T1	4	2	4	5	4	5	4	5	5	2
T1-08	T3	4	3	5	4	2	4	3	3	2	1
T1-09	F1	2	1	1	3	2	1	1	2	5	1
T1-10	B1	3	5	5	5	5	4	3	2	2	4
T1-11	F1	3	4	4	5	5	4	3	4	5	1
T1-12	F4	3	3	3	4	5	5	2	3	4	2
T1-13	B1	3	1	1	2	2	4	2	5	5	2
T1-14	F2	4	3	4	4	4	4	4	4	5	4
T1-15	B3	3	4	5	3	3	3	2	2	2	5
T1-16	B2	3	1	2	2	2	3	2	2		1
T1-17	B3	2	2	4	1	2	1	2	1	3	1
T1-18	F3	3	2	4	4	4	3	4	3	2	2
T1-19	B1	3	4	4	4	3	3	1	3	2	1
T1-20	B2	2	3	3	2	3	3	1	1		1
T1-21	B1	4	4	5	4	5	4	5	2	5	4
T1-22	B3	3	4	3	3	2	1	2	2	2	1
T1-23	B1	4	4	5	5	4	3	5	4	4	5
T1-24	B3	4	4	3	4	2	2	1	2	4	1
T1-25	F5	2	4	4	4		2		3	4	2
T1-26	B1	4	4	5	5	4	4	5	4	5	5
T1-27	T2	3	4	1	3		4		2	4	4

Question #	Item Type	Expert #1	Expert #2	Expert #3	Expert #4	Expert #5	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T1-28	T7	2	4	2	2	4	4	4	2	2	5
T1-29	T6	3	1	2	2		4	1	2	2	2
T1-30	T4	3	2	4	3	3	3	4	2	2	3
T1-31	T5	3	3	4	3	4	4	4	2	2	3
T1-32	F3	3	1	3	4		2	1	4	2	2
T1-33	F4	2	4	3	4	5	3	3	4	3	1
T1-34	T4	3	2	5	3		1	1	1	1	1
T1-35	T7	4	3	5	5		2	5	3	3	5
T1-36	S1	2	4	4	3		5	2	5	3	3
T1-37	F5	4	1	4	3		4	3	3	4	3
T1-38	T4	4	3	2	2		3	5	3	4	2
T1-39	F2	3	3	5	2		3	2	3	3	3
T1-40	T2	3	4	5	4		5	5	1	5	5
T1-41	B7	4	5	4	2		3	3	4	3	2
T1-42	S1	3	4	5	2	4	4	3	4	2	3
T1-43	S2	3	4	5	3	4	3	5	4	4	5
T1-44	T6	4	1	5	4		3	3	2	3	1
T1-45	S3	3	1	3	2		3	3	2	2	1
T1-46	B7	4	5	4	5		3	5	3	3	2
T1-47	S2	2	1	4	3		4	4	3	2	4
T1-48	F5	3	1	2	3		3	3	4	4	3
T1-49	B7	2	5	2	2	4	3	4	2	4	2
T1-50	S1	2	4	2	2		4	4	2	5	2
T1-51	S2	2	1	5	3		4	4	2	3	3
T1-52	P6	2	1	5	2		3	3	1		4
T1-53	B7	3	3	5	2		3	3	2	2	4
T1-54	S3	3	2	4	2		4	4	2	2	1

Question #	Item Type	Expert #1	Expert #2	Expert #3	Expert #4	Expert #5	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T1-55	S1	3	4	5	2		4	4	2		3
T2-01	B4	3	4	4	4	4	4	4	5	4	1
T2-02	B4	4	1	5	2	3	4	3	5	5	5
T2-03	B5	4	3	5	4	4	4	4	5	5	2
T2-04	B5	4	4	5	4	3	4	4	5	5	5
T2-05	B6	4	1	2	1	1	2	1	2	1	3
T2-06	E1	2	4	5	2	2	3	4	1	3	4
T2-07	E3	3	2	4	3	3	2	3	3	2	1
T2-08	B4	4	4	4	4	4	4	3	4	4	1
T2-09	B5	3	4	5	4	3	4	3	4	4	2
T2-10	B6	3	4	2	1	1	2	2	3	1	2
T2-11	E1	3	4	2	1	3	3	4	4	4	5
T2-12	E3	4	4	5	3	3	3	4	3	2	5
T2-13	B4	4	4	5	4	4	4	4	4	3	2
T2-14	B4	3	2	5	3	3	4	5	4	3	5
T2-15	P1	5	3	3	2	2	1	5	2	2	4
T2-16	P2	2	1	4	3	2	1	2	3	2	4
T2-17	P3	3	4	4	2	2	1	2	4	2	2
T2-18	P4	4	5	2	4	4	2	3	3	4	5
T2-19	P5	3	5	3	3	3	1	2	1	3	5
T2-20	B4	4	4	5	4	4	3	5	4	4	1
T2-21	B4	3	2	5	3	4	4	5	5	2	5
T2-22	P1	3	4	5	3	4	2	3	4	4	5
T2-23	P2	3	1	2	1	3	1	1	2	2	4
T2-24	P3	4	1	4	2	3	1	1	4	3	5
T2-25	P4	4	5	5	4	4	3	2	3	3	5

Question #	Item Type	Expert #1	Expert #2	Expert #3	Expert #4	Expert #5	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T2-26	E2	4	5	5	4	4	3	3	5	4	5
T2-27	P5	3	5	3	3	3	1	1	2	3	4
T2-28	E2	3	4	4	2	3	2	2	3	4	5

Appendix E: Raw data from round #2

This appendix contains the raw data form the second round of the Delphi study. Please note that while the numbering scheme presented corresponds to the numbering used in the instruments themselves, they do not match to the scheme presented in the text. To match the two schemes, please refer to Appendix G for the inter-round question numbering map.

Question #	Item Type	Expert #2	Expert #4	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T1-01	F1	3	4	4	5	4	5	1
T1-02	F1	4	4	4	4	4	5	1
T1-03	F2	3	3	4	4	4	4	4
T1-04	F2	3	3	3	3	3	3	3
T1-05	F3	2	4	3	4	3	2	2
T1-06	F4	3	4	5	3	3	4	2
T1-07	F4	4	4	3	3	3	3	1
T1-08	B1	2	5	5	4	4	4	1
T1-09	B1	5	5	4	3	2	2	4
T1-10	B1	4	3	4	4	2	5	4
T1-11	B1	4	5	3	5	4	4	5
T1-12	B1	4	4	4	5	4	5	5
T1-13	B3	4	3	3	2	2	2	5
T1-14	T1	5	4	5	4	4	5	2
T1-15	T1	3	4	5	4	4	5	2
T1-16	T2	4	3	4	1	2	4	4
T1-17	T2	4	3	5	5	1	5	4
T1-18	T3	3	4	4	3	3	2	1
T1-19	F5	4	4	2	2	3	4	2
T1-20	F5	1	3	4	3	3	4	3
T1-21	B7	5	1	3	3	3	3	2
T1-22	B7	5	4	3	4	3	3	2
T1-23	B7	5	2	3	4	2	4	2
T1-24	B7	3	3	3	4	2	2	4
T1-25	T4	3	2	3	5	3	4	2
T1-26	T5	3	2	4	4	2	2	3
T1-27	S1	4	3	5	2	5	3	3
T1-28	S1	4	3	4	4	4	2	3

Question #	Item Type	Expert #2	Expert #4	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T1-29	S1	4	2	4	4	2	5	2
T1-30	S1	4	3	4	4	2		3
T1-31	S2	4	2	3	5	4	4	5
T1-32	S2	1	3	4	4	3	2	4
T1-33	S2	1	3	4	4	2	3	3
T1-34	T7	4	2	4	4	2	2	5
T1-35	T7	3	4	2	5	3	3	5
T1-36	B2	5	3	5	4	4	1	2
T1-37	F2	5	4	4	5	5	3	3
T1-38	T3	3	4	4	5	5	2	1
T1-39	NE1	3	4	4	3	4	3	2
T1-40	B4	5	3	4	4	4	3	5
T1-41	S2	5	4	3	4	5	2	4
T2-01	P1	4	3	4	4	4	5	5
T2-02	P4	5	4	4	4	3	4	5
T2-03	P4	5	4	3	4	3	3	5
T2-04	E1	4	3	3	3	1	2	4
T2-05	E1	4	3	3	3	4	4	5
T2-06	E2	5	4	3	3	4	4	5
T2-07	E2	4	2	2	3	3	4	5
T2-08	E3	4	3	3	4	3	3	5
T2-09	B2	4	3	2	3	4	3	5
T2-10	B2	2	3	2	3	2	4	5
T2-11	NE2	4	3	4	3	4	3	5
T2-12	NA1	5	5	4	4	4	4	1
T2-13	B4	5	4	3	4	3	4	2
T2-14	F5	5	5	3	4	3	3	5

Question #	Item Type	Expert #2	Expert #4	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T2-15	F5	5	3	4	4	5	5	5
T2-16	F5	4	4	3	4	3	3	5
T3-1	B4	3	2	1	2	1	1	4
T3-2	B4	3	2	4	4	5	4	1
T3-3	B5	3	2	1	2	1	1	3
T3-4	B5	2	1	4	4	5	4	1
T3-5	B4	2	2	2	2	2	2	4
T3-6	B5	2	1	2	2	2	1	3
T3-7	B4	2	1	2	2	2	1	4
T3-8	B4	2	1	4	4	4	5	1
T3-9	B4	2	1	3	3	2	2	4
T3-10	B4	2	1	3	4	4	4	1

Appendix F: Raw data from round #3

This appendix contains the raw data form the third round of the Delphi study. Please note that while the numbering scheme presented corresponds to the numbering used in the instruments themselves, they do not match to the scheme presented in the text. To match the two schemes, please refer to Appendix G for the inter-round question numbering map.

Question #	Item Type	Expert #2	Expert #4	Expert #6	Expert #7	Expert #8	Expert #9	Expert #10
T1-01	F1	4	4	4	5	4	5	1
T1-02	F1	4	4	5	4	4	5	1
T1-03	F2	3	4	5	4	4	4	4
T1-04	B1	4	3	4	4	2	4	4
T1-05	B1	4	5	5	5	4	4	5
T1-06	B1	4	4	5	5	4	5	5
T1-07	T1	5	5	5	4	4	5	2
T1-08	T1	4	4	5	4	4	5	2
T1-09	T2	4	3	5	4	1	5	4
T1-10	S2	4	3	4	5	4	4	5
T1-11	F2	4	4	4	5	4	4	3
T1-12	B4	5	3	4	4	4	3	5
T1-13	S2	4	4	3	4	5	2	4
T2-01	P1	4	4	4	4	4	5	5
T2-02	P4	5	4	4	4	5	4	5
T2-03	P4	4	4	3	4	4	4	5
T2-04	E1	4	3	4	3	4	4	5
T2-05	E2	5	4	3	4	4	4	5
T2-06	NE2	4	4	4	4	4	4	5
T2-07	NA1	4	4	4	4	4	4	2
T2-08	F5	5	4	4	4	4	4	5
T2-09	F5	4	4	4	5	5	5	5
T2-10	F5	4	4	4	4	3	4	5

Appendix G: Inter-round question numbering map

This appendix contains the map to match the question schemes used in each of the three surveys with the universal coding used in the text.

Universal Code	Question	Questionnaire #1	Questionnaire #2	Questionnaire #3
1	Lower cost due to a vendors economies of scale	T1-01	T1-01	T1-01
2	Ability of IT outsourcing to simplify management agenda (decreases management workload)	T1-02	T1-08	
3	Improve technical services (e.g. dissatisfaction with current, in-house IT support)	T1-03	T1-14	T1-07
4	High confidence that the contractor will perform to government expectations	T1-04		
5	Lower costs due to a vendor's tighter control over fringe benefits	T1-05		
6	Ability of IT outsourcing to flatten organizations	T1-06		
7	Increase customer satisfaction of IT related services	T1-07	T1-15	T1-08
8	Access to a vendor's large research and development efforts	T1-08	T1-18	
9	Lower costs by vendors relocating data centers to cheaper areas	T1-09		
10	Ability of IT outsourcing to leverage innovation	T1-10	T1-09	
11	Lower costs due to a vendor's more focused expertise in managing IT	T1-11	T1-02	T1-02
12	Improve the long-term financial predictability of IT budgets	T1-12	T1-06	
13	Increase employee motivation and cohesion	T1-13		
14	Improve cost controls (e.g. develop standardized processes for all agency members to follow)	T1-14	T1-03	T1-03
15	Act as a change agent for reorganization	T1-15	T1-13	
16	Demonstrate compliance with government guidelines	T1-16		
17	Absorb unnecessary IT employees generated by agency merger	T1-17		
18	Convert large IT capital budgets into more flexible operating budgets	T1-18	T1-05	
19	Increase hardware utilization	T1-19	T1-10	T1-04
20	Comply with Government requirements to outsource	T1-20		
21	Reassign current internal IT resources to higher priority activities	T1-21		
22	Absorb excess IT assets after reorganization	T1-22		
23	Improve quantity or quality of agency outputs	T1-23	T1-11	T1-05
24	Solve technical incompatibilities after reorganization	T1-24		
25	Potential for hidden costs (e.g. unexpected costs for assumed IT services)	T1-25	T1-19	
26	Productivity improvements	T1-26	T1-12	T1-06
27	Retain competent IT professionals	T1-27	T1-16	
28	Inability of a vendor to guarantee interoperability with system they don't control	T1-28	T1-34	

Universal Code	Question	Questionnaire #1	Questionnaire #2	Questionnaire #3
29	Inability of the vendor to meet system availability requirements	T1-29		
30	Vendor not upgrading or keeping staff proficient	T1-30		
31	Complications between vendor and customer technical IT interfaces	T1-31	T1-26	
32	Restructuring IT budgets to allow different appropriations to be used	T1-32		
33	Protect and stabilize IT budgets (e.g. placing IT on contract to protect funding)	T1-33	T1-07	
34	Potential that poor performing agency personnel, whose jobs have been outsourced, will be employed by the vendor	T1-34		
35	Large number of integration and system dependencies	T1-35	T1-35	
36	Security concerns over granting an IT vendor's maintenance personnel access to a DoD IT systems	T1-36	T1-27	
37	Increased transactional costs (contract processing, administration, coordination, etc.)	T1-37	T1-20	
38	Feelings that vendor will not be able to solve agency specific IT requirements	T1-38	T1-25	
39	Record all costs incurred by the users	T1-39	T1-04	
40	Locate competent IT professionals	T1-40	T1-17	T1-09
41	Lose control over IT services	T1-41	T1-21	
42	Security concerns over allowing outside security specialists access to IT systems	T1-42	T1-28	
43	Security concerns over how vendors handle agency data on their own systems	T1-43	T1-31	T1-10
44	Inability to meet recovery and back-up requirements	T1-44		
45	Potential release of system design information	T1-45		
46	Loss of critical IT skills base	T1-46	T1-22	
47	Concerns over a vendors e-mail security procedures when discussing agency issues	T1-47	T1-32	
48	Potential for inflated cost savings projections	T1-48		
49	Becoming overly dependent on contractors	T1-49	T1-23	
50	Security concerns about subcontractors	T1-50	T1-29	
51	Concerns over how a vendor disposes agency information after it is no longer needed	T1-51	T1-33	
52	Lack of trust between Government and contractors	T1-52		
53	Loss of control over timing and quality of outputs	T1-53	T1-24	

Universal Code	Question	Questionnaire #1	Questionnaire #2	Questionnaire #3
54	Security risk that technical design information will be compromised	T1-54		
55	Possibility that vendor will disclose classified data	T1-55	T1-30	
56	I believe my agency has a high ability to write an adequate IT service level agreement	T2-01	T3-01 (reworded)	
57	I believe my response to the question above impacts my decision to outsource	T2-02	T3-02	
58	I believe my agency has the ability to properly manage an IT contract	T2-03	T3-03 (reworded)	
59	I believe my response to the question above impacts my decision to outsource	T2-04	T3-04	
60	I believe IT outsourcing lowers my agency's ability to maximize its business opportunities	T2-05		
61	I believe the length of time an IT manager knows they will be in a position affects their decision to outsource	T2-06	T2-04	
62	I believe concern over displaced IT staff members affects my decision to outsource	T2-07		
63	I believe my agency is capable of establishing its information requirements	T2-08	T3-05 (reworded)	
64	I believe IT contracts can be adequately managed by my agency's current personnel	T2-09	T3-06 (reworded)	
65	I believe IT outsourcing decreases my agency's ability to fully leverage IT	T2-10		
66	I believe the longer an IT manager is in a position, the more it will affect their decision to outsource	T2-11	T2-05	T2-04
67	I believe decisions to start outsourcing are influenced by peoples perceptions on how it affects them	T2-12	T2-08	
68	I believe my agency can adequately establish contract deliverables from its information requirements	T2-13	T3-07(reworded)	
69	I believe my response to the question above impacts my decision to outsource	T2-14	T3-08	
70	I believe some IT managers solicit outsourcing proposals in the hopes it will prove the efficiency and continued existence of the internal IT department.	T2-15		
71	I believe some IT managers solicit outsourcing proposals so that they can get senior leaders to authorize additional funding for an IT program by showing them outsourcing is not more cost effective	T2-16		
72	I believe some IT managers consider outsourcing to expose exaggerated claims made by vendors, thereby working to ensure senior leaders do not enter an outsourcing relationship prematurely	T2-17		

Universal Code	Question	Questionnaire #1	Questionnaire #2	Questionnaire #3
73	I believe some IT managers outsource to eliminate a troublesome function that is "not worth the headaches"	T2-18	T2-02	T2-02
74	I believe some IT managers outsource to appear more corporate and credible in the hopes of enhancing their own career	T2-19		
75	I believe my agency can develop a proper acquisition strategy for its information requirements	T2-20	T3-09 (reworded)	
76	I believe my response to the question above impacts my decision to outsource	T2-21	T3-10	
77	I believe some IT managers attempt to convince senior managers that their internal IT departments can perform the same services an outside vendor can perform for the same amount or less	T2-22	T2-01	T2-01
78	I believe some IT managers justify new resources by starting an IT source selection knowing that vendors will not be competitive against the internal department	T2-23		
79	I believe some IT managers will start outsourcing evaluations to prove to senior leadership that outsourcing might not meet their expectations	T2-24		
80	I believe some IT managers outsource IT to simply eliminate a problematic function	T2-25	T2-03	T2-03
81	I believe the more other government agencies outsource their IT, the more mine might	T2-26	T2-06	T2-05
82	I believe some IT managers outsource in the hopes that senior management will appreciate and value them more	T2-27		
83	I believe some IT managers are interested in IT outsourcing only because other IT managers in the government are	T2-28	T2-07	
N84	Congressional Interest		T1-36	
N85	Create agency wide business practice		T1-37	T1-11
N86	Ability of IT outsourcing to make interoperability between systems LANs better		T1-38	
N87	Quality of Intra-agency relationships (between IT and business units)		T1-39	
N88	Lack of a clearly delineated set of systems, costs and service levels		T1-40	T1-12
N89	Controlling different security levels of data without security incident		T1-41	T1-13
N90	I believe that many agencies feel that outsourcing is either mandated or so strongly encouraged as to be, in essence mandated		T2-09	
N91	I believe that many senior IT managers see outsourcing as an end in itself		T2-10	

Universal Code	Question	Questionnaire #1	Questionnaire #2	Questionnaire #3
	rather than a strategy to achieve a goal			
N92	I believe outsourcing activities are not initiated by IT organizations. External actors loom large in decisions		T2-11	T2-06
N93	I believe some IT managers view outsourcing as a means to adopt industry best practices and improve processes		T2-12	T2-07
N94	I believe some IT managers view outsourcing as a means to mitigate the inability of government to remove incompetent IT workers		T2-13	
N95	I believe the cost of outsourcing is not clearly understood		T2-14	T2-08
N96	I believe outsourcing should not be done without a comprehensive business assessment to establish value		T2-15	T2-09
N97	I believe managers do not determine best value prior to outsourcing		T2-16	T2-10

Appendix H: List of all factors, sub-factors, and associated alphanumeric designators

This appendix contains a listing of all the factors, sub-factors and assigned alphanumeric designators.

FINANCIAL (F1-F4)

BENEFITS: FINANCIAL

1. Cost Reductions =F1
    a. Economies of scale
    a. Tighter control over fringe benefits
    b. Relocation of data centers to lower cost areas
    c. More focused expertise in managing IT.
2. Improved cost controls: Develop formal and structured IT service channels = F2
3. Restructuring IT Budgets: Using different colors of money = F3
4. Protect and stabilize IT Budgets: Contracting regulations provide protection = F4

RISKS: FINANCIAL

5. Potential problems with cost reductions
    a. Increased organizational costs
    b. Increased Coordination costs
    c. Increased Transactional costs
    d. Over inflated and inaccurate cost savings projections
    e. Hidden costs
    f. Decreased service

BUSINESS (B1-B7)

BENEFITS: BUSINESS

1. Focus on Core Competency: Those things a company does better than any other = B1
    a. Potentially leads to:
        i. Simplifying the management agenda
        ii. Flattening organizations
        iii. Leveraging innovation
        iv. Increased employee motivation and cohesion
        v. Freeing up resources in the form of funding and personnel to apply to more strategic activities
        vi. Increased hardware utilization
        vii. Improved manufacturing yield
        viii. Productivity improvements
2. Government Regulations and guidelines = B2
    a. Requirements to outsource
    b. Using outsourcing as a method to demonstrate compliance with guidelines
3. Facilitating Reorganizations = B3
    a. Change Agent
    b. Unite dissimilar systems
        i. Solve technical incompatibilities
        ii. Absorb excess IT assets
        iii. Absorb unnecessary IT employees generated by a merger

RISKS: BUSINESS

4. Inability to write an adequate service level agreement = B4
    a. Inability to establish information requirements

b. Inability to transform requirements into deliverables

5. Inability to develop proper acquisition strategy
6. Inability to manage a contract: Using unskilled contract managers = B5
7. Inability to fully leverage IT: Less potential to realize and understand the true power of IT = B6
    a. Inability to get IT to act as a 'profit center'
8. Loss of control = B7
    a. Lose control of services provided
    b. Critical IT skills disappear from firm
    c. Becoming overly dependent on the contractor and losing control of the firm
    d. Timing and quality of outputs

TECHNICAL (T1-T3)

BENEFITS: TECHNICAL

1. Improving Technical Services: Dissatisfaction with current, in-house IT support = T1
2. Access to Technical Talent = T2
    a. Ability to find competent IT professionals
    b. Ability to retain competent IT professionals
    c. Ability to reassign current internal IT staff members to higher priority activities
3. Access to New Technologies = T3
    a. Access to a vendor's large research and development efforts.

RISKS: TECHNICAL

4. Potential problems with accessing technical talent
    a. Same personnel used
    b. Talent is not adept at solving a new customers requirements
    c. Vendor does not upgrade or keep staff current
5. Potential Problems with accessing new technologies
    a. Vendor and customer interfaces get complicated as systems grow
6. Inadequate recovery and back-up capability
7. Excess Integration and Interoperability problems

POLITICAL (P1-P6)

BENEFITS: POLITICAL

1. Proving efficiency: Obtaining outsourcing proposals in the hopes that it will prove the efficiency of the internal IT departments and justify its continued existence = P1
2. Justifying New Resources: Getting senior leaders to authorize additional funding for an IT program by showing them outsourcing is not more cost effective = P2
3. Exposing Exaggerated Claims: Work to ensure senior leaders do not enter an outsourcing relationship prematurely = P3
4. Eliminating a Troublesome Function: IT is not worth the headaches = P4

5. Breaking the so-called Glass Ceiling: Attempt by IT managers to appear more corporate and creditable in the hopes of enhancing their own career = P5

RISKS: POLITICAL

6. Lack of Trust between Government and Contractors = P6

SECURITY (S1-S3)

RISKS: SECUIRTY

1. Controlling access to the information = S1
    a. Granting vendors access to the IT infrastructure
        i. Using outside security specialists
            1. Disclosing classified data
    b. Security concerns surrounding sub-contractors
2. Overall vendor security procedures = S2
    a. How they:
        i. Handle customer data on their own systems
        ii. Correspond with each other via e-mail
        iii. Dispose of a customers information after it is no longer needed,
3. Release of Competitive advantage = S3
    a. Release of system design information

ENVIRONMETAL (E1-E3)

BENEFITS: ENVIRONMETAL

1. Length of service remaining for outsource decision makers: The length of time an IT manager knows they will be in a position will effect their decision to outsource = E1
2. Changes in the amount of IT outsourcing within the DoD: Diffusion theory = E3
    a. When a respected firm within a social system outsources its IT, other firms follow

RISKS: ENVIRONMETAL

3. Internal Resistance: Concern over displaced IT staff members effects a firms decision to outsource = E2

NEW FACTORS CREATED BY EXPERTS

NEW ENVIRONMETAL

BENEFITS: ENVIRONMETAL

1. Intra Agency Relationships
2. External Actors

NEW ADDITIONAL

BENEFITS: ADDITIONAL

1. Best practices and processes

Vita

Captain Alex J. Barelka was born on [redacted] in Toledo, Ohio. He graduated from Colorado Springs Christian School in Colorado Springs, Colorado in 1988. He then attended the Rochester Institute of Technology in Rochester, New York and graduated with a Bachelor of Science Degree in Imaging Science and was commissioned in May 1992.

His first assignment was to Kirtland AFB where he served as an electro-optical specialist and Program Manager for an airborne test platform, within Special Projects, and for the Maui Space Surveillance System. His next assignment was to the National Imagery and Mapping Agency, Reston, Virginia where he was the Program Manger for the Defense Dissemination System III.

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14. ABSTRACT

Each year the Department of Defense (DoD) spends billions of dollars on information technology (IT) outsourcing. However, little formal or academic guidance has appeared that explains how, why, or even when this occurs. This study presents and evaluates several determinants that may impact a decision to outsource information technology systems in the Department of Defense.

It begins with the development of a conceptual model, which was created using semi-structured interviews and an extensive literature search. This model was then matured into an analytic version by using the Delphi method, which is an accepted methodology to use when insufficient or no applicable data exists, the required data is too expensive to obtain and analyze, or the problem variables and their interaction are not clearly known.

The results seem to suggest that while some determinants are more important than others, the decision to outsource IT in the DoD is a multifaceted one. This is consistent with similar research done in the private sector. The results also seem to suggest that in the area of IT outsourcing, the DoD seems to be experiencing much the same evolution the private sector did and that each organization has a slightly different focus and requirement set.

15. SUBJECT TERMS

Information Systems, Outsourcing, Delphi Techniques, Department of Defense, Acquisition, Contracted Services, Management Planning and Control, Costs, Cost effectiveness, Military Procurement, Infrastructure, Theses

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