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**KEYS TO SUCCESSFUL IMPLEMENTATION AND SUSTAINMENT OF
MANAGED MAINTENANCE FOR HEALTHCARE FACILITIES**

THESIS

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AFIT/GAQ/ENV/04M-12

**DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY**

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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AFIT/GAQ/ENV/04M-12

KEYS TO SUCCESSFUL IMPLEMENTATION AND SUSTAINMENT OF
MANAGED MAINTENANCE FOR HEALTHCARE FACILITIES

THESIS

Presented to the Faculty

Department of Systems and Engineering Management

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In Partial Fulfillment of the Requirements for the
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Elizabeth A. Waggoner, BA

First Lieutenant

March 2004

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KEYS TO SUCCESSFUL IMPLEMENTATION AND SUSTAINMENT OF
MANAGED MAINTENANCE FOR HEALTHCARE FACILITIES

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Abstract

Health care providers are faced with two critical issues in today's evolving marketplace: lowering operational costs and achieving more efficient, cost-effective methods to deliver high quality patient care. The rising costs of healthcare and decreasing budgets have placed additional strain on the United States Air Force Medical Service to aggressively lower its facilities' costs. With fewer funds and less personnel, the Air Force medical service is re-evaluating its current maintenance outsourcing implementation practices and reexamining how these strategies might be implemented and sustained more successfully.

This research offers some of the foundational needs for designing, implementing and sustaining any type of outsourcing effort. Additionally this study highlighted some DoD specific issues to program management, focusing on some of the unique attributes associated with successfully managing and sustaining a DoD medical facility maintenance program. Content analysis was used to determine the ingredients for successful outsourcing implementation and sustainment.

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Additionally, I would like to thank my research partner, Captain Daria Gaillard, with whom I collaborated extensively on the data collection and analysis of Chapter III and the presentation of the interview results in Chapter IV. Captain Gaillard's patience in working with me on identically targeted populations for study made the arduous task of data collection bearable. Due to this commonality our gracious research committee allowed this specific aspect of our research effort to be performed together during the data collection effort to better leverage available resources. All other aspects of the research remained separate, individual efforts.

Elizabeth A. Waggoner

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KEYS TO SUCCESSFUL IMPLEMENTATION AND SUSTAINMENT OF MANAGED MAINTENANCE FOR HEALTHCARE FACILITIES

Introduction

Background

From fiscal year 1998 to 2001 the Department of Defense's (DoD) expenditures on facility maintenance rose by 26 percent, from \$3.8 billion to \$4.8 billion. Despite budgetary increases, the current levels of funding are insufficient to stop the deterioration of DoD's infrastructure, to include healthcare facilities. The shortfalls have hindered the Air Force's (AF) ability to sustain and operate facilities and have only allowed the AF to meet day-to-day maintenance needs. (Holman, 2003)

Adjusted for inflation, DoD's annual spending on medical care almost doubled from 1988 to 2003, rising from \$14 billion to over \$27 billion (Percy, 2003). Additionally, DoD cut the size of the active duty force by 38% over the same period (Percy, 2003). The end of the cold war brought about many base closures and healthcare facilities consolidations that resulted in a decrease in the total number of DoD in-house medical treatment facilities. These closures helped contribute to the rapid decline, 74%, of the number of beds operated by DoD from 1990 to 2000, and a similar reduction in total number of outpatient visits (Department of Defense's Office of the Assistant Secretary of Defense for Health Affairs, 2002). The shift in wartime mission, and resulting reduction of healthcare facilities alleviated the short-term need to maintain crumbling facilities and made the remaining facilities seem more cost effective

(Department of Defense's Office of the Assistant Secretary of Defense for Health Affairs, 2002). However, this optimistic vision of increasing long-term operating efficiencies with fewer real properties to maintain and decreased active duty personnel population, did not materialize as budgets continued to shrink and the strain on the remaining facilities and personnel continued to grow (Department of Defense's Office of the Assistant Secretary of Defense for Health Affairs, 2002).

Health care providers are faced with two critical issues in today's evolving marketplace: lowering operational costs and achieving more efficient, cost-effective methods to deliver high quality patient care (META Associates, 1998). The rising costs of healthcare and decreasing budgets have placed additional strain on the United States Air Force Medical Service to aggressively lower its facilities maintenance costs. Since maintenance has both associated costs and benefits, organizations must weigh them against available resources in assessing how much can and should be allocated to maintenance. With fewer funds and fewer personnel, the Air Force medical service is re-evaluating its current maintenance policies and programs for increased efficiency and cost savings (Kincaid, 2001).

Challenges

DoD faces a growing burden in providing peacetime healthcare for the military personnel. Active duty personnel, retirees and their dependents and survivors total over eight million. DoD's annual spending on medical care, adjusted for inflation, almost doubled from 1988 to 2003, topping \$27 billion. While outsourcing some aspects of healthcare for the military could alleviate some of the operating expenses associated with

providing on-site healthcare, complete outsourcing is not an option. DoD insists maintaining an in-house system is the only way to ensure U.S. forces would have reliable, high-quality healthcare in time of war and would be able to maintain the level of health care benefits necessary to retain members in peacetime (Percy, 2003).

Simultaneously maintaining crumbling facilities along with meeting the demand for more efficient, cost-effective methods to deliver quality patient care when faced with shrinking budgets has placed Air Force Materiel Command's Surgeon General (AFMC/SG) in an untenable position. As reported in the United States General Accounting Office report to Congressional Committees, "DoD and active military service officials report that 68 percent of facility classes rated by major commands are in such a deteriorated condition that they negatively affect the quality of life of military personnel and their families and their ability to achieve their mission" (FDCH Government Account Reports, 2/19/2003). Air Force leaders realize that maintaining a well-managed and highly efficient facility and asset management program is critical to mission accomplishment (National Institute of Building Sciences, 1998).

Facility maintenance is a necessary service resulting from the normal wear and tear, deterioration due to age and exposure, and abnormal wear and tear due to abuse or neglect. Equipment most likely to require and benefit from maintenance includes: frequently used equipment, equipment exposed to the elements, equipment needed for aesthetic value and equipment most likely to be overused or abused (Marshall, 2000).

Research has consistently shown insufficient and/or inadequate facilities maintenance planning quickly (and inevitably) leads to equipment malfunction and even failure (Marshall, 2000). Conversely, data has shown facilities with well-focused

facilities maintenance plans can reduce their annual maintenance costs by 15% to 25% (Marshall, 2000).

The enormity of the problem facing the DoD led to the implementation DoD's Defense Facilities Strategic Plan which was created to guide the armed forces in maintaining thousands of facilities throughout the world. The plan has four main goals: right size and place; right quality; right resources; and right tools and metrics. The fourth goal, right tools and metrics, focuses on using best practices, modern asset management techniques, and performance-oriented metrics to improve facility management and planning (Holman, 2003).

Attempting to maximize the returns on stretched budgets for the Air Force's health care system, AFMC/SG recently implemented managed maintenance, using a third-party supplier warrantor as a means of managing medical equipment and facility maintenance contracts. Now that the program has been created and has moved into the execution and governance phase, it is appropriate to assess how well this program achieved its objectives.

Research indicates five primary motives for outsourcing: costs, capital, knowledge, capacity and more recently "less sorrows", indicating outsourcing is led by strategic considerations to focus on core business activities (Fill and Visser, 2000). Through the outsourcing of non-critical functions, organizations are attempting to leverage their financial resources, share financial risks and allow their management to directly focus on their core business activities (Fill and Visser, 2000).

Organizational Change

As the 21st century unfolds, organizational leaders are faced with the inevitability of change. Cultural and social forces such as global competition, the Internet, and instant information require companies to adapt or face extinction. The list of companies that have undergone dramatic change reads like a “Who’s-Who” of business: IBM, General Motors, and Ford to name a few. On the other end of the spectrum are companies like Montgomery Ward, Encyclopedia Britannica, and Pan-Am that no longer exist due to their inability or unwillingness to change (Gibson, et. al., 2003).

While change is necessary for survival, organizations vary widely in their ability to manage change. A study of change programs at 40 organizations revealed that 58% failed to meet their expected return on investment and 20% realized only a third of the value expected. The remaining 42% exceeded their expected returns. The companies with the lowest returns exhibited poor change management capabilities while the companies that exceeded their expectations had solid change management skills. (LaClair and Rao, 2002)

The ability of an organization to manage change is a prerequisite to the consideration of outsourcing, but numerous other elements can influence the decision. Several factors that have created the need for AFMC/SG to explore the use of managed maintenance. The Office of Management and Budget (OMB) Circular No. A-76 (Revised), dated March 29, 1979, was created to determine whether DoD commercial activities should be performed within the DoD, by another federal agency, or by the private sector (DefenseLink, 1999). The Federal Activities Inventory Reform Act of 1998, led to the 1999 revision of the A-76 Circular to define the federal government’s

role in the performance of commercial activities (Office of Management and Budget, 2003). The general intent of the A-76 policy is to achieve economy and enhance productivity through partnership with the commercial sector.

Based on the assumption that the federal government should not compete with its citizens, the A-76 process began identifying functions that could be accomplished by industry and not federal government organizations. As result of the A-76 guidance, many maintenance duties involving the maintenance of healthcare facilities can no longer be performed by military organizations, leading Air Force leaders to look to outsourcing as a possible solution. It is clear that the ability to successfully manage change is critical to not only an organization's success but even its survival. But what happens when an organization does not plan for change properly and their initial attempt at change fails? How do they recover?

Problem Area

Congress has long been concerned with the Department of Defense's (DoD) management of its facility maintenance programs. In particular, the absence of accurate data has made it difficult if not impossible to make reliable funding decisions. As result, in 1999 the General Accounting Office (GAO) surveyed 571 military bases and major commands worldwide and determined DoD lacked a comprehensive or standardized strategy for maintaining its infrastructure. Each service differed in its prioritization of repairs, allocation of resources and analysis of property conditions. In addition, the GAO found many bases did not request sufficient funding to cover their real property needs,

requesting only up to one fifth of the funding necessary to cover real property maintenance and reported receiving only about one-sixth (Chan, 1999).

Responding to much of this under-funding of facility and infrastructure maintenance, Air Force senior leadership has increased the Air Force Medical Service's (AFMS) maintenance budget for its Sustainment, Restoration and Modernization (SRM) program. With funding in hand, but unreliable historical data, the US Air Force Material Command (AFMC) contracted with specialized healthcare facility consultants, META Associates, to accurately determine the condition of its health care facilities and to establish a database on facility information. META engineers and architects conducted a thorough assessment of healthcare facilities on seven bases, totaling 1.9 million square feet, and analyzed the infrastructure for architectural, mechanical, and electrical conditions. Deficiencies were categorized by priority. META categorized the deficiencies as: health hazards/life safety, code compliance, energy conservation, service life/reliability and functionality/capacity. (AFMC/SG Case Study, META Associates, 2002)

These deficiencies highlighted the unfortunate and alarming condition of the Air Force's medical facilities and brought attention to the need for transformation. Reacting to the need to transform and the increasing pressure to outsource all non-core activities (Luz, 1996), AFMC Surgeon General (AFMC/SG) discontinued its previous use of full cost reimbursement with base-level Civil Engineering (CE) for facility maintenance and adopted a relatively new maintenance outsourcing strategy: strategic partnering with an facility maintenance management firm.

Specifically, AFMC/SG's strategy of managed maintenance uses a system of 'right of first refusal' to allow CE the option to perform the maintenance before it is outsourced. The primary driver in this program selection is the impact another outsourcing relationship would have on base-level CE. Although senior leadership has embraced the concept and implemented the program command-wide, the overall management and execution of the program is still in its infancy.

Decision makers at AFMC/SG require visibility into how well outsourcing efforts are maximizing healthcare assets. The management, contracting, and execution of such a program are new territory for AFMC/SG. This program, still in its infancy, presents unique challenges and AFMC/SG requested this study to obtain an objective assessment to ensure optimization of the program. Evaluation of the program, including an evaluation of the implementation of the maintenance strategy will reveal what elements of outsourcing are essential in implementation and sustainment outsourcing success.

This research seeks to assist AFMC/SG decision makers in determining the critical success factors for successful implementation and sustainment of a facility maintenance program.

Research Questions

This research will evaluate the key factors that most influence the successful implementation and sustainment of a medical managed maintenance contract within the AF environment.

- 1) How outsourcing success should be assessed?
- 2) What are the most critical elements of successful implementation? Of sustainment?

Investigative Questions

The preceding discussion and the general research questions lead to the development of the following investigative questions:

- 1) What are the objectives of outsourcing the AFMC/SG facility maintenance?
 - What metrics or measurements determine effectiveness and efficiency of the outsourcing initiative?
- 2) What are the key drivers for success in the implementation and sustainment of a medical managed maintenance contract within the AF environment?
 - What are the current contracting methodologies and their strengths and weaknesses with respect to these drivers? What, if any, other option would be more effective?

Methodology

To evaluate the necessity of certain elements in outsourcing efforts interviews will be conducted with those parties affected by the facility maintenance outsourcing effort. Additionally, different organizations will be queried to determine what process was used in their program implementation and sustainment efforts. Medical personnel currently managing outsourced healthcare-related contracts, healthcare providers, and facility managers in differing types of military and civilian organizations will be interviewed to compare findings of key issues. Data will be analyzed using triangulation.

Contribution

This research seeks to assist AFMC/SG decision makers by systematically identifying, investigating and analyzing key organizational factors that impact military maintenance effectiveness and efficiency and program success. The results may provide key insight to

the effectiveness of the implementation and sustainment of the Air Force Material Command's current managed maintenance program. In addition, results may serve as a useful model for other DoD organizations to evaluate their respective implementation and sustainment of maintenance management programs.

Thesis Overview

The remainder of this thesis describes the study. Chapter II contains a literature review that summarizes what scholars and researchers have published on the topic of this research. Chapter III discusses the research methodology, analysis, and validation tools employed in conducting this research effort. Chapter IV provides an analysis of the collected data and the findings that resulted from this analysis. Finally, Chapter V provides conclusions and recommendations for future research.

II. LITERATURE REVIEW

Introduction

This literature review summarizes the pertinent literature regarding the determination to outsource and industry practices in the medical facility maintenance. The literature review will consist of five primary sections. The first section will focus on the definition of outsourcing, strategic sourcing, and the reasons to outsource. The second section will concentrate on the relevant contract types available to DoD agencies and the impact organizational culture can play in the critical elements of program implementation and sustainment. The third section will examine and discuss general maintenance programs and strategies. The fourth section will discuss the concept of defining and measuring organizational effectiveness. The fifth section discusses performance metrics and their relevance in governmental organizations and their reliability in achieving strategic objectives.

This literature review focuses on investigating the two main components necessary to answer this research question: How to perform facility maintenance and the essential elements of successful outsourcing. The chapter will be organized to discuss the factors that affect both outsourcing implementation and sustainment first, followed by those areas that affect each area respectively.

The intention of this research is to assess the drivers behind existing contracting strategy selection and allow the AFMC/SG facilities maintenance office to select the 'best fit' based on objective criteria. Based on this assessment, AFMC/SG should be better able to select the most appropriate contract vehicle for healthcare facility maintenance. This chapter contributes to that goal by reviewing both the strategies for

managing healthcare facilities and lessons learned from industry. It concludes by exploring these issues in the DoD context.

Drivers of Change

Although many factors influence change, this research focuses on the two main drivers of change, technology and information. Technology is constantly evolving at an incredible pace, with a reported 80% of the world's technological advances occurring since 1900. It is impossible for any one organization to remain abreast of all of the technological events that could possibly impact their organization or industry.

Outsourcing non-core activities to respective subject matter experts allows a company to remain focused on what distinguishes their company in the marketplace. Information is the other key driver that influences an organization's adaptation to the marketplace.

Knowledge is power and capturing necessary information can only improve an organization's competitiveness. While it is impossible to gather all the pertinent information that might be essential to an organization, this area, like technology, can be outsourced to experts to keep an organization informed as necessary (META Associates, 2004).

Understanding the drivers of change can be vital to understanding the challenges of outsourcing and maintaining sustainable competitive advantage in the marketplace. Sustainable competitive advantage requires critical decisions about the allocation of resources. It is imperative that organizations ask where the most return will be realized in the utilization of limited resources (META Associates, 2004).

Outsourcing

Outsourcing has been defined as the procurement of a good or service that was previously provided internally from a third party for a specific length of time with an agreed-upon price and service level (Saunders, et. al., 1997). For the purpose of this study, outsourcing is defined as the transfer of a support function traditionally performed by an in-house organization to an outside service provider, with the issuing organization continuing to provide appropriate oversight (Deavel, 1998). Outsourcing is a subset of competitive sourcing whereby the private sector service provider is selected to perform a commercial activity (Deavel, 1998).

In search of the best value for DoD dollars, agencies' contracting services have refined the means to compete and award contracts. One of the concepts used to control costs and increase benefits is strategic sourcing.

Competitive Sourcing versus Strategic Sourcing

Although both sourcing methods are used as to accomplish outsourcing, competitive sourcing and strategic sourcing differ in a variety of ways. Competitive sourcing is the process whereby the cost of government performance of a commercial activity is formally compared to the cost of performance by commercial vendors (DCMA, 2003). Strategic sourcing is the cornerstone of the Air Force's approach to outsourcing and privatization. Overall, strategic sourcing seeks to balance military effectiveness (the ability to fight and win) with the incorporation, where possible, of increased efficiencies from best business practices. The selection of the optimum source and process is central to strategic sourcing and should result in improved performance, efficiency, quality, and cost effectiveness. Strategic sourcing is not limited to

commercial activities, but also includes inherently governmental and military essential functions. When internal sources are required, strategic sourcing ensures that mission performance requirements are met or exceeded in the most cost-effective way. When an external source is available, strategic sourcing facilitates the identification of the best way to either compete with private or public sector suppliers to achieve performance and cost advantages, or to directly outsource or privatize the function under existing policies, procedures, and statutes. (AFMIA, 2001)

Reasons to Outsource

Understanding the drivers behind any outsourcing decision is crucial to selecting the right areas to outsource. Experts suggest five top reasons for outsourcing. The single most important intentional reason for outsourcing is to reduce or control operating costs. The most compelling short-term gain is realized in the initial shift to an outside provider's cost plans. According to a recent survey, companies reported that on average they realized a nine percent reduction in costs through outsourcing. The other reasons for outsourcing are making capital funds available, receiving a cash infusion, obtaining resources are not available internally, and addressing a function that is difficult to manage or control. Also included in the discussion are the top five strategic reasons for outsourcing which are listed in the table below. (META Associates, 2004)

Table 1. META Associates (2004) Top Reasons for Outsourcing

| Top Five Strategic Reasons for Outsourcing | Rationale |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Improve Business Focus | Outside expert handles time consuming, laborious tasks and frees up management's time and resources |
| Access to World-Class Capabilities | Partnering enables access to new technology, tools and techniques previously not available. |
| Accelerated Reengineering Benefits | Outsourcing can often result from business process reengineering. Allows company to immediately enjoy benefits of reengineering by outsourcing to a world-class organization |
| Shared Risks | When companies outsource enables more flexibility and more adaptability to changing opportunities. |
| Free Resources for Other Purposes | Outsourcing allows for re-direction of resources from non-core activities to activities with greater return for the customer. |

Determinants of Successful Outsourcing

One of the tenants of successful outsourcing is to never outsource a core function. According to Saunders, et al, (1997) a core function is defined a "one of a limited number of functions that provides strategic advantage to the company". Saunders, et. al., (1997) also go on to describe a core function as one that is developed slowly and is achieved through collective learning and information sharing and can not be acquired through rapid investment. This type of knowledge, tacit knowledge, is not easily transferred to others and outsourcing this inherently necessary function would possibly erode any competitive advantage a company maintained.

Determining What to Outsource

Experts also evaluated what functions of healthcare facilities would be most suited for outsourcing. Low risk outsourcing functions include project management, real estate, facility management, network management, data-processing, temporary staffing, supply-chain management, payroll, security services, food services, housekeeping, roads and grounds, real estate management and maintenance (META Associates, 2004).

Additionally Meta Associates (2004) also measured the services that are most often outsourced and they are depicted below in Figure One. The figure shows the services most often outsourced are those that are relatively simple to define and lack a significant degree of complexity. There is an inverse relationship between the complexity of a service and the percentage of those types of services being outsourced. It is noteworthy that building maintenance is midway through those services outsourced, but was included on those functions that are considered low risk for healthcare facilities (META Associates, 2004).

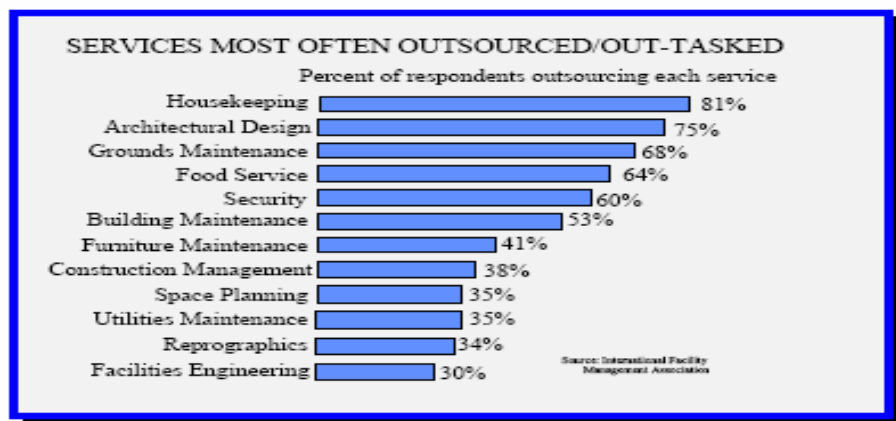


Figure 1 META Associates (2004) Services Outsourced

Additionally, some suggest project-specific and periodic requirements arise should rely on specialized expertise. Also, any task that requires a shift in focus from for the administrative and operational duties necessary to maximize a facility's ability to operate smoothly and efficiently should be seriously considered for outsourcing. Successful outsourcing creates the opportunity for health care facilities to focus on key business objectives and the core strategies of providing top-level healthcare services (META Associates, 2004).

The decision to outsource requires the organization to deal with an external provider. The organization then must determine, among other things, the form of the business relationship between itself and the provider. The next section discusses the various contract types that can govern the relationship.

Contract Type

Contract selection is one of the basic building blocks of determining how to implement and sustain any facility maintenance program. Aspects of the contract type selected can play a big part in the effort and support that will be required to launch a maintenance program and the flexibility that will be available during the sustainment phase. This element becomes especially important in the public sector that has more guidelines and restrictions regarding funding and contract types.

The Federal Acquisitions Regulation (FAR) was established to provided consistency and uniformity for the agencies within the federal government. The vision of the Federal Acquisition System was to allow the federal procurement system to offer the best possible product or service to the war fighter, while upholding the tax-payer's trust in federal acquisition practices. (Baldwin, 2001)

Because the government needs to acquire a vast variety of goods and services, numerous contract types are available to offer flexibility in the procurement of a range of specialized to simplified acquisitions needs of the war fighter. This section defines the most prominent contract types and highlights the advantages and disadvantage of each.

While there are many contract types available to the government, generally, contracts fall into two main categories: fixed price and cost reimbursement. Although there are numerous variations of each type, the primary difference between the two categories is the level of responsibility assigned to the government and contractor for performance and the degree of profit incentive offered for achieving specific goals.

Selecting the correct contract type is crucial to achieving optimal results. Ideally a balance is struck between the reasonable assignment of risk to the contractor, while providing the contractor the greatest incentive for efficient and economical performance (Baldwin, 2001, FAR Part 16, 2003).

Fixed Price Contracts

Fixed price contracts can provide the government and contractor a firm, or definite, price or in some limited cases, fixed parameters with some adjustment to the final price. Fixed-price contracts assign the contractor full responsibility for the performance costs and resulting profits. The Federal Acquisition Regulation (FAR) dictates that a firm fixed price or a fixed price with economic price adjustment contract shall be used when acquiring commercial items (FAR Part 16, 2003).

Firm Fixed Price (FFP)

According to the FAR, a firm-fixed-price contract, which best utilizes the basic profit motive of business enterprise, shall be used when the risk involved is minimal or

can be predicted with an acceptable degree of certainty. However, when a reasonable basis for firm pricing does not exist, other contract types should be considered, and negotiations should be directed toward selecting a contract type (or combination of types) that will appropriately tie profit to contractor performance. (FAR Part 16, 2003)

Firm requirements and a set price are the primary components of this contract type. The FFP contract places the full responsibility of performance costs and resulting profit or loss on the performing contractor. FFP uses the basic profit element to motivate the contractor and encourages the contractor to use good business sense to maximize profits. The FAR recommends this contract type when risk is minimal or can be foreseen with a predictable degree of certainty and does not unduly burden the contractor (Baldwin, 2001, FAR Part 16, 2003).

Fixed-Price with Economic Adjustment (FPEA)

The FPEA contract allows for upward and downward revisions in the previously stated contract price in the event of specified contingencies. Using this type of contract is appropriate when there is little to no stability in the anticipated labor and/or market conditions during the period of performance (FAR Part 16, 2003).

Fixed Price Incentive Fee

The primary objective of adding award fees to fixed price contracts is to motivate and incentivize the contractor to perform beyond meeting the most basic elements of the contract and addressing area of customer concern (Baldwin, 2001). This contract type allows for an adjustment to profit and the establishment of the final contract price by utilizing a formula tied to a predetermined relationship of final negotiated total cost to

total target cost. The primary benefit of this contract type is the reduced number of claims after contract award (FAR Part 16, 2003).

Cost Reimbursement Contracts

Cost reimbursement contracts establish an estimate of the total cost of the contract, with a not-to-exceed ceiling identified. The reimbursement contract provides for payment of allowable costs as prescribed in the contract terms. Cost reimbursement contracts are used when there is a high degree of cost uncertainty. (FAR Part 16, 2003)

Cost-Plus Fixed Fee (CPFF)

CPFF is based on a base fixed fee (profit) determined at the time of award. The predetermined fee does not vary in absolute amount based on costs incurred. This type of contract is primarily used for research and because the level of effort is unknown it places minimal responsibility for performance on the contractor. (FAR Part 16, 2003)

Cost-Plus Incentive/ Award Fee (CPI/AF)

The cost-plus-incentive-fee/award fee contract is a cost reimbursement contract that provides for the initially negotiated fee to be adjusted later by a formula based on the relationship of total allowable costs to total target costs. This type of contract has two means of payment to the contractor. This contract type specifies a target cost, a target fee, minimum and maximum fees, and a fee adjustment formula. (FAR Part 16, 2003)

The first portion, the fee, or base price of the contract, is based on a predetermined amount and will be awarded to the contractor independently of performance. After contract performance, the fee portion payable to the contractor is determined in accordance with the formula. The formula provides, within limits, for

increases in fee above target fee when total allowable costs are less than target costs, and decreases in fee below target fee when total allowable costs exceed target costs. This increase or decrease is intended to provide an incentive for the contractor to manage the contract effectively. When total allowable cost is greater than or less than the range of costs within which the fee-adjustment formula operates, the contractor is paid total allowable costs, plus the minimum or maximum fee. The second portion is the incentive component that is tied to a judgmental evaluation conducted by the Government that allows the issuing agency to offer financial motivation for excellent contract performance. An incentive program should optimize efficiency without sacrificing quality and safety. Incentive structure can be positive or negative or have features of both. (.FAR Part 16, 2003, Drake, et. al., 1977).

Indefinite Delivery Contracts

There are three types of indefinite-delivery contracts. All three types limit the government's obligation to the minimum quantity specified in the contract and permit flexibility in both quantities and delivery scheduling. Definite quantity, requirements contracts and indefinite quantity contracts may be used when exact times or quantities of future needs are not known at the time of contract award. (FAR Part 16, 2003)

Definite-Quantity

This contract provides for the delivery a defined quantity of specific supplies or services for a predetermined period of time, without specific dates of delivery specified within the contract period. This contract type is appropriate for supplies or services that require little to no lead-time. (FAR Part 16, 2003)

Requirements Contracts

A requirements contract provides for filling all actual purchase requirements of designated Government activities for supplies or services during a specified contract period, with deliveries or performance to be scheduled by placing orders with the contractor. A requirements contract may be appropriate for acquiring any supplies or services when the Government anticipates recurring requirements but cannot predetermine the precise quantities of supplies or services that designated Government activities will need during a definite period. (FAR Part 16, 2003)

When a requirements contract is used to acquire work (e.g., repair, modification, or overhaul) on existing items of Government property, the FAR states the contracting officer shall specify in the Schedule that failure of the Government to furnish such items in the amounts or quantities described in the Schedule as “estimated” or “maximum” will not entitle the contractor to any equitable adjustment in price under the Government Property clause of the contract (FAR Part 16, 2003).

Indefinite Quantity

This contract provides for the delivery of an undetermined quantity of supplies or services to be provided during a predetermined period of time. However, a quantity range is established and deliveries are requested by placing orders with the performing contractor. Contracting officers may use an indefinite-quantity contract when the Government cannot predetermine, above a specified minimum, the precise quantities of supplies or services that the Government will require during the contract period, and it is inadvisable for the Government to commit itself for more than a minimum quantity. The

contracting officer should use an indefinite-quantity contract only when a recurring need is anticipated. (FAR Part 16, 2003)

Contract Selection

A wide selection of contract types is available to the Government and contractors in order to provide needed flexibility in acquiring the large variety and volume of supplies and services required by agencies. Selecting the contract type is generally a matter for negotiation and requires the exercise of sound judgment. Negotiating the contract type and negotiating prices are closely related and should be considered together. The objective is to negotiate a contract type and price (or estimated cost and fee) that will result in reasonable contractor risk and provide the contractor with the greatest incentive for efficient and economical performance (Baldwin, 2001, FAR Part 16, 2003). Many factors affect the decision to the determination the appropriate type of contract: price competition, price analysis, cost analysis, type and complexity of the requirement, urgency of the requirement, period of performance, contractor's technical capability and financial responsibility, adequacy of the contractor's accounting system, concurrent contracts, extent and nature of proposed subcontracting, and acquisition history.

(Baldwin, 2001, FAR Part 16, 2003)

Selecting the correct type of contract for any acquisition is also affected by the type of services or items to be procured as well as other external considerations such as the marketplace, number of offerors, and the organizational culture of requiring agency. While the impact of price and cost to an organization are well known, the influence of

current organizational culture and the correct successful contract selection is less understood (Baldwin, 2001, FAR Part 16, 2003).

Innovative contracting is perceived as difficult in the conservative DoD environment under the prescriptive guidance of the Federal Acquisition Regulation (FAR). Creating flexible contracting vehicles that are adaptive in DoD's changing operational environments that both benefit and protect the government and the contractor is the ultimate goal of the contract formation process. (McFadden, 2001:22)

Towards this goal, DoD contracting initiatives have moved from low-cost to best-value. The force behind this shift was the 1998 Packard Commission's findings recommending increased use of commercial competition practices. The emphasis is on commercial competition practices, namely the commercial sector's emphasis on quality and established past performance along with price. Best value assessment criteria attempt to alleviate the expectations of false economies from the basis of awarding on lowest price. Best value decisions are based on assessing long-term worth opposed to initial acquisition price. Awarding on the basis of best value, versus low cost—technically acceptable, allows the procuring agency a greater degree of flexibility in selecting a contractor. (The President's Blue Ribbon Commission on Defense Management, 1986, Vollmecke, 1992)

With this working understanding of outsourcing and contract types that can govern an outsourced relationship, the next section reviews approaches to maintaining medical facilities.

Approaches to Facilities Maintenance

Astute management decisions regarding maintenance strategies have become increasingly complex and necessary. Facilities and equipment are becoming more technologically advanced—comprised of more intricate, automated systems and machinery. Furthermore, the reliability and failure rates of highly sophisticated medical equipment and components cannot be determined with absolute certainty, leaving decision makers with hypothetical models and historical data as the basis for making critical decisions (Walls and Thomas, 1999).

Deinstadt (2002) suggests three significantly different philosophies are available to those managing healthcare assets. The first, maintenance insurance, simply transfers the risk of the items covered to the insuring party. The second philosophy, asset management or managed maintenance, focuses on delivering a management system based on expert analysis and technical expertise and is part of a long-term management system for facility and asset management. The key benefit of managed maintenance is that it allows facility managers to focus on primary duties and allows experts to handle the facilities and equipment to maximize utilization and minimize downtime (National Institute of Building Sciences, 1998). In the third philosophy, a more informal program, existing in-house staff typically covers maintenance needs as they occur. The first two strategies utilize some form of outsourcing to implement and sustain their strategy (Deinstadt, 2002).

Regardless of the maintenance strategy chosen, managers must carefully measure the costs and benefits of matching the basic maintenance strategies with alternative maintenance conditions. Decision makers may choose a hybrid of the strategies or tailor

particular systems or equipment to one of the strategies depending on the needs of the system. It is the failure to properly research and justify a decision resulting in ad hoc or informal decisions, which inevitably leads to sub-optimal maintenance strategies and considerable if avoidable financial losses to the organization. (Walls and Thomas, 1999)

Given the severity of the situation, researchers have analyzed various maintenance scenarios and alternative decisions to create a viable framework to select appropriate maintenance strategies (Walls and Thomas 1999). Research has shown that while facilities and equipment may change due to technological advancement, four fundamental maintenance strategies remain unchanged: reactive, predictive, proactive, and preventative. Ideally, a maintenance program, or strategy, is a blend of the four types with respect to cost, criticality, and impact of failure to develop the plan that best fits their organization (C.White, 1998).

Reactive maintenance involves responding to individual outages as they occur, with little to no warning prior to the outage. This strategy can be useful in situations where the cost of monitoring an item(s) outweighs the cost of repair or replacement. Therefore the decision to use a reactive maintenance strategy is typically limited to low cost and non-critical commodity type items. However, relying on a reactive maintenance strategy alone can increase safety concerns, maintenance costs, and downtime. (C.White, 1998, Walls and Thomas, 1999)

Predictive maintenance is a strategy that monitors the condition of the items to be maintained, with the condition of the equipment as the determinant for repair or service. This strategy is cost-effective as it maximizes the utilization of an item without ever letting the item fail. Because this strategy is tied to the condition of the equipment, it

considered more cost effective than a time-based schedule as it reduces unnecessary maintenance, ultimately reducing maintenance costs. Predictive maintenance is typically used in conjunction with proactive maintenance as predictive maintenance only provides information into the current issue and does not address any underlying issues. (C.White, 1998, Walls and Thomas, 1999)

Proactive maintenance relies on predictive methods for information and uses that information to pinpoint and diagnose the underlying factors associated with current problems. The maintenance team's attempt to solve the underlying problem takes the maintenance a step further through the technician's analysis of the problem in its entirety, thus minimizing or eliminating any secondary damage. This proactive approach, in combination with the predictive approach, can eliminate recurring problems, reduce outages, reduce maintenance costs and extend equipment life. (C. White, 1998)

Preventative maintenance, in contrast to predictive, is time based rather than condition based. Preventative maintenance is the cornerstone of any maintenance strategy as it is usually the low cost method for preventing costly outages. Preventative maintenance is thought to be the first line of defense against costly outages; however, this method comes at a price. Unless maintenance schedules are based on reliable, factual data, maintenance can be done before it is necessary, thereby creating unnecessary expense. Preventative maintenance, when performed regularly can preserve the initial investment and reduce energy and utility costs, increase productivity and extend the life of equipment. While vitally important, this method does not prevent all outages. In fact, when maintenance personnel are inexperienced, preventative measures can sometimes create larger problems. (C.White, 1998, Walls and Thomas, 1999)

Facility equipment management and maintenance, as defined in Appendix 1, involve coordinating the physical workplace with the people and work of the organization. Ideally the successful maintenance of facilities and equipment maximizes asset utilization (Department of Defense, 2001).

One way an organization can gain control over escalating costs in facility and equipment maintenance is by tying its maintenance strategy to its organizational goals (J. White, 1998). Gaining control over this enormous cost area has presented a huge challenge to the DoD.

Regardless of the approach, contract type, or other factors, chosen for a particular facilities maintenance situation, decision makers will want to assess the effectiveness of the maintenance. The next section addresses this issue.

Defining Organizational Effectiveness

It is likely that military and civilian organizations will have differing criteria for defining organizational effectiveness. Additionally these definitions of organizational effectiveness can vary throughout the different levels of both types of organizations (Drake, et. al., 1977).

Some of the fundamental differences between military and civilian organizations maybe attributed to different goals and objectives. Organizations are usually developed to accomplish specific goals and objectives. These founding objectives and goals are often used as the basis for determining the structure and operational features and organization should possess to accomplish those objectives. The primary objective of the

military organization is to support the overall mission requirements of the parent military agency.

Historically cost is not a major component of measuring maintenance efficiency and effectiveness for non-profit or government agencies. The key measure for governmental agencies is rated from a mission effectiveness perspective, such as uptime and utilization rates are evaluated. Conversely, civilian goals include supporting the objectives of the user organization as well as operating cost effectively and maximizing profit and expansion of the market. (Drake, et. al., 1977, Averson, 1999)

Measuring Organizational Performance

Managing anything effectively requires a clear set of objectives (Arditi, 1999, J. White, 1998). The most important reason to measure performance is to determine if organizational goals and objectives are being met (GAO, 1996, J. White, 1998).

Determining the most effective way to assess the current performance of a program is complex. Developing metrics that support an organization's strategic plan is a challenging process to determine what performance measures capture the essence of the goals and desired outcomes (J. White, 1998, Kaplan and Norton, 1996).

One of the issues associated with performance measurement involves the span of time used in evaluation criteria. The trade-offs associated with short and long- run results make determining the optimal timeframe difficult. Short-run measures emphasize the origination of action, versus the completion, with little regard given to the final result. The short-run performance measure offers lower risk to the performing agency, but can result in a higher rate of performance distortion. The long-term perspective evaluates the

final result of the project. While this measure has less distortion and places greater emphasis on the long run profitability, it often penalizes the performing agency of the contract for events outside of their control. With the emphasis on the final result, the long-term performance measures offer less incentive distortion, but passes along higher risk to the performing agency. The ultimate choice of long or short run is largely determined by trade offs between risk and distortion and the costs associated with each (Baker, 2002).

Measures of Organizational Performance

A high maturity organization, such as the federal government, is expected to heavily rely on the use of metrics for process and project management (Jalote, 2001). In such organizations metrics are used as a basis for evaluating and optimizing program performances (Collins, et. al., 2000), and historical data is often used in planning for effort estimation (Jalote, 2001). Choosing which metrics to monitor and track is typically the most arduous task when developing a performance measurement system (Collins, et. al., 2000).

Metrics are derived from requirements and should be embedded as evaluation criteria for contract award, when appropriate (Collins, et. al., 2000). Metrics can be utilized to assess actual performance during ongoing management of the product or service to measure whether predicted values are being achieved and to provide the basis of corrective action when they are not (Collins, et. al., 2000).

One of the key elements of developing strong metrics is to understand how value is perceived and to align objectives and metrics accordingly (Spafford, 2003).

Determining the various stakeholders and the type of value each desires helps to determine the type of metric to utilize (Spafford, 2003).

Interest Groups and Stakeholder Perspective

Spafford (2003) states there are essentially three interest groups that define value: the overall organization; the sponsor(s); and the stakeholders. Each of these interest groups will be discussed later this chapter to understand their various interactions and how it helps define a project's overall perception of value.

Interest Groups and Value Drivers

Value drivers for all of the interest groups can be either formal, quantitative, and objective or informal, qualitative, and subjective or some combination of the two. Understanding there are various communities of interest and their differing values, can impact the formulation of metrics and desired outcomes. Swafford (2003) refers to a 'balanced understanding' as the assimilation of all the differing parties needs, based on the understanding of how the various parties perceive value, deliverables, and metrics.

Identifying the Stakeholder

Stakeholders are those individuals, groups, or other organizations that have an interest in the actions of an organization and have the ability to influence it. Savage et al., (1991) argue that organizations must use an integrative organizational strategy, requiring a consensus among the key stakeholders to combat volatility and risk (Savage, 1991).

The organization in this study is defined as the USAF/AFMC health care delivery system, which is made up of individual health care facilities. While the organization also

contains various stakeholders, overall the group as a whole will be referred to as the organization.

For this study the sponsor is the USAF AFMC/SG who is responsible for commissioning this research and is responsible for executing the operations and maintenance plans for all USAF AFMC healthcare assets. While it is not uncommon that the sponsor and the organization have similar values, it will not be assumed that is the case in this research.

The stakeholder group can be further subdivided into two groups, those directly affected and those indirectly affected. The directly affected groups, also known as key stakeholders, are those who stand to benefit or lose from a particular project's outcome. Key stakeholders and their desires can greatly influence the outcome of an event through influence and level of support. The indirectly affected groups may feel a ripple affect from change, but do not directly influence the project's outcome. However the impact on these groups may be used to gauge some of the subjective elements of success after the implementation. (Savage, 1991)

Customer Satisfaction and the Stakeholder

Customer satisfaction is central to competitive advantage. It is defined as the ability of a good or service to meet and/or exceed a customer's needs or expectations. Customer satisfaction encompasses both the tangible and intangible traits of a firm's goods or services. (Boone and Kurtz, 1995) Not only is customer satisfaction critical to an organization's success (Drucker, 1954), but it is the true measure of the quality of a good or service (Boone and Kurtz, 1995; Gibson, et. al., 2003).

Customers have product performance and service expectations, which they expect to have met. Customers have begun to demand more than simply a fair price, but added value, which results in increased worth by offering more than expected. Customer satisfaction then becomes a balancing act between what each respective customer wants and what organizations can afford to provide. (Boone and Kurtz, 1995)

In order to optimize this relationship, companies need accurate information. With more precise information, companies can focus on the integral issues actually driving satisfaction. Directed focus often leads to cost reductions since organizations can target improvements in areas of customer concern and de-emphasize their focus in non-customer-valued adding areas. (Michel, 1999)

Strategic Maintenance Management Objectives

In many business areas, successful outsourcing can be measured simply by looking at the bottom line (Fill and Visser, 2000). However, healthcare facilities and equipment maintenance require a more thorough evaluation of outsourcing performance (Hubbard, 1993). The following list details the key objectives decision makers face as they choose to outsource and the metrics used to evaluate performance (Fill and Visser, 2000)

Timeliness- The nature of the work involved and the criticality of the equipment affect response goals and thus response times. Timeliness is measured by the average time to respond for particular classes of maintenance activities. It is calculated by capturing the elapsed time between the work request and the actual time work has begun.

This measurement is helps indicate how well maintenance satisfies customers' expectations of timeliness (Hubbard, 1993).

Quality of Service- While there has always been a focus on reducing costs, firms are becoming more sophisticated and are looking less for "labor brokers" and more frequently for value. Firms more often desire outsourcing agents who bring best practices with them as well as sophisticated procedures and technical knowledge (Finchem, 1997). Quality of work is not as quantifiable as timeliness and therefore not as easily measured.

Reliability Improvement: Equipment Downtime- As the heading indicates, this maintenance goal seeks to maximize the uptime of all devices. Maximizing operational availability improves patient care (Hertz, et. al., 2002).

Cost Reduction- Historically, cost reduction has been a primary driver for outsourcing maintenance (Finchem, 1997).

Cost Stability- Cost stability shows a continual identification of waste and abuse, new controls and cost reporting and national purchasing power (Hubbard, 1993).

Program Flexibility- Program flexibility as a maintenance objective is the ability to expand and contract services based on demand (Hubbard, 1993).

Management Expertise- Management expertise allows for the more efficient use and utilization of specialized skills and knowledge (Hubbard, 1993).

Repair Documentation Management- More efficient repair documentation management allows for less obsolescence since preventative maintenance is being performed in a timely manner with the documentation being organized and managed (Hertz et. al., 2002).

Metric Classification and Criterion

To understand the utility of measures and what they capture, it can be helpful to classify them into two categories; outcome and driver measures. Outcome measures include areas such as customer satisfaction, profitability or cost containment, and employee skills and abilities. Driver measures include areas such as defect rates, uptime, and cycle time. The primary difference between the measures is when they are gathered in the process. Outcome measures, or lag indicators, are reported after the process is completed. Driver measures, or lead indicators, provide measurement feedback during the process. Ideally a combination of the two will be used to give a balanced assessment, during and after the process is complete (J. White, 1998, Kaplan and Norton, 1996).

An additional classification of measures is objective and subjective. Typically objective measures are more straightforward and easier to develop. Subjective measures are more difficult to develop and use based on their qualitative elements. Subjective measures, such as customer statistics, tend to be interesting, but alone do not reveal the underlying economic and relational drivers. Although subjective measures are questioned for viability, accuracy, and importance these measures can be invaluable in measuring certain process elements (J. White, 1998).

White (1998) categorized metrics in five areas: cost effectiveness; overhead reduction; customer satisfaction; infrastructure reduction; and a miscellaneous category. In order to measure these areas the following criteria were selected to quantify and assess these areas: cost per unit output; production efficiency and resource utilization; material readiness; customer satisfaction; and quality. However, the best-designed metrics can be rendered ineffective by poor implementation. Using bottom-up, locally gathered data can

help build consensus around the value, accuracy and implications of metrics (J. White, 1998).

Ideally there are certain minimum criteria desirable in any metrics selected. Identifying the desired features prior to the design of metrics will increase the likelihood of capturing the data to be measured. Arveson (1998) suggests the following twelve features of good metrics:

Table 2 Arveson (1998) Twelve Features

| Feature |
|-----------------------------------------------------------------------------------|
| Leading indicators; allow to forecast future trends inside and outside the agency |
| Objective and Unbiased |
| Normalized; allow for benchmarking against other agencies |
| Statistically reliable; small margin of error |
| Unobtrusive gathering technique; not disruptive to work or undermining of trust |
| Inexpensive to collect; small samples are adequate |
| Balanced; a blend of qualitative and quantitative for multiple perspectives |
| Appropriate; measure and capture the correct things |
| Quantifiable; ease of aggregation, calculation, and comparison |
| Efficient; can draw many conclusions from data set |
| Comprehensive; show all the significant features of an agency's performance |
| Discriminating; small changes are meaningful |

The literature shows there can be a variation of desired outcomes and methods to assess these desired outcomes, depending on the stake holder's perspective.

Role of Metrics in Government Organizations

To determine the most appropriate means for procuring a service it is critical to know what factors of that service the customer values most and how they will be measured. The form the optimal contract takes, and the efficiency of the contract, depends on the relationship between the performance measures used and the contract objectives (Baker, 1999).

Ideally metrics point to actionable insights and quantifiable impacts. Determining how to capture these points is difficult, and knowing what areas are worth capturing is vital. Top-line numbers often capture aggregate data points and are too inclusive to allow for point pointing actionable items. Determining scope and depth of metrics are valuable. Tailored metrics can highlight opportunities. The most powerful metrics will identify and quantify opportunities within focused comparisons as well as across broader, structural comparisons. Whether they are leading, lagging, internal, external, objective or subjective indicators, metrics are vital tools for leaders to gauge the performance of their organizations (J. White, 1998).

As government agencies are not profit driven, Arveson (1999) argues the key metric for gauging government performance is not financial, but mission effectiveness. While an agency's mission can be fluid, the metrics used to gauge them need to remain focused on capturing the most essential elements of the mission goal. Arveson (1999) discusses the differences in the strategic features of the commercial and government sector in eight areas. While the general strategic goal for the private sector is competitiveness, the public sector is focused on mission effectiveness. Profit and growth are financial goals in the private sector, while cost reduction; efficiency and

accountability to the public are top financial concerns in the public sector. The differences in stakeholders, justification for secrecy and budget factors also impact the fundamental differences in what determines the key success factors and the metrics that are appropriate for each sector.

The chart below, table three, outlines some of the primary differences between the general goals of private and public sector as discussed in the article, “Translating Performance Metrics from the Private to the Public Sector.” Recognizing the differences between the two types of agencies, and the respective evaluators, is key to developing evocative and accurate measures of performance (Averson, 1999).

Table 3. Averson (1999) Translating Metrics

| Strategic feature | Private Sector | Public Sector |
|--------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| General Strategic Goal | Competitiveness | Mission Effectiveness |
| General Financial Goals | Profit; Growth; Market Share; Innovation; creativity; good will | Cost Reduction; Efficiency: Accountability to Public |
| Values | Recognition | Integrity; fairness |
| Desired Outcome | Customer Satisfaction | Customer Satisfaction |
| Stakeholders | Stockholders; Owners; Markets | Taxpayers; Inspectors; Legislators |
| Budget Priorities Defined By: | Customer Demand | Leadership; Legislators: Planners |
| Justification For Secrecy | Protection of Intellectual Capital; Propriety Knowledge; Growth Rate; Earnings; Market Share | National Security |
| Key Success Factors | Uniqueness; Advanced Technology | Best Management Practices; Economies of Scale; Standardized Technology |

Metrics needed by government agencies fall into three general categories; strategic needs; mission effectiveness; and operational efficiency. Mission effectiveness metrics are intended to assess the health and viability of ongoing missions that will be needed in the future. Operational efficiency metrics are intended to assess the quality of support functions in enabling the needed missions to be accomplished for the minimum cost and time. Operational efficiency metrics require standardized metrics and combined with benchmarking will lead to the identification of best and worst practices. These more generalizable metrics can then be benchmarked across other organizations to compare processes with the private sector. This study will focus primarily on mission effectiveness and operational efficiency metrics (Arveson, 1999).

Accurately measuring an organization's performance is difficult (Arveson, 1999). Gauging performance, and awarding contractor incentives based on loosely correlated metrics can unintentionally undermine the effectiveness of the metrics and result in misleading performance indicators. For example, basing an incentive program on customer satisfaction levels and using customer satisfaction measures as an indicator of overall organizational performance, can become problematic. While knowing current levels of customer satisfaction can be meaningful, tying an incentive program to these levels may encourage contractors to explore ways of increasing customer satisfaction, without increasing the overall performance of the organization. While customer service levels and organizational performance may be highly correlated, tying incentive plans to these factors may result in incentivizing the wrong contractor behavior (Baker, 2002)

The measures for the non-profits are more likely distorted than those of for-profit agencies for a variety of reasons. Measuring performance in a not-for-profit agency, such

as the federal government, is also challenged by the lack of 'real' market value assigned to outputs, as they are not sold in the marketplace. The combination of intangible inputs, (e.g., volunteer hours, charitable donations, and tax incentives) makes it almost impossible to use the for-profit practice of letting the market participants determine what a product or service is worth. The limited market transactions not-for-profits engage in reduce the effectiveness of this strategy. As a result, the costs and revenues not-for-profits accrue may not accurately measure the value of the goods or services being produced. Thus, tying incentive programs to revenue and cost measures in not-for-profit agency may unintentionally skew results and limit the effectiveness of incentive programs (Baker, 2002).

Not-for-profit agencies using distorted performance metrics are often characterized by weak incentives. Relying solely on objective performance measures can compound this effect. Utilizing subjective assessments allow managers to examine the behaviors and underlying motivations in contractor decision-making. This aspect of subjectivity also decreases the degree of distortion and risk involved in relying solely on objective performance measures. Ideally, a blend of the two types of performance measures is preferred (Baker, 2002).

Conclusion

This chapter provided a review of relevant literature on outsourcing, contract type selection, facilities maintenance, and performance measurement. The researcher merged these areas into a research question and hypotheses for testing. Chapter III discusses the methodology and validation tools the researcher used for testing the research question.

III. METHODOLOGY

This chapter outlines the procedure for answering the primary investigative question, which is to evaluate the key factors that most influence the successful implementation and sustainment of a medical managed maintenance contract within the AF environment. After reviewing the research problem and related questions, the chapter discusses the selection of research design, and validates the selection of the independent variables and the dependent variables. In addition, it discusses the sample selection, including the final selection of the DoD facilities used in the study and the subsequent interviews with the subject matter experts.

Research Problem

Health care providers are faced with two critical issues in today's evolving marketplace: lowering operational costs and achieving more efficient, cost-effective methods to deliver high quality patient care. The rising costs of healthcare and decreasing budgets have placed additional strain on the United States Air Force Medical Service to aggressively lower its costs, especially facility costs, to include facilities maintenance. Since maintenance has both associated costs and benefits, organizations must weigh them against available resources in assessing how much can and should be allocated to maintenance. With fewer funds and fewer personnel, the Air Force medical service is re-evaluating its current maintenance policies and programs for increased efficiency and cost savings. Reacting to the need to transform and the increasing pressure to outsource all non-core activities, AFMC Surgeon General (AFMC/SG) discontinued its previous use of full cost reimbursement with base-level Civil Engineering (CE) for facility

maintenance and adopted a relatively new maintenance outsourcing strategy: strategic partnering with an facility maintenance management firm. Specifically, AFMC/SG's strategy of managed maintenance uses a system of 'right of first refusal' to allow CE the option to perform the maintenance before it is outsourced. The primary driver in this program selection is the impact another outsourcing relationship would have on base-level CE. Senior leadership in an attempt to implement the best possible solution wanted to gain some insight into the critical success factors in implementing and sustaining an outsourcing initiative. The objective of this study is to compare the necessary ingredients in successful outsourcing to those proposed in the existing literature.

Research Objective and Questions

This study explores the dynamics associated with outsourcing medical maintenance and medical equipment. Relying on archival data and interviews with 7 MAJCOM representatives and 21 survey respondents, this study seeks primarily to:

- 1) How outsourcing success should be assessed?
- 2) What are the most critical elements of successful implementation? Of sustainment?

Investigative Questions

- 1) What are the objectives of outsourcing the AFMC/SG facility maintenance?

What metrics or measurements determine effectiveness and efficiency?

- 2) What are the key drivers for success in the implementation and sustainment of a medical managed maintenance contract within the AF environment?

What are the current contracting methodologies and their strengths and weaknesses with respect to these drivers? What, if any, other option would be more effective?

Qualitative Research

The methodology describes the research process necessary to properly answer the research questions in a reliable and repeatable way, that avoids “rabbit-out-of-the-hat conclusions” (Sauer, 1993, p. 138). In this chapter, the rationale for choosing the methodology, research design factors, data collection, and design quality issues will be discussed.

Although there are various methodologies used for qualitative research, all methods have two basic tenants in common (Leedy and Ormrod, 2001). The first is they all focus on phenomena that occur in natural settings and, second they involve studying those phenomena in all their complexity (Leedy and Ormrod, 2001). According to Denzin and Lincoln (1994), qualitative research emphasizes processes and meanings that are not rigorously examined or measured in term of quantity, amount, intensity, or frequency. There are numerous research strategies available in this type of research; study design, case study, ethnography, phenomenology, ethnomethodology, grounded theory, biographical method, historical method, action and applied research, and clinical research.

Representative Types of Qualitative research

Case Study Method

The case study design has been described as the optimal methodology when the “phenomenon under study is not readily distinguishable from its context ... [for] example a complex interaction between a phenomenon and its (temporal) interaction” (Yin, 2003a, 4). Due to the complexity of the interaction and the richness of the context, the study

may have more variables than data points (Yin, 2003a). The researcher, therefore, “(a) attempts to gain insights about the nature of a particular phenomenon, (b) develop new concepts or theoretical perspectives about the phenomenon, and/or (c) discover the problems that exist within” it (Leedy and Ormrod, 2001, 148). As such, the case study “may be especially suitable for learning more about a little known or poorly understood situation” (Leedy and Ormrod, 2001, 149). A multiple-case study also allows for comparisons, theory building, or proposition of generalizations (Eisenhardt, 1989; Leedy and Ormrod, 2001). “In conducting a case study, the complex social and political web in which computing developments are undertaken becomes salient” (Sauer, 1993, p. 133).

Phenomenological Method

Phenomenological refers to a person’s perception of the meaning of an event. A phenomenological study is a study that attempts to understand subject’s perceptions, perceptions, and understandings of a particular situation. Phenomenological research depends almost exclusively on lengthy interviews with a carefully selected sample of participants. A typical selection size of five to 25 is appropriate with all respondents having direct experience with the phenomenon being studied. Data analysis in phenomenological research has one central task: identify common themes in people’s description of their respective experiences (Leedy and Ormrod, 2001).

Grounded Theory

While most qualitative research methodologies have a beginning theoretical framework, grounded theory research is one of the exceptions. The major purpose of grounded theory study is to begin with data and use them to develop a theory, using a prescribed set of procedures. As with other qualitative research designs, data collection

is field-based, flexible and likely to change through the course of the study. Interviews typically play a major role, but other sources of data such as historical records, observations, and other documents. The only restriction on the data used in this methodology is that the data collected must include the perspectives of the people being studied (Leedy and Ormrod, 2001).

Research Design

Methodological Triangulation

Denzin and Lincoln (1994) suggest because different perspectives can result from the use of different methods, often more than one method may be used within a project to gain a more holistic view of the setting. This dual view is referred to as methodological triangulation (Denzin and Lincoln, 1994).

A research design develops a logical plan for taking the proposed questions to conclusions. For the case study, Yin identified five components in the design: the study's questions, propositions, unit(s) of analysis, logic linking data to propositions, and criteria for interpreting the findings. Each component will be discussed in more detail as it pertains to this research.

This research has numerous elements that add to the complexity of collecting accurate and full data. For that reason a cross-section of methodologies will be used to add to the rigor of the research as well as ensure capturing the full perspective of the targeted population.

Research Design Quality

Readers, reviewers, and practitioners must be able to assess the worth of a proposal or research (Leedy and Ormrod, 2001). Four tests are commonly used to validate empirical research, and they can also be used to validate qualitative research (Yin, 2003b). Also, a fifth test is often added to qualitative research studies (Isaac and Michael, 1997, Lincoln and Guba, 1985). These tests, tactics for use, and appropriate research phase for implementation are summarized in Table 6 (Yin, 2003b).

Table 4. Case Study Tactics for Design Tests (Lincoln and Guba, 1985, Isaac and Michael, 1997, Yin, 2003b)

| Tests | Case Study Tactic | Phase of research in which tactic occurs |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Construct validity (credibility) | <ul style="list-style-type: none"> • Use multiple sources of evidence • Establish chain of evidence • Have key informants review draft case study report | data collection data collection |
| Internal validity (credibility) | <ul style="list-style-type: none"> • Do pattern-matching • Do explanation-building • Address rival explanations • Use logic models | data analysis data analysis data analysis data analysis |
| External validity (transferability) | <ul style="list-style-type: none"> • Use theory in single-case studies • Use replication logic in multiple-case studies | research design research design |
| Reliability (dependability) | <ul style="list-style-type: none"> • Use case study protocol • Develop case study database | data collection data collection |

Construct Validity

Establishing correct operational measures for the concepts being studied creates construct validity. The tactics used in establishing construct validity are the use of

multiple sources of evidence, establishing a chain of evidence to ensure data integrity, and verification of data by key informants. (Isaac and Michael, 1997)

Internal Validity/ Credibility

Internal validity is designed to eliminate rival explanations for the findings in contrast to those presented by the researcher. Similarly credibility aims to produce findings that believable and convincing (Isaac and Michael, 1997). To achieve construct validity, an investigator must specifically define the variables of interest, relate them to the study's objectives, and demonstrate the selected measures reflect these variables (Yin, 2003b). Yin (2003b) lists three tactics to meet the test of construct validity: use multiple sources of evidence, encouraging convergent lines of inquiry; establish a chain of evidence; and have the draft study report reviewed by key informants. All three tactics were employed for this research. Details of the first two tactics are discussed in the section on data collection principles. Review of the draft study report will be discussed next (Yin, 2003b).

External Validity/ Transferability

External validity establishes the domain to which a study's findings can be generalized. Transferability attempts to apply findings in one setting to other contextually similar settings (Yin, 2003a, Isaac and Michael, 1997). To determine whether research findings are generalizable beyond the immediate case study, Leedy and Ormrod (2001) cite two applicable strategies for external validity: use of a real-life setting and replication in different context. A case study naturally occurs in a real-life setting. As discussed previously, the research was conducted as a multiple-case design. The multiple cases allow for replication. Furthermore, Yin (2003b) calls for analytical

generalizations, where the results use a broader theory as the basis for generalization.

Yin (2003b) cautions that the generalization is not automatic and insists the theoretical generalization must be tested by the same replication logic underlying experiments. This study relies primarily upon replication to create external validity by context and theory through the use of a multiple-case design.

Reliability/Dependability

Reliability asks whether or not findings in a particular study can be replicated. Dependability addresses the question concerning which findings are consistent with those of other similar investigations. Lincoln and Guba (1985) suggest two ways of establishing this. The first method is overlap, a form of triangulation, where the investigator(s) views the problems from different angles to determine whether or not the original findings still hold true. The second method is a form of auditing where an outside person examines both the process and form of inquiry, including the accuracy and integrity of data (Lincoln and Guba, 1985, Isaac and Michael, 1997).

Objectivity/Confirmability

Objectivity strives to eliminate subjective bias by assuring that the methods of obtaining information are public and observable to allow agreement across multiple observers. Confirmability attempts to ensure that both the process and the product are auditable by an outside party. Confirmability is the most demanding of the four criteria, involving a comprehensive examination of the entire sequence of the entire event. The purpose of this examination is to establish the extent sound decisions were made, but also to determine if accurate information was attained (Isaac and Michael, 1997).

Approval Process

Guided Interview Questionnaire Reviews and Pre-Testing

After the guided interview questionnaire instrument was developed it went through multiple review and pre-testing procedures. The guided interview questionnaire reviews came in two different forms. The first was the Air Force Personnel Center (AFPC) approval process and the second was the Human Subject Review Board (HSRB) approval process. Finally, the guided interview questionnaire was pilot tested by experts from both academia and practitioners. Each of these guided interview questionnaire reviews are discussed below.

AFPC

The AFPC approval process explained in Air Force Instruction (AFI) 36-2601 is an integral step for a guided interview questionnaire or survey administered to Air Force personnel. With few exceptions, AFPC is the focal point for all questionnaires administered within the USAF (AFI 36-2601). The AFPC survey approval program is designed to protect individual responses and ensure confidentiality to preclude any possible negative action or reprisal (AFI 36-2601). Documents pertaining to the AFPC approval are in Appendix C.

Human Subjects Review Board

The second review process accomplished during this research effort was the Human subjects Review Board (HSRB), conducted at Wright Patterson AFB, Ohio. The purpose of the HSRB is similar to that of the AFPC review process, yet the focus is strictly on the protection of subjects being tested or interviewed. The HSRB, a review committee created from AFI 40-402, was created solely for the “Protection of Human

Subjects” (AFI 40-402). The HSRB is responsible for the examination and review of each study, experiment or research project performed in the USAF that deals with human participants. Documents pertaining to HSB approval are in Appendix C.

Testing the Survey

The last method of review was conducted by subject matter experts. The purpose of the pilot test was to test the guided interview questionnaire, identify discrepancies, redundancies and highlight areas of improvement. In addition, it was intended to allow the researcher to gather data for testing and comparison. Respondents offered feedback that the questionnaire was too lengthy and certain sections of the survey were not applicable to their respective job specialties. Adjustments were made based on these reviews.

Collecting Expert Opinion

This research sought to extract expert opinion regarding the selection and optimization of maintenance management models; however, experts acknowledge the original research questions may shift during the research process (Eisenhardt, 1989). Interviews were selected as the primary and most appropriate data collection methodology for this research. The interview technique was deemed the most flexible and adaptable method for gaining insight into contemporary research questions, which may themselves evolve. The interaction between the interviewer and interviewee provides the distinct opportunity to seek further clarification and/or explanation regarding answers or insights.

In an effort to enhance the creative potential and confidence in the interview process, the research utilized two investigators instead of one. Not only do team members have complementary insights, which add richness to the data, but they offer converging observations and a higher likelihood of discovering unique findings. (Eisenhardt, 1989) The two-person research team divided the interviewing responsibilities between them. While one researcher conducted the interviews, the other researcher taped the sessions and recorded notes and observations.

All interviews were conducted in accordance with AFI-36-2601, Personnel: Air Force Personnel Survey Program and local Air Force Institute of Technology (AFIT) procedures. Participants were all informed their identities would not be disclosed and their responses would not be used in such a way as to trace their identities.

The research employed purposeful sampling select the pool of interviewees (Patton, 1990, Isaac and Michael, 1997). This method is particularly appropriate for case study research since it is designed to understand certain select cases in their own environment without generalizing to an entire population. Furthermore, it offers the opportunity to study in depth information rich cases, where the researcher can learn most about central issues pertinent to their study. Within purposeful sampling, there are ten variations from which to choose (Isaac and Michael, 1997):

1. Extreme or deviant case sampling
2. Maximum variation sampling
3. Homogeneous samples
4. Typical case sampling
5. Critical case sampling

6. Snowball or chain sampling
7. Criterion sampling
8. Confirmatory or disconfirming cases
9. Sampling politically important cases
10. Convenience sampling

Of these ten variations, this research used homogeneous samples. It allowed for a small sub-group to be studied in-depth and for the possibility of uncovering major program issues (Isaac and Michael, 1997).

Respondent Representation

Members of this study conducted interviews with representing members of each Air Force Major Command (MAJCOM) represented at the Medical Facility Management Planning conference. The representatives were typically the senior person involved in the planning and execution of long-term facility maintenance for their respective MAJCOM.

Guided Interview Questionnaire Reviews and Pre-Testing

The guided interview questionnaire instrument was developed from a literature review and was reviewed and pre-tested by AFIT personnel and then field-tested on subject matter experts to determine the accuracy of the instrument and type of data to be captured.

Criteria for Selecting Subjects

In qualitative research data, sources are selected purposefully based on belief that they will best answer the research question (Denzin and Lincoln, 1994, Creswell, 1994).

As such, the limits described in the unit of analysis were applied without attempting to randomly select subjects (Creswell, 1994). AFMC/SG assisted the researchers, directing them to various populations for study and subsets of the target audience. To ensure more accurate and valid results, various geographical locations and population cases were chosen in an attempt to cover the spectrum of implementation stages and challenges. More information related to validity and reliability can be found in later in this chapter.

Data Collection

Data Collection Principles

Yin (2003b) prescribes three principles for data collection. First, the study should “use as many sources as possible” (Yin, 2003b, p. 85). Yin next advocates maintaining a database of information. Finally, he stipulates the research should maintain a chain of evidence similar to that of law enforcement officers. The following paragraphs describe the application of each principle within this research.

Using multiple sources of evidence is a strength of qualitative research (Yin, 2003b). Yin suggests six major sources of evidence: documentation, archival records, interviews, direct observations, participant observation, and physical artifacts. For this study, documentation, archival records, interviews, and direct observations were used. More detail concerning the interview data collection follows in the section on design quality.

Yin (2003b) strongly recommends the use of a database for organizational purposes. In compliance with this recommendation, an electronic file containing all the literature, documentation, and data was created. The database file facilitates the

separation of the interview and literature data, or evidence, and the research report of the investigator. The research database leads to Yin's (2003b) third principle, maintaining a chain of evidence. The database allows the raw data to remain untainted and free from manipulation. In addition, the documentation and literature contain the source information. All data and report elements can be traced back to the point of origin.

Supporting documentation, such as charts, policy documents, and project management documents, were collected to provide additional facts in direct correlation to the questions asked. This method added value to the research and was gathered as needed to aid in supplying evidence that directly supported the answers provided during the interview process.

Semi Structured Interviews with MAJCOM Personnel

Using a semi-structured format, the interview began by asking the MAJCOM representative to describe their MAJCOM's healthcare facilities maintenance strategy. In order to discover the collective viewpoints of Air Force health facilities experts, the interviews were conducted during a conference of the Air Force Health Facilities Division. Participating personnel represented the Air Force MAJCOMs, with additional members from the host organization, Brooks City Base. A total of eight interviews were conducted from the following MAJCOMs: PACAF, ACC, AMC, AFMC and AFMSA. Experience ranged from two years to 25 years. Due to time constraints, the researchers were unable to obtain interviews from every MAJCOM. Using representatives from the conference limited the number of potential subjects who could be interviewed, however the experience and knowledge of these particular "subject matter experts" offered the

exact knowledge and information the interviews sought to extract and thus did not pose a significant threat to the validity of the research.

The interview began with a request for a description of the command's view on facility maintenance with respect to their function in the organization. Each interviewee was also asked to describe the deficiencies, contributions, and tradeoffs their current facility maintenance strategy offered (Eisenhardt, 1989). The representative was then asked a series of open-ended questions. Following the methods of inductive research, these initial questions were supplemented with additional questions that seemed fruitful to pursue during the course of the interview. The interviews typically lasted from 30 minutes to one hour, with two interviews taking as long as three hours.

Two researchers conducted each interview with one responsible for the interview and the other for taking notes. Immediately following each interview the researchers' cross-checked facts and impressions to ensure accurate recording. The interviews were taped with the interviewee's permission to allow for verification of the facts at a later date. Eisenhardt (1989) recommended two protocols be followed during the interview process. The first was to include all data, regardless of its importance in the notes of the interview. The second was to end the interview notes with overall impressions of the interviewee and their willingness to participate in the study (Eisenhardt, 1989).

The purpose of the interviews was to gather information and expert opinion on the current maintenance programs being used in Air Force healthcare facilities today. The interview questions were adapted from a guided interview questionnaire previously developed by the research team. The guided interview questionnaire is attached to this document in Appendix A. During the interviews, the questionnaire was used to capture

demographic information and lead the discussion until the interviewees were comfortable in speaking free form of their maintenance programs.

Secondary source and other data

Industry reports and literary sources were examined if available. Informal observations were made, and data were collected on personality and leadership styles, MAJCOM demographics, and prior experience with various healthcare facility maintenance strategies (Eisenhardt, 1989).

Key Informant Review

Although release permission was granted from each respondent about the data during the interviews, interviewers gave each interviewee an opportunity to add, delete or modify the interview findings the data was analyzed. The findings were returned to the participants for validation and a reply granting or denying release was requested. If a release was not granted on some, or all of the information, the interview did not become part of the research.

The interview findings were used in the composition of the case study report. Once the case study report was completed, key informants were asked to review the report for accuracy, especially regarding data on the implementation and sustainment effort. Key informant evaluation of the results of the study increased the validity and reliability of the research.

Data Analysis

The analysis procedure was adapted from the grounded theory approach first formulated by Glaser and Strauss (1967) and more recently employed by Isabella (1990).

The approach requires that data and theory be constantly compared and contrasted throughout the collection and analysis process. The fluidity of this approach often results in a re-conceptualization, which should account for and include all nuances of the data (Isabella, 1990).

Once the interviews were completed, they were each transcribed and summarized by the team. The analysis process began with preparing separate summary tables for each interviewee. The tables were divided to represent the alternate views between the subjects' present management programs and the "desired" or "in process" management programs. Additionally, the tables captured the shifting perceptions of the effectiveness and/or efficiency of the strategic objectives as they related to the present and desired management programs.

The data was initially pre-arranged in the tables through recorded notes and observations. The team collaborated to fill in any gaps, clarify interpretations and discuss inconsistencies. Next, the team listened to the recorded interviews and adapted the data tables as needed. As a final independent review, the summarized interviews were electronically sent to the interviewees for validation. This allowed the subjects to preserve any language they wished and helped to ensure the accuracy of the results. The interview results provided a basis to establish the limitations of the original research question and the opportunity to gain new insights into the research question and assess the current environment surrounding healthcare facility maintenance within the Air Force.

Content Analysis Design

Content analysis provides a framework for data analysis within the case study design of this research necessary to answer the research questions. Therefore, content analysis must also be explored. The following paragraphs detail the use of content analysis in general as well as the specific ranking scheme used for this research and its reliability. Although a complete methodology in itself, content analysis was used here to help guide the researcher to valid and reliable conclusions and ensure the repeatability of the study. The rigor of the study lies primarily in the case analysis design.

Use of content analysis

Content analysis takes many words from a document and classifies them into much fewer content categories, “reducing [the document] to more relevant, manageable bits of data” (Weber, 1990, p. 5). For a proper analysis, a coding scheme must be created a priori. The scheme should ensure reliability of coding as well (Weber, 1990).

Content analysis was used in this study to determine appropriate categories for the reported implementation issues. It was also used to pattern match the determined implementation issues identified in the literature to the findings. Furthermore, content analysis provided the mechanism to generate the operational IRM construct from literature and documentation. Generation of the coding scheme and its reliability will be discussed in the following sections.

The coding scheme

Weber (1990) provides a stepwise process to creating and using a coding scheme, which will be used for this study. First, the researcher must define the recording unit, the basic unit of text to be classified. The recording unit may vary from a single word to the

entire text. After the recording unit has been established, the categories must be determined using two distinctions: (1) will categories be mutually exclusive and (2) will categories be narrowly or broadly defined. Weber prescribes testing of the scheme next using a small sample of test or actual data. Following testing, Weber suggests reviewing the coding rules. Any necessary changes, as indicated by testing, should then be made.

Application of Weber's (1990) coding scheme process lead the researchers to the following. For this study, a theme created by contiguous phrases served as the recording unit. Themes, expressed in predefined categories, best suit the desired objectives of both a comparison of reported issues to the represented issues in implementation and sustainment issues.

Coding reliability

Three types of coding reliability must be considered for content analysis: stability, reproducibility, and accuracy (Krippendorff, 1980). Also known as intercoder reliability, reproducibility “refers to the extent to which content classification produces the same results when the same text is coded by *more than one* coder” (Weber, 1990, p. 16). Low reproducibility could indicate ambiguous coding instructions or the lack of a shared understanding with respect to the constructs, themes, or categories. “[R]eferring to the extent to which the results of content classifications are invariant over time” (Weber, 1990, p. 16), stability can be assessed through multiple codings by the *same coder*. Inconsistencies in the coding represent unreliability. The strongest form of reliability, accuracy “refers to the extent to which classification of text corresponds to a standard or norm” (Weber, 1990, p. 16). The lack of established standard codings makes accuracy a seldom used measure.

This study employed all three types of coding reliability. To ensure reproducibility, the interviews were coded by multiple coders. Interviewees and two separate researchers were used as coders in these instances. Issues of low reproducibility were associated with a misunderstanding of the intent of the interview content. Resolving any misunderstandings of the interviewee's intent increased reproducibility and the correctness of the interview transcripts. Due to the interdependencies of the categories and the open nature of interview responses, inconsistent coding did occur. Such instances occurred where the interviewer assigned a primary and secondary meaning to a response. In keeping with the case study methodology as a whole, the content analysis ties back to theory as a means for reliability.

Summary

This chapter described the objective of this study and justified the research strategy employed. This chapter presented a description of the methodology chosen for this research. It addressed the case selection process and the interview methodology used to gather the appropriate data. This chapter also covered a description of the data analysis techniques that will be employed in Chapter IV, data collection, research design, and quality issues. The next chapter will present results of key party interviews.

IV. RESEARCH RESULTS

Overview

The focus of chapter III was the methodology of the research effort. This chapter focuses on the guided interview questionnaire findings and alternate collection methods used. The chapter is structured as follows. First, a discussion on each investigative question begins with a review of supporting literature. After establishing the foundation for each investigative question, a proposition is presented that hypothesizes the expected response based on the extant literature. Following the stated proposition, the discussion proceeds to an explanation of the findings derived from analysis performed on the collected data.

Investigative Question 1

What are the objectives of outsourcing the AFMC/SG facility maintenance?

Supporting Literature

The literature is replete with reasons for outsourcing. Some of the fundamental drivers leading to the outsourcing decision are: improve business focus; access world-class capabilities; accelerate reengineering benefits; share risk; free resources for other purposes; timeliness; quality of service; reliability improvement; cost reduction; cost stability; program flexibility; management expertise and repair documentation management (META Associates, 2004; Fill and Visser, 2000).

Investigative Question 1a

What metrics or measurements determine effectiveness and efficiency?

Supporting Literature

Arveson (1999) suggests twelve features to any good metric; with the most important being the ability to give objective and unbiased results that can be used to reasonably forecast the probability of events in the future. As government agencies are not profit driven, Arveson (1999) argues the key metric for gauging government performance is not financial performance, but mission effectiveness (Drake, et. al. 1977, Arveson, 1999). One of the key elements of developing strong metrics is to understand how value is perceived and to align objectives and metrics accordingly (Spafford, 2003). Managing anything effectively requires a clear set of objectives (Arditi, 1999; J. White, 1998). The most important reason to measure performance is to determine if organizational goals and objectives are being met (GAO, 1996, J. White, 1998). Developing metrics that support an organization's strategic plan is a challenging process to determine what performance measures capture the essence of the goals and desired outcomes (J. White, 1998:62, Kaplan and Norton, 1996).

Findings

Table five synthesizes of the findings of respondents about current metrics and their applicability. Based on the data and the literature it appears that the missing ingredient in this element is tying metrics to organizational goals in any meaningful way to validate their significance.

Overall the data collected shows that most of the historical data and current metric measurement is focused on short-term, instead of providing the data needed to use for

long-term predictors. Baker (2002) highlights the trade-offs associated with short and long-run. Short run measures emphasize the origination of action, versus the completion, with little regard given to the final result. The short-run performance measure offers lower risk to the performing agency, but can result in a higher rate of performance distortion. The long-term perspective evaluates the final result of the project. While the long-term metric has less distortion and places greater emphasis on the long run profitability, it often penalizes the performing agency of the contract for events outside of their control. With the emphasis on the final result, the long-term performance measures offer less incentive distortion, but passes along higher risk to the performing agency. The ultimate choice of long or short run is largely determined by trade offs between risk and distortion and the costs associated with each (Baker, 2002).

Table 5. Synthesis of Metric Findings

| | <i>Q.1) What metrics are <u>helpful</u> in gauging 'success' of your programs</i> | <i>Q.2) Which ones are a complete waste of time?</i> | <i>Q.3) Which ones would be helpful</i> |
|--------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------|
| Respondent A | Unscheduled outages; random PM completion checks; non-partisan system inspection results | Self inspections | End user satisfaction surveys; life cycle costs- predicted and actual |
| Respondent B | Response times; whether or not requested work was satisfactorily completed | | Historical cost data; weighted customer service scales |
| Respondent C | Life cycle costs | | Quantified cost-per-square foot formula; historical cost data |
| Respondent D | PM inspections; Life cycle costs | | Life cycle costs; visibility into costs |
| Respondent E | Back-up Generator in-commission rates; Number of Safety discrepancies by quarter; percentage of staff wearing security badges | Fire extinguisher in-commission percentage | Utility costs versus utility usage per month trended by season |

Table 5, along with the findings of Table 6, which summarizes individual responses later in the chapter, underscore that there is very little quantifiable about existing maintenance plans. This makes the use of metrics very limited. Of the metrics that were identified as helpful, preventative maintenance (PM) completion checks were the only recurring metric that was listed by Respondent A and D. However it is noteworthy that Respondent A valued the verification of PM completion, but discounted the validating of self inspection. While it is unclear what context self inspection was taken, it seems initially contradictory. One possible explanation that should be explored in the future is the time aspect: preventative maintenance inspection is random, and self-inspection is scheduled. Although life cycle costs were listed by Respondent C and D, it is unclear from the data if the respondents felt they had this information and it was helpful, or they were providing a response for question 3, and suggesting metrics that would be helpful. This ambiguity also should be explored in future research. Initially, it seems likely that more complete life cycle information would be useful to all respondents, including those that indicated they had some data.

The other key finding from Table 5 is the consensus among respondents about the type of metrics they would like to see available in the future. The top answers to question 3 were historical cost data and life cycle costing. These answers are likely attributable to the lack of quantifiable data currently available. Respondent C's request for a cost formula based on square footage, underscores the practitioners frustration with the lack of tangible measures from which to develop costing methodologies and forecasts.

Ultimately the organizational goals have to be linked to the metrics utilized as well in the sign of supplier performance measurements. The absence of a standardized

report card for suppliers makes it difficult to benchmark and compare sourcing and contracting alternatives between and among the MAJCOMs. While quantifiable metrics are not the panacea for this challenge, it would help to add some clarity to some of the previously used subjective measures.

Investigative Question 2

What are the key drivers for success in the implementation and sustainment of a medical managed maintenance contract within the AF environment?

Supporting Literature

Customer satisfaction is central for gauging whether or not something is successful. It is defined as the ability of a good or service to meet and/or exceed a customer's needs or expectations (Boone and Kurtz, 1995). Not only is customer satisfaction critical to an organization's success (Drucker, 1954), but it is the true measure of the quality of a good or service (Boone and Kurtz, 1995, Gibson, et. al., 2003).

In many business areas, successful outsourcing can be measured simply by looking at the bottom line (Fill and Visser, 2000). However, healthcare facilities and equipment maintenance require a more thorough evaluation of outsourcing performance (Hubbard, 1993). Key objectives, such as timeliness, quality of service, cost reduction and stability, reliability improvement, and program flexibility are some of the considerations decision makers face as they choose to outsource (Fill and Visser, 2000).

Findings

In this investigative question, the practitioner's perception of drivers of success is gleaned and aggregated from the individual interviews and tabulated in a frequency count

chart below showing the most heavily weighted drivers for implementation and sustainment success. Tables 6 and 7 are listed with the respective rankings of each respondent (table 6), followed by an aggregate count of the top three selections with their respective numbers (table 7).

Cost, one of the most heavily weighted factors cited in the literature for outsourcing decisions, was not found to be the most heavily weighted factor by the practitioner. Overall, cost ranked fourth out of 11 objectives as an outsourcing objectives according to the practitioner. Despite the importance placed on cost in outsourcing decisions, Table six shows interview subjects 1, 2, 4, and 7 described no cost control and non-existent cost stability under their existing maintenance programs. Many respondents also expressed concerns that costs would ever be able to be satisfactorily controlled under the existing programs and optimizing that element would be a primary consideration in the selection of the next contract type. According to practitioners cost would not be the overriding consideration, but gaining visibility into costs would be emphasized.

The top three responses, based on importance and tabulated in a frequency count are response time, quality of service, and minimal equipment downtime. Timeliness, the top criterion for gauging outsourcing success according to practitioners, was listed as one of the primary detractors on the existing maintenance plan. From Table ten, Respondents 1,2,3,5, and 7 listed complaints about the administrative burden placed on technical personnel and the lack of response time reliability when CE is performing the maintenance.

One factor for implementation and success that emerged that was not presented in the literature was the necessary skills and abilities in a pivotal employee, the Facility

Manager (FACMAN). Subjects 1, 2, 5, 6, and 7 all listed various components of the FACMAN position that were limiting factors. Subjects 1 and 5 cited limitations of the FACMAN position as contributing to a degradation of quality of service under existing programs. Subjects 2, 6, and 7 listed FACMAN position deficiencies as contributions to a lack of management expertise of existing programs. An important distinction that was raised was the limitation of the FACMAN position, not the current employee in those positions. For example, over 70% of those interviewed cited examples of how the FACMAN function is limited by the requiring job description from having the necessary skills to ensure successful program management.

Table 6. Outsourcing Objectives Ranking

| | | Respondent Number, cont | | | | | | | | | | | | |
|------------------------------|-------------------------------|--------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|
| Outsourcing Objective | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| | Response Time | 1 | | | 3 | 2 | 1 | 1 | 3 | 2 | | 2 | 4 | 2 |
| | Quality of Service | 3 | 2 | | 1 | 1 | 4 | 2 | 1 | 3 | 3 | 3 | 1 | 1 |
| | Equipment Downtime | 2 | | | | | | | 2 | 1 | 2 | 6 | 2 | 3 |
| | Cost Reduction | | 3 | 1 | 2 | 3 | | | 4 | 4 | | 1 | 3 | 4 |
| | Cost Stability | | | | 2 | 3 | 2 | | | 7 | | | 6 | 5 |
| | Program Flexibility | | 1 | 2 | | 4 | | 3 | 7 | 8 | | 4 | 8 | 6 |
| | Management Flexibility | | | 3 | | | | | 6 | 6 | | 5 | 5 | 7 |
| | Management Expertise | | | | | | | 4 | 8 | 5 | 1 | 7 | 7 | 8 |
| | Repair Documentation | | | | | | 3 | | 5 | | | | | |

Table 6 Outsourcing Objectives Ranking, continued

| | | Respondent Number, cont | | | | | | | | | | |
|------------------------------|-------------------------------|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Outsourcing Objective | | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | Response Time | 4 | 2 | 3 | 3 | 2 | 1 | 2 | 3 | 3 | 2 | 3 |
| | Quality of Service | 1 | 4 | 2 | 2 | 1 | 3 | 3 | 1 | 5 | 1 | 2 |
| | Equipment Downtime | 3 | 1 | 1 | 1 | 3 | 2 | 1 | 5 | 1 | 3 | 1 |
| | Cost Reduction | 2 | 3 | 6 | 5 | 4 | 4 | 4 | 2 | 8 | 8 | 4 |
| | Cost Stability | 7 | 8 | 8 | 4 | 6 | 7 | 8 | 8 | 2 | 7 | - |
| | Program Flexibility | 6 | 5 | 5 | 6 | 5 | 5 | 6 | 7 | 4 | 4 | 7 |
| | Management Flexibility | 5 | 6 | 4 | 7 | 7 | 8 | 7 | 4 | - | - | 6 |
| | Management Expertise | 8 | 7 | 7 | 8 | 8 | 6 | 5 | 6 | 7 | 5 | |
| | Repair Documentation | - | - | - | - | - | - | - | - | 6 | 6 | |

Table 7 Outsourcing Objective Frequency Count

| Number of Top Responses | | | | | |
|--------------------------------|-------------------------------|------------|------------|------------|----------------------------------|
| Outsourcing Objective | | 1's | 2's | 3's | Total Number of Responses |
| | Quality of Service | 9 | 5 | 6 | 20 |
| | Response Time | 4 | 8 | 7 | 19 |
| | Equipment Downtime | 2 | 4 | 4 | 15 |
| | Cost Reduction | 2 | 3 | 4 | 9 |
| | Cost Stability | 0 | 3 | 1 | 4 |
| | Program Flexibility | 1 | 1 | 1 | 3 |
| | Management Flexibility | 0 | 0 | 1 | 1 |
| | Management Expertise | 1 | 0 | 0 | 1 |
| | Repair Documentation | 0 | 0 | 1 | 1 |

Investigative Question 3

What are the current contracting methodologies and their strengths and weaknesses with respect to these drivers? What, if any, other option would be more effective?

Findings

While most practitioners did express some frustration with the FAR, many were willing to work within the existing constraints and found that one type of contract offered would best fit their contracting needs.

The option that was most often mentioned was a ‘module’ concept in which like parts equipment or maintenance would be grouped together to allow for outsourcing of that module, with having to commit to the all – or –none outsourcing concept. This module would be best implemented utilizing the IDIQ contract format that would allow for termination privileges for non-performance or substandard performance. As discussed later in Table 15, of the 24 respondents that expressed a form of contracting vehicle, 55% expressed an interest in an IDIQ type of contract. Table 15 also shows that the largest limitation of the current program was overwhelmingly constrained resources. Contracting was listed as the second largest limitation according to practitioners. Contracting limitations included Federal Acquisition Regulation, the contract vehicle, and the perception that contracting is often more focused on the process and not the outcome of a sourcing decision.

Cross-Case Analysis of Reported Issues

It is important to analyze the findings across all cases. A cross-case analysis provides an opportunity to compare and contrast results from the different cases and

enhances claims to generalizability (Isabella, 1990). Issues reported by all MAJCOMs will first be discussed. Then, select issues reported by individual MAJCOMs will be explored. The final analysis will cover any significant issues reported by a single MAJCOM but not already discussed in this section.

Individual Results

This section presents the results of additional exploratory analysis.

Interview Data Results.

The following tables represent the collected data from interview subjects and are arranged individually. Using the information from the tables, frequency counts were accomplished to identify the predominate themes emerging from the data.

For the purposes of this research, customer satisfaction was viewed narrowly as the satisfaction of the interviewee. The implicit assumption was that the interviewee’s general satisfaction balanced those of the internal customers (hospital personnel) and those of the external customers (MAJCOM senior decision-makers).

Table 8. Interview Subject 1

| | Existing Program | Desired Program |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Maintenance Program | 100% Outsourced: Combination of OEM/ 3 rd party—Item specific—Insurers manage equipment repair w/ onsite resources | Menu-Driven Maintenance Model |
| Timeliness | Techs unable to accomplish as much as quickly with admin workload | Relieving techs of admin burden through work order clerks, will accelerate response times |

| | | |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |
| Quality of Service | <ul style="list-style-type: none"> ○ FACMANs cannot perform QA accurately or adequately ○ Performed by many Contractors ○ No true visibility into quality or adequacy of Contractor’s QA plan | <ul style="list-style-type: none"> ○ Focuses on “best-value” ○ New initiative to hire a dedicated, trained expert to perform random QA checks at all installations ○ More objectivity in QA process |
| Equipment Downtime | Techs unable to accomplish work as quickly given admin workload | Using work order clerks will allow techs to service HVAC components faster |
| Cost Reduction | <ul style="list-style-type: none"> ○ Sustainment Budget too high ○ High manpower costs | <ul style="list-style-type: none"> ○ Top priority ○ New initiative to estimate collective manpower/sq ft |
| Cost Stability | Over-manned | <ul style="list-style-type: none"> ○ Efficient use of manpower |
| Program Flexibility | Outsourced programs offer more flexibility | Initiative to hire more work-order clerks to relieve techs of admin burden |
| Management Expertise | More administrative in nature, more technical proficiency needed | <ul style="list-style-type: none"> ○ Better mix of skill sets ○ FACMANs oversee program ○ Dedicated expert performs more thorough spot checks to support FACMANs |
| Repair Documentation Management | <ul style="list-style-type: none"> ○ Data is insufficient ○ DMLs not being used | <ul style="list-style-type: none"> ○ Implementing initiative to gather repair data ○ Program will use DMLs |
| Drawbacks | <ul style="list-style-type: none"> ○ Short-term focus ○ More money spent on CR ○ Insufficient resources for PM | |
| Benefits | <ul style="list-style-type: none"> ○ Predecessors accomplished documentation necessary to eliminate in-source requirements and put outsourced contracts in place | <ul style="list-style-type: none"> ○ Initiatives will allow and validate for true QA to be performed ○ Better visibility into facility infrastructure |
| Limiting Factors | <ul style="list-style-type: none"> ○ Maintenance “spot checks” performed 10% of time by FACMANs, who are ill-qualified for true QA ○ Technicians over-burdened with administrative duties | |

| | | |
|--------------|---------------------------------------------------------------------------------------------------|---------------------------------------|
| Tradeoffs | Inefficient use of manpower— Satisfaction of customers at the expense of too much personnel | |
| Satisfaction | Customers satisfied, senior management want more cost control | Customers and management satisfied |

Subject one reported facility maintenance customers were satisfied with the work because preventative maintenance (PM) and corrective maintenance (CM) were being accomplished. However, the interviewee felt PM and CM incurred an enormous sustainment costs. The interviewee made a distinction between customer satisfaction and management satisfaction. Although CMs were being accomplished, management felt PMs—invisible to most customers until it results in CMs, were not being performed well.

Additionally, the interviewee expressed dissatisfaction with the knowledge and expertise of the facility managers to accurately assess the condition of facilities from a quality assurance/ quality control (QA/QC) standpoint. The interviewee also expressed frustration at the amount of administrative work given the technicians and FACMAN, keeping them from true *maintenance* work. The interviewee felt that outsourced programs offered far more management flexibility than current in-house and hybrid programs. Furthermore, under an outsourced arrangement, the Government can require the contractor to use DMLs or its equivalent in reporting and recording repair documentation.

Table 9. Interview Subject 2

| | Existing Program | Desired Program |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintenance Program | Single comprehensive provider—provides in-house management and on-call service | <ul style="list-style-type: none"> ○ Strategic Maintenance Modules ○ Modules (CLINs): ○ HVAC ○ Power Production ○ Doors ○ Elevators |
| Timeliness | <ul style="list-style-type: none"> ○ Too slow | <ul style="list-style-type: none"> ○ Accelerated response time |
| Quality | <ul style="list-style-type: none"> ○ Poor quality ○ Prime contractor inexperienced with medical facility maintenance ○ Subcontractors inexperienced ○ PM work not being done in a timely manner | <ul style="list-style-type: none"> ○ New initiative to quantify an adjusted cost/sq ft for all MTFs ○ Will lead to more visibility into real infrastructure ○ Provides a reliable, consistent benchmark ○ Will highlight quality programs and service providers for future decision makers |
| Downtime | Very high | Will be reduced |
| Cost Reduction | No cost controls in place | Initiative will result in a fully loaded maintenance cost serving as a platform for revived fiscal responsibility |
| Cost Stability | <ul style="list-style-type: none"> ○ Non-existent ○ Very little fiscal responsibility | Initiative will quantify costs of real property and equipment for cost control and budget forecasting |
| Flexibility | <ul style="list-style-type: none"> ○ Directed externally with little control over prime and subs | Maximum control over prime |
| Management Expertise | <ul style="list-style-type: none"> ○ FACMANs do not have appropriate skill sets—too administrative in nature-- ○ More technical expertise is needed ○ Management not managing the contract | Will supplement the weaknesses of FACMANs |
| Repair Documentation Management | <ul style="list-style-type: none"> ○ Illusion—Contractor controlled comprehensive database not reality ○ | More thorough with OEMs maintaining equipment |

| | | |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Drawbacks | <ul style="list-style-type: none"> ○ Individual MTF goals and objectives not aligned with MAJCOMs ○ Merging facility and medical equipment under one program flawed--Two separate entities ○ Maintenance is being performed improperly | |
| Benefits | | More outcome focused |
| Limiting Factors | <ul style="list-style-type: none"> ○ Front-loaded program ○ Too process-focused and not outcome-focused ○ No outcome factors ○ No fiscal accountability ○ No external, objective source to judge PM and QA ○ Local problems become “global fixes” | |
| Tradeoffs | <ul style="list-style-type: none"> ○ Consolidating management has resulted in redundancies and too many layers of management ○ No external, objective source to judge PM and QA ○ Insufficient technical workers to perform maintenance/repairs and PM ○ Loss of control over Prime | |
| Satisfaction | Unsatisfied, frustrated customers and workforce | Satisfied customers and management |

Subject two was very dissatisfied with the current comprehensive program in existence. The interviewee expressed no satisfaction of any of the strategic objectives presented. The interviewee acknowledged the discrepancy between the intentions of the program with the reality of its outcomes. The comprehensive program was implemented because it promised additional expertise, cost stability, cost reduction and better quality.

However, since accurate accounting data has not been maintained or captured, it is difficult to compare the current program with its predecessor of using multiple OEMs.

Additionally, the interviewee felt the current program had no real cost control mechanisms in place and sacrificed necessary control over the prime for management flexibility and expertise that were “illusory”.

The interviewee also expressed frustration with the expertise and skill-sets of the facility managers. The interviewee felt the current FACMAN function was an additional and unnecessary layer of management. The function can be made more effective by requiring additional technical proficiency while off-loading the more administrative duties to a work order clerk or administrative assistant. More importantly, the emphasis of the maintenance team should shift from more management to more technicians or “wrench-turners”. The current program intends to be more flexible and offer better value, but it is too process-focused and has an imbalance of management layers to technicians and ill-suited for a facility maintenance program.

Table 10. Interview Subject 3

| | Existing Program | Desired Program |
|---------------------------------|------------------------------------------------------------|------------------------|
| Maintenance Program | Varies depending on facility | |
| Timeliness | Experiencing difficulties with in-house CE responsiveness | |
| Quality of Service | Experiencing difficulties with in-house CE quality of work | |
| Equipment Downtime | | |
| Cost Reduction | | |
| Cost Stability | | |
| Program Flexibility | | |
| Management Expertise | | |
| Repair Documentation Management | | |

| | | |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Drawbacks | Outsourcing often preferred, but all avenues should be exhausted first | |
| Benefits | | |
| Limiting Factors | <ul style="list-style-type: none"> ○ No formalized methodology or initiatives in place to determine appropriate programs for facilities ○ Not enough manpower | |
| Tradeoffs | | |
| Satisfaction | Varies with facility | |

Subject three acknowledges the difficulties with using base civil engineering, but expressed caution about immediately turning to outsourcing as the “quick fix”. The interviewee felt base civil engineering were the “true” real property managers and as such should be consulted and collaborated with in order to determine the best facility maintenance model for each base. Outsourcing should be used as a last resort when all other options and avenues had been exhausted and the facility maintenance team and base civil engineering had mutually determined that it (outsourcing) was in the base’s best interests.

Table 11. Interview Subject 4

| | Existing Program | Desired Program |
|---------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintenance Program | Single OEM— Comprehensive program. Insurer manages repairs and PM with onsite resources | New initiative to implement: “HVAC+” Non-insurance, comprehensive program IDIQ modules Vendor will provide on-call service |
| Timeliness | Satisfied | Satisfied |
| Quality of Service | Satisfied | Satisfied |
| Equipment Downtime | Satisfied | Satisfied |
| Cost Reduction | Costs are too high—do not meet any objectives or expectations | Primary driver for new program |

| | | |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Cost Stability | No stability | More stability |
| Program Flexibility | Too rigid | Allows facilities to customize their services |
| Management Expertise | Need more subject matter experts | Expertise available through new program |
| Repair Documentation Management | | |
| Drawbacks | Far too expensive--Not tailored to Tri-Care's HFDs | |
| Benefits | | Will not be run by a general officer so less political pressures More open-minded and receptive |
| Limiting Factors | Too much use of IMPAC cards as a payment vehicle Poor contracting vehicle Too much duplication and administration | |
| Tradeoffs | Quality for cost | |
| Satisfaction | Satisfied with aspects of quality, but not cost | Satisfied |

Subject four was satisfied with many of the strategic objectives to include timeliness, quality of service and equipment downtime. However, the interviewee expressed that attaining customer satisfaction and achieving these strategic objectives is coming at too high a price. Additionally, the interviewee expressed that additional management expertise was necessary for a more effective program.

Table 12. Interview Subject 5

| | Existing Program | Desired Program |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Program | Single comprehensive provider | Different contractor |
| Timeliness | Vendors slow to respond, most likely influenced by poor timeliness of payments | Expect timeliness to improve |
| Quality of Service | PMs and CMs are being accomplished. FACMAN performs 10% QA checks | Desirable but not essential to have additional, expertise to supplement FACMAN and perform QA |
| Downtime | Pretty good on average | Expected satisfaction |
| Cost Reduction | Higher premium in order to fund full coverage program | More PMs should result in fewer CMs which should decrease program costs |
| Cost Stability | Fixed price with rebate program. Renegotiated yearly | Same fixed price will apply |
| Flexibility | Very good. Contractor is responsible for PM and CM | Very good. |
| Management Expertise | Current contractor new in market and inexperienced | Future contractor more established within industry and more experience |
| Repair Documentation Management | Not being performed well. DMLs not being used | New SOW to require DMLs |
| Drawbacks | Inefficient contract pricing structure. Contractor was new and inexperienced and had poor business management | Higher cost per sq/ft because of full coverage |
| Benefits | Program offers cost stability and comprehensive coverage | New SOW to include more rigorous standards |
| Limiting Factors | Current contract specified how to perform work--not performance based Contractor's poor business affected subcontractor payments and further quality and timeliness of PMs and CMs | |
| Tradeoffs | Flexibility and cost stability, for cost reduction, and visibility over repair maintenance through subcontractors | Higher cost for program flexibility and cost stability. |
| Satisfaction | Dissatisfied with Contractor but not program | Expected satisfaction |

Subject five makes a clear distinction between the program and the contractor performing the contract under that program. A single comprehensive provider is being used, but the contractor in place was ill-suited and ill-experienced to perform the necessary contract requirements. Many of the strategic objectives were not fulfilled, because of the contractor’s inability and not the program structure. The interviewee is satisfied with the concept of the program and its strategic intentions. The interviewee also acknowledges that the program has significant cost tradeoffs. In order to achieve cost stability and increased flexibility, a “premium” is being paid for the comprehensive coverage. Although using a more experienced contractor will most likely not decrease the costs, it should achieve the quality, timeliness, downtime and management objectives outlined by the program but left unfulfilled by the current contractor.

Table 13. Interview Subject 6

| | Existing Program | Desired Program |
|---------------------------------|--------------------------------------------------------------------------------------|------------------------|
| Maintenance Program | CE A-76—Base-wide single comprehensive provider | |
| Timeliness | Exceptional. CMs accomplished same day. 24 hr call service. | |
| Quality of Service | Satisfied | |
| Equipment Downtime | Satisfied | |
| Cost Reduction | Analysis unknown since externally driven | |
| Cost Stability | Unknown since externally driven | |
| Program Flexibility | Very flexible. Has 2-4 dedicated technicians on site | |
| Management Expertise | FACMAN and Contractor oversee QA. Has enough in-house expertise to judge PMs and CMs | |
| Repair Documentation Management | Contractor uses DMLs. Very good documentation management | |

| | | |
|------------------|--------------------------------------------------------------------------------------------------------------------------|--|
| Drawbacks | No control over in-house “mix” of manpower. FACMAN needs more administrative skills. Should be more of a program manager | |
| Benefits | Full coverage, dedicated maintenance techs and 24 hour call service | |
| Limiting Factors | Cannot select in-house skill sets or number of people | |
| Tradeoffs | Assuming cost for flexibility | |
| Satisfaction | Very satisfied | |

Subject six expressed enthusiastic satisfaction with the program in place. Since the Civil engineering function was A-76'd, the base contracted with a single comprehensive provider to accomplish all facility maintenance to include its medical facility. Although the interviewee was very satisfied with the fulfillment of many of the strategic objectives, the subject had no awareness or visibility into cost stability or cost reduction. The interviewee also expressed mild dissatisfaction with the program management skills of the FACMAN function. Even though in-house expertise was available to supplement those of the FACMAN, the function still lacked core programmatic skills such as using new software or budgeting manpower and resources. This resulted in some dissatisfaction over less control of the skill-sets of in-house staff.

Table 14. Interview Subject 7

| | Existing Program | Desired Program |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maintenance Program | Varies by facility. Mixture of in-house and outsourcing | Single comprehensive provider with on-site techs |
| Timeliness | Dissatisfied. CE cannot provide accurate repair times | Contractor provides schedule of PM and more notice of CMs |
| Quality of Service | Cannot enforce through CE | Can be enforced through a contract |
| Equipment Downtime | Dissatisfied | Expect improvement with qualified vendor |
| Cost Reduction | Not satisfied. No accounting mechanism in place | Better negotiation of contracts or use of single provider |
| Cost Stability | No cost stability program in place | Long-term contracts or using single provider |
| Flexibility | CE has no understanding of unique nature facility repair has in customer's perception of quality care. Cannot force "non-urgent" repairs faster | Expects much more flexibility--Could contract for additional clerical and administrative help In better position to compete with "perception" of quality of care offered externally |
| Management Expertise | In-house technicians deploy and go TDY. Inconsistent skill set at any one time | FACMAN would have higher skill set. Additional technical expertise could be contracted on an "as-needed" basis |
| Repair Documentation Management | Improving | Can force Contractor to use DMLs and maintain documentation |
| Drawbacks | No QAE. Not structured for in-house--does not use DMLs FACMANs need to be program managers. CE drives contract strategy by determining scope of work to be outsourced | More expensive to contract out than to use existing CE resources |

| | | |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Benefits | CE services are cheaper than contractors' | QAE built-in. Services can be scheduled. Can force Contractor to use and apply DMLs Burden of proficiencies shifted from revolving in-house expertise to dedicated contracted support Can enter comprehensive provider relationship versus piecemeal program |
| Limiting Factors | CE determines its scope of work, which dictates how much outsourcing can be accomplished. Manpower is limited and schedules are difficult to predict Must use base contracting to select vendors--lacks expertise and relies on CE to determine quality /experience of vendors Does not have dedicated FACMANs—additional duty | Not sanctioned to use GSA to purchase qualified services in a “turn-key” fashion |
| Tradeoffs | CE is cheaper, but quality and timeliness sacrificed | Contractors may be more expensive, management gains quality, scheduling stability and visibility and program flexibility. |
| Satisfaction | Not satisfied with current “piecemeal” program | Would be very satisfied |

Subject seven expressed moderate to high dissatisfaction with each of the strategic objectives except for repair documentation management, which the interviewee acknowledged was improving. The subject was frustrated with the current relationship with base civil engineering and the challenges of balancing the needs of the facility with the realities of the manpower situation. The interviewee felt CE was under-staffed and

ill-suited to perform PM and CM for the medical facility. The CE staff and skill-sets were unreliable due to TDY and deployment schedules and ill-equipped to keep pace technically with the evolving facility maintenance expertise needed. The interviewee felt that using CE was by far the cheaper solution, but it sacrificed necessary quality oversight, timeliness and downtime. The interviewee felt CE was unaware and perhaps unsympathetic to the unique nature of medical facility maintenance. The interviewee feels the base must compete with private healthcare facilities and as such must present an image of impeccable cleanliness and order. Because of poor workmanship in the past and many CMs being performed during duty hours, this image may have been tarnished in the view of patrons.

Summarized Results

The following section summarizes the results obtained during the interviews and analysis. The results are summarized by strategic objectives.

Timeliness: 2 of the 7 interviewees expressed satisfaction with their current management program's ability to achieve this strategic objective. Of the satisfied interviewees, the following management programs were being used: single OEM management program and a single base-wide comprehensive provider.

Quality: 3 of the 7 interviewees expressed satisfaction with their current management program's ability to achieve this strategic objective. Of the satisfied interviewees, the following management programs were being used: a single OEM management program, single comprehensive provider and a base-wide comprehensive provider.

Equipment Downtime: 3 of the 7 interviewees expressed moderate to high satisfaction with their current management program's ability to achieve this strategic objective. Of the satisfied interviewees, the following management programs were being used: a single OEM management program, a single comprehensive provider and a base-wide comprehensive provider.

Cost Reduction: 6 of the 7 interviewees expressed dissatisfaction with their current management program's ability to achieve this strategic objective. One of the interviewees was unable to determine if the current management program achieved this strategic objective since they had no visibility into the base-wide provider contract.

Cost Stability: 1 of the 7 interviewees expressed satisfaction with their current management program's ability to achieve this strategic objective. The satisfied interviewee utilized a single comprehensive provider.

Flexibility: 3 of the 7 interviewees expressed satisfaction with their current management program's ability to achieve this strategic objective. Of the satisfied interviewees, the following management programs were being used: a single comprehensive provider, a 100% outsourced combination of OEM/3rd party program and a base-wide comprehensive provider.

Management Expertise: 1 of the 7 interviewees expressed satisfaction with their current management program's ability to achieve this strategic objective. The satisfied interviewee utilized a base-wide comprehensive program.

Repair Documentation Management: 2 of the 7 interviewees expressed satisfaction with their current management program's ability to achieve this strategic objective. Of the satisfied interviewees, the following management programs were being

used: base-wide comprehensive provider and a hybrid of in-house CE and outsourced 3rd party providers.

Table 15 Other significant findings:

| Respondent Number | | | | | |
|-------------------------------------|---------------------------------|---------------------------------------------------|------------------|-------------------------------------------------------------------------|-----------------------------------------------------------|
| | 1 | 2 | 3 | 4 | 5 |
| Largest Drawback of current program | Too large administrative burden | Lack of visibility and no apparent accountability | | Too many layers of administration and Contractor performing QA function | |
| Biggest limitation | | No one is fiscally responsible | Contract vehicle | Contracting No specific skill set required to perform QA | Contracting is focused on the process and not the outcome |
| Good Feature of existing program | | | | | |
| Contracting Vehicle Desired | IDIQ | IDIQ | IDIQ | Menu-driven contract | IDIQ |
| Foreseeable Trade-offs | | | | | |
| | | | | | |

| Table 15. Other significant findings continued: | | | | | |
|--------------------------------------------------------|----------|----------|----------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| Respondent Number | | | | | |
| | 6 | 7 | 8 | 9 | 10 |
| Largest Drawback of current program | | | Unpredictable manning levels and costs | No centralized control over funds and management of contracts | Staff shortages |
| Biggest limitation | | | Cost | same | Staff is all active duty, i.e. Deployments, etc |
| Good Feature of existing program | | | Responsiveness and Consistency | | Flexibility to respond to all emergencies and unique requests |
| Contracting Vehicle Desired | | | IDIQ | | |
| Foresee-able Trade-offs | | | | | |

| Table 15. Other significant findings continued: | | | | | |
|--------------------------------------------------------|-------------------------------------------------------|----------------------------|--------------------------------------------------|----------------------------------------------------------------------|---------------|
| Respondent Number | | | | | |
| | 11 | 12 | 13 | 14 | 15 |
| Largest Drawback of current program | Contract being replaced due to lack of performance | Not being managed properly | | Cost/ outsourced | None provided |
| Biggest limitation | Little to no effort placed on PMIs | | Money and manpower | Cost | |
| Good Feature of existing program | Requires less government personnel to run | continuity | Technical expertise | Flexibility and onsite tech availability | |
| Contracting Vehicle Desired | No comment | No comment | Flexible with allowance for contractor personnel | Outsource and leasing | |
| Foreseeable Trade-offs | Loss of experience and knowledge of Civil Engineering | | | Lost ability to control bidding and selection & on site technicians. | |

| Table 15. Other significant findings continued: | | | | | | |
|--------------------------------------------------------|-------------------------------------------|------------------------------------------------------|---------------------------|---------------------------------------------------|------------|-------------------------------------|
| | Respondent Number | | | | | |
| | 16 | 17 | 18 | 19 | 20 | 21 |
| Largest Drawback of current program | Still formalizing maintenance strategy | No visibility into the work order request and status | Lack of budgeted coverage | None | None given | Tight funding/ insufficient manning |
| Biggest limitation | Resources | Time and manpower | money | None | None | Money |
| Good Feature of existing program | Clear and concise | Timely response to emergency work orders | System wide contractor | Effective provider and great working relationship | | Numerous vendors |
| Contracting Vehicle Desired | Hybrid- some in-source and some outsource | | | | | |
| Foreseeable Trade-offs | Unknown, early stages | | | None | None | None |

| Table 15. Other significant findings continued: | | | |
|--------------------------------------------------------|-----------|-----------|-----------------------------------------------------------|
| | 22 | 23 | 24 |
| Largest Drawback of current program | | | In-house staff gets less opportunity to work on equipment |
| Biggest limitation | | | FAR and too expensive |
| Good Feature of existing program | | | Computerization of maintenance records |
| Contracting Vehicle Desired | | | Hybrid –with continued outsourcing |
| Foreseeable Trade-offs | | | Increasing contract costs |

Summary

This chapter presents the results of the research study based on data collected from interviews and written documentation. This chapter presented the results of personal interviews of individuals involved in the case study findings providing answers to the research questions presented in chapter one. Using the primary research question and investigative questions, it displayed the findings in both tables and figures and outlined how each investigative question had been answered during the course of the research. Additionally, additional insights gained into the dynamics involved in determining the correct tools necessary to implement and sustain any outsourced initiative. These lessons learned provide valuable feedback for any agency attempting to determine the keys to successful implementation and sustainment of health care facilities.

V. RESULTS AND FINDINGS

Summary

The last chapter presented the results and findings of this research effort. In this chapter the implications of the analysis will be explored. Next, the limitations of the research will be examined. Finally, future possible research ideas will be presented.

Conclusions about the Study

Overall Impressions and Perceptions

Exploring the critical success factors associated with successful outsourcing implementation and sustainment in the DoD environment is complex and plagued with limitations that private-sector organizations do not face in outsourcing efforts.

Understanding the factors that influence an outsourcing effort is critical to managing and sustaining outsourcing success. By approaching every sourcing decision through a structured, disciplined process, with a clear understanding of the critical success factors, requiring agencies and service providers can successfully develop outsourcing relationships

Understanding the drivers of an element of study is essential to knowing what aspects of study can be grouped together. This research began as an investigation into both facility and medical equipment maintenance. However, after research into the literature and discussions with subject matter experts, it was determined that maintenance of medical equipment and medical facilities were too dissimilar to attempt to study simultaneously.

It was determined during the course of the research that the divergent driver, technology, was such an influencing factor that approaching the same maintenance strategy for both areas would require different methodologies and focuses. Due to time and resource constraints thoroughly assessing both areas was not possible. The decision was made to down scope the initial research and focus solely on medical facilities maintenance during data collection and analysis. This shift allowed for a more probing exploration of this maintenance arena and more focused interviews with health facilities experts to map the critical success factors for outsourcing implementation and sustainment.

From the study, it was gleaned facility maintenance and medical equipment maintenance are diverse and separate entities, with divergent strategic and tactical needs. Whereas comprehensive maintenance may be feasible for medical equipment, it is ill-fated with facility maintenance. Medical equipment maintenance is more “clear-cut”. The equipment either works or does not work. Preventive maintenance can be camouflaged on expensive facility components such as HVAC.

Sourcing Management

One of the most-compelling critical success factors relate to how outsourcing relationships are governed. There is a direct correlation between the amount of care and nurture put into a relationship, and the overall success of that relationship. Enterprises that understand that outsourcing does not eliminate the need to manage the function outsourced are the most satisfied with their ongoing relationships. The more complex the relationship is in terms of breadth of services, the more need there is for visibility and verifiability that the relationship is meeting organizational needs.

Setting the Stage for Success

In any outsourcing decision, it is imperative that the decision be based on complete and accurate information. It is important to recognize that the business case for outsourcing is only as accurate as the facts on which it is built. Basing any sourcing decision or strategy selection on unclear or badly articulated strategy and objectives sows the seeds for future discontent on all sides.

Once the decision is made to outsource, full disclosure of all pertinent information is essential if dispute and disagreement is to be avoided with the performing agency. It is also necessary to make clear that the data which will be used as a base for measuring performance is based in fact and verifiable by both parties.

The goal of any successful outsourcing deal is a 'win-win' outcome, and that starts with selecting the right source and the right contractual vehicle. Allocating sufficient time and resources to investigating potential sources that mesh with organizational needs is critical. Minimizing this early stage can create problems that surface throughout the contract performance period.

Developing a contractual relationship that sets out to provide both parties with the benefits and protection they require is necessary to make the relationship work. The contract has to be fair to both parties and right for the duration of the contract, not just the day it was signed. Vague, ambiguous contracts only create frustration and unmet expectations by both parties. Defining the contractual relationship as clearly as possible lends itself to a clearer road to outsourcing success.

Sustaining Success

One of the biggest outsourcing mistakes occurs during the implementation phase. The biggest mistake made by outsourcing is to assume that the day after signing an outsource agreement they no longer have to be involved in the project. Active, continuous involvement in an outsourcing contract is a non-negotiable, pre-requisite for a successful relationship and requires the requiring agency to staff skilled people to oversee and fulfill this role. Poor relationship management is one of the leading causes of declining performance and unresolved issues.

Maintaining the partnership is an additional element of sustaining outsourcing success. To accomplish this outsourcing arrangements have to be sponsored at the highest level in the organization. Communication becomes both parties responsibility. But the requiring agency must empower its staff and give those employees a clear mandate and are given access to the resources necessary to make the contract work. Everybody involved has to be clear that this arrangement is built on the basis of mutual benefit; typical buyer/seller attitudes will not provide long-term sustainable value to either party. Staff continuity is critical in the first two years to establishing a real and lasting partnership.

Ensure change commitment by top leaders and effectively communicate and manage change with employees. The absence of visible sustained executive backing will undermine any forward momentum achieved in the implementation stages and hamper the programs long-term success. Finally, the intentional ignorance of organizational and cultural issues will contribute to poor change management results and continuing outsourcing success.

Significant Findings

Findings seven and ten answer the first research question of how outsourcing success could be assessed. Findings one, two, three, five and nine all address answering both elements of the second research question – What are the most critical elements of successful implementation and sustainment. Findings four, six, and eight are tailored to the sustainment element of outsourcing.

Finding 1: The requiring organization must ensure the purchasing agency utilized is qualified to select experienced vendors.

If the purchasing agency is ill-equipped to evaluate vendors—or relies on the judgment and analysis of another department that is ill-equipped, the facility’s maintenance program may suffer with a potentially substandard vendor. Matching the program objectives with the business objectives increases the likelihood of success. As shown in Chapter IV, the contracting agency was cited as the second largest limitation to the outsourcing effort (Table 15). Defining key objectives, benefits and expectations before starting will also help determine selection criteria. Although difficult to do, a list of high level program objectives for the year will help focus team members and ensure the desired end-state objectives are known.

Finding 2: The experience level of the vendor is critical to the customer satisfaction of maintenance program.

A common theme throughout the interviews was the correlation between experience level of the vendor and the quality and effectiveness of the preventive and corrective maintenance being done. Although there are many stakeholders in determine customer satisfaction, the selection of competent vendors is one of the foundational elements of success.

Subject two cited “poor prime contractor experience”; Subject four cited, “not enough subject matter experts available”; and Subject five stated the ‘contractor was new to the market and inexperienced”.

Finding 3: Ensure there is top-level support from managers and field operatives.

All programs need top-level management buy in to get off to a successful start and to remain organizational priorities. Assigning key personnel to new programs underscore the level of commitment in the organization. Selecting the best and brightest staff to implement and sustain an outsourcing effort will be an external indicator of top level support of organizational resources and personnel.

Finding 4: Plan for post-implementation before you get there.

Visualizing and stating the desired end state is another critical element to expressing and conveying organizational support for the entire length of the program. Using outsiders to manage change can be beneficial to an organization with poor success with program management or have a change-adverse culture. Creating a change management and integration team can also assist in helping employees understand and participate in organizational changes.

Finding 5: Do not try to go it alone.

Outside expertise can be vital to understanding a program and how to best define, implement, and sustain it. Many organizations specialize in supporting program launch efforts and can be critical to the success of your program. Consultants can be expensive and the successful use of them depends on organizational culture, skills gaps and the

level of risk associated with program failure. The determination to use consultants or subject matter experts should not solely depend on budget constraints; some programs are so complex that without the necessary expertise these programs would have very little chance of succeeding.

Finding 6: The facility management (FACMAN) function requires more technical expertise and may need to be augmented through outside expertise.

Another common theme within the interviews dealt with the requirements and general perception of what skills are best suited for the FACMAN function. Over half of the interview respondents (Subjects 1,2,5, and 7) felt the FACMAN position was a limitation of achieving better results for any type of maintenance program. More technical expertise and more program management skills were the primary skills lacking in many of the FACMANs. Suggestions included adjusting the position descriptions of this function to require the additional skills needed.

Although many of the interviewees desired additional technical expertise in the FACMAN function, this did not translate into being a technical expert, but technical proficiency. However, it was noted the FACMAN's required 10% QA/QC "spot" checks may not be sufficient for accurately determining the state of facilities. Additionally, it was noted many MAJCOMs desired a more thorough QA analysis than the current spot checks. For this purpose, it was proposed the FACMAN function should be partially supplemented using a trained expert to conduct inspections on an annual basis for each facility within the MAJCOM.

Finding 7: Interpretation of ‘success’ is determined by the stakeholder.

To most healthcare recipients, the external appearance of healthcare facilities is reflective of the quality of care they receive. If healthcare facilities are seen as uncleanly, or poorly maintained, this translates into poor quality of care to many customers and potential customers. While the physical aesthetics of a building may not be an accurate predictor of the level of care offered, it is a factor in evaluating a ‘successful’ program. Few FACMAN personnel would disagree that a high prioritization on CR and PM is essential, but for fundamentally different reasons.

Finding 8: On-Site personnel results in a higher rate of program satisfaction

The overall trend in satisfaction is directly tied to the availability of qualified, repair technicians. Having a sufficient number of qualified technicians allowed the FACMAN more latitude and flexibility to manage maintenance programs and ensure customer satisfaction with their internal customers.

Finding 9: Local problems become global fixes.

One of the more interesting findings was the observation that local problems or challenges of one facility resulted in changes implemented command-wide. The suggestion identified was prudence and discretion prior to crafting new policies or regulations. Although local problems may be indicators or symptoms of larger problems applicable to many healthcare facilities, it is necessary to first isolate the problem and determine its root cause. Until a root cause analysis is performed, “global fixes” should not be enacted.

Finding 10: To measure success of a program strategic objectives must be quantified.

To empirically assess success of a program it is necessary to develop a systematic way of gauging a program's performance in relationship to its strategic goals and objectives. To do this while decreasing costs and maintaining quality, the facility must gain visibility into its costs through meaningful metrics. Programs or projects designed to determine the optimal cost/square foot or needed amount of manpower/square foot are necessary to gain cost efficiency.

Finding 11: Prior to implementing a new management program, a facility should analyze its current management program and work to supplement deficiencies and/or weaknesses.

All of the interviewees acknowledged that a "cookbook" approach should never be the first action taken when new management inherits a facility maintenance program. One respondent went so far as to express frustration that outsourcing was the first response when a facility experienced problems with their in-house CE staff. The respondent's suggestion was to work with the "real property" managers first and determine how to rectify and avoid future issues. Additionally, each respondent clearly felt senior management should analyze the current program's strengths and weaknesses and work to supplement the weaknesses—not create a new program to supplant the existing one. Work to fill in the gaps prior to structural overhauls.

Contribution

Implication of Research Results

The immediate answers to the research questions have further implications. As described in the analysis, determining the tenants to successful outsourcing implementation and sustainment as an effective model selection criterion is difficult. The literature provides a framework for outsourcing success in general, thereby, provides a framework for avoiding or minimizing these major issues associated with outsourcing. These results imply a larger context for the application of outsourcing in unique market niches.

Recommendations for Managers

Through the interviews, the scope and depth of new initiatives being undertaken by the MAJCOMs to drive more efficiency and visibility into their existing programs was realized. Efforts to articulate a dollar/square foot and manpower/square foot are excellent areas of research, which should be wholly supported by AFMC/SG. The findings of such efforts should provide solid methodologies, prototypes and pilot programs from which many DoD installations may emulate and/or tailor to their benefit.

There is evidence to suggest that some organizations use outsourcing to solve internal political problems (Lacity and Hirschheim, 1993). Prior to implementing a new management program, an organization should analyze its current maintenance management program and work to supplement deficiencies and/or weaknesses with out completely ignoring the problems that exist and assume they will disappear with a new maintenance program. Many of the problematic issues that occur will often be repeated

due to poor management or implementation strategies and have little to do with the program itself.

All subjects interviewed expressed dissatisfaction with the implementation efforts when faced with a new facility maintenance program. One respondent expressed frustration with the management perception that outsourcing is always the right answer. Interview respondents clearly felt senior management should analyze the current program's strengths and weaknesses and work to supplement the weaknesses—not create a new program to supplant the existing one. Managers should work to understand the limitations of the existing program prior to structural overhauls.

Final Recommendation

Any outsourcing effort needs to be a well thought out and deliberate effort. Fully understanding the objectives of a particular outsourcing initiative is imperative if the effort is to be successful. Several issues hamper successful outsourcing.

Employee resistance to any outsourcing effort is compounded by a lack of clear direction or purpose. A lack of lasting commitment by senior management also robs any program of its forward momentum. Whether the short-fall appear in manning, financial backing, or other resource constraints personnel negatively affected by these measures resist further change as a result. Building a successful outsourcing effort starts from the ground floor and moves upward. Without buy-in from the primarily affected parties any outsourcing effort will be doomed for dismal performance. Specially within DoD healthcare facilities one of these critical parties that should be involved is that of the Facility Manager.

Senior management should work to empower its existing FACMAN function. This means broadening the skill-sets required to include more technical expertise and program management skills. In-house management is sufficient and additional layers of management add only to cost but not to overall efficiency or effectiveness. In order to empower the FACMAN function, appropriate resources need to be in place. If in-house resources are insufficient, contract to augment the maintenance team as needed to include, but not limited to: additional expertise, on-site repair technicians and administrative personnel such as work order clerks and/or assistants.

Limitations of the Study

This research acknowledges several limitations.

Limitations to Case Study

The selected methodology and its execution present a few possible limitations to the results of this research. Stemming from the interpretation of the survey respondents, possible construct validity issues may exist. The apparent interdependency of some issues may also present reliability issues. Reliability issues concerning the data sets must also be addressed. Finally, the sampling process must be mentioned. The following paragraphs will address these possible limitations.

Construct validity issues might exist around successful medical outsourcing as a document detailing the definition of successful medical outsourcing does not exist. Therefore, the researcher relied on the information contained in other literature about other outsourcing initiatives for a framework of successful outsourcing in other arenas. Further research should explore this construct more fully.

An interdependency of the outsourcing concepts, specifically the primary drivers, presented as a secondary finding of this research. Although these concepts were considered mutually exclusive for the purposes of coding, the possibility exists that they are not. A high degree of interdependency leading to the concepts not being mutually exclusive could affect the reliability of the results.

Reliability may also be affected by the data. Originally, the data collection involved hand scribed notes. These notes were transcribed and reviewed by the researchers and respondents to create a secondary data collection. Although both data sets were retained as per the methodology, it remains possible that the notes are too enigmatic. The shorthand format and overabundance of acronyms and jargon may prevent future analysis by other researchers. Review by the respondents the researcher demonstrated the data sets was interpretable by individuals with considerable knowledge in the facility maintenance and sustainment environment. Another limitation of the study was obtaining additional sources of evidence. The amount of additional documentation and archival records was limited to the amount on hand from the interview subjects.

The sampling process was purposefully not random. Although this practice is standard for qualitative research, it may affect the external validity of the findings. The case study respondents collected may have been an insufficient quantity. Furthermore, the respondents' perspective may not have been representative. In addition to the case selection, the determination of literature and documentation included in the analysis may affect the external validity.

Additionally, this research began as an investigation into both facility and medical equipment maintenance. However, after research into the literature and discussions with

subject matter experts, it was determined that time and resource constraints would prevent a thorough analysis of both fields. The decision was made to down scope the initial research and focus solely on the facilities side during data collection and analysis. This allowed for a more probing exploration of this maintenance arena and more focused interviews with health facilities experts.

The final limitation of this study is the bias introduced from both the investigator and the interview subjects. The researcher's limited knowledge base may also be considered a limitation to the case study. Since the researcher is not recognized as an expert on the maintenance of healthcare facilities or medical equipment, the researcher's knowledge base can become a limiting factor to the overall research capability.

Interviewee bias was addressed through triangulation of interview transcripts and documentation and cross-checking data with other interview transcripts. Data concerning interview subject's opinion, and results were not altered.

Future Study

Future research may take a variety of avenues from this foundational study. With very little specific information available about outsourcing medical facilities, a historical perspective of all efforts tried would be beneficial. Analyzing and comparing the expected and realized results of each initiative would highlight some of the elusive hazards DoD has experienced in its past outsourcing initiatives.

Additionally empirically assessing stakeholders and their various perspectives would provide insight into how past programs were evaluated with regard to success. Specifically identifying the similarity and differences in DoD senior leadership and

practitioner opinions and perceptions would help determine some of the specific drivers associated with managing change and achieving success with each population.

Regarding facility maintenance, the development of a model of cost per square footage would quantify the budgetary needs of each facility to allow for consistent and accurate facility maintenance planning.

Summary of Overall Thesis

Management and implementers face many problems when introducing any new system. Addressing common implementation issues during the first stages of the implementation effort goes a long way in easing the transition for users. Including users in identifying the requirements of any system and continuing involvement throughout development increases their acceptance of the new system. Completing any program without user input will result in less than a positive an outcome for the long-term success of any program.

Unwavering management support during an implementation effort sets the tone for a new system. Management support through either policies or rational persuasion conveys the importance of the system to users. Systems have failed because of the lack of management support. Programs that have elements of success can be tied to management and implementers and their ability to address user concerns early in the implementation effort and the use of positive influence behaviors throughout.

Appendix A: Guided Interview Questionnaire
Sponsored by: AFMC/SG

Section I Demographics

1. Organization: ___Clinic___Hospital___Med Center
2. If facility offers inpatient services, approx number of beds:___
3. Please fill in your Facility Name/City/MAJCOM/Base: _____.
4. What is your position and, how long have you been in that position?:_____

Section II Survey of Facility Maintenance

5. Please indicate the status of your organization's facility management program.
____Formal program in place ____Formal program currently being implemented
____No formal program
6. Please indicate how long your current program has been in place?_____
7. Was the program you have in place now directed by an external authority?_____
8. Please indicate which of the following strategies best describes your organization's facility maintenance management program:
____Total In-sourcing ____Total Outsourcing ____Combination

9. If your organization uses or will use outsourcing, please indicate which of the following primary (greater than 50%) strategies it employs/will employ:

Outsourcing Facility Maintenance Management Strategies

____Insurance Program: A service provider who underwrites facility repair costs and charges the organization fixed prices to provide repair coverage for facilities.

Number of Insurers

- ____Single insurer
____Multiple insurers

Provider

- ____Original Equipment Manufacturer(s) insures facilities
____A third party service provider(s) insures facilities
____Combination of both insures facilities

Coverage

____Comprehensive Program: All or most of the facility's preventive maintenance and/or repair is covered under one insurance provider.

_____Item Specific Program: All or most of the facility's preventative maintenance and/or repair is covered by different insurers based on the item.

Management

_____Insurer(s) manages facility repairs and/or preventive maintenance with internal or onsite resources.

_____Insurer(s) manages facility repairs and/or preventive maintenance with subcontracted resources.

_____Health care facility manages facility repairs and/or preventive maintenance with reimbursement from insurance provider(s).

_____Non-Insurance Program

Number of Vendors

_____Single vendor

_____Multiple vendors

Coverage

_____Episodic Program: Facility's preventative maintenance and/or repair are covered on an "as needed" basis.

_____Comprehensive Program: Facility's preventive maintenance and/or repair are covered under one pre-negotiated program.

Management

_____Vendor provides in-house management.

_____Vendor provides in-house management and on-site technicians.

_____Vendor provides on-site technicians.

_____Vendor provides an on-call service.

10. Please rank the following outsourcing objectives in order of their importance to your organization with 1 being the most important. If your organization has objectives not shown, please write them in using the space provided. If outsourcing was not selected please select insourcing and the primary motivator for remaining in-house. Ranking objectives does not imply any objectives are unimportant, only that some are more critical to your organization.

_____Response time

_____Quality of Service

_____Equipment Downtime

_____Cost Reduction

_____Cost Stability

_____Program Flexibility

_____Management Expertise

_____Repair Documentation Management

_____Other _____

11. Please indicate your satisfaction with your facility maintenance program by circling the number that best gives your answer with 1 being the lowest score and 7 the highest.

11A) Timeliness: Supplier's average response time

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

11B) Quality of Service

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

11C) Equipment Downtime

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

11D) Cost Reduction

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

11E) Cost Stability

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

11F) Program Flexibility

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

11G) Management Expertise

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

11H) Repair Documentation Management

| | | | | | |
|-------------------------------|---|---|-----------------------|---|-----|
| Did not meet needs/objectives | | | Met needs/objectives | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |
| Did not meet any expectations | | | Exceeded expectations | | |
| 1 | 2 | 3 | 4 | 5 | 6 7 |

12. What is the largest drawback to your facility maintenance program?

13. Please rank the following issues and the degree to which they were existent in your organization during the outsourcing determination process of facility maintenance, with 1 being noticeably absent and 7 being clearly present.

Noticeably Absent

Clearly Present

13A) Organization-wide understanding of company goals and objectives with regard to facility maintenance and sourcing solution

1 2 3 4 5 6 7

13B) Senior executive support and involvement

1 2 3 4 5 6 7

13C) Open communication with affected individuals and groups/Good flow of information and updates

1 2 3 4 5 6 7

13D) Use of outside expertise/Consultants, etc.

1 2 3 4 5 6 7

13E) Consideration of your perspective when selecting the vendor

1 2 3 4 5 6 7

13F) Ongoing management of the relationships between and among those parties impacted by the sourcing decision

1 2 3 4 5 6 7

13G) Sourcing arrangement (contract, process) clearly defined and easy to follow

1 2 3 4 5 6 7

13H) Careful attention provided to those personnel impacted by sourcing decision

1 2 3 4 5 6 7

Other(s)

1 2 3 4 5 6 7

14. Please rank the following factors and the level that they were existent in your organization during the outsourcing sustainment process of medical facility maintenance, with 1 being noticeably absent and 7 being clearly present.

Noticeably Absent

Clearly Present

14A) Organization-wide understanding company goals and objectives with regard to medical equipment maintenance and sourcing solution

1 2 3 4 5 6 7

14B) Senior executive support and involvement

1 2 3 4 5 6 7

| | | | | | | |
|----------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|
| 14C) Open communication with affected individuals and groups | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14D) Use of outside expertise/Consultants, etc. | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14E) Consideration of your perspective when the relationship was continued | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14F) Ongoing management of the relationships between and among those parties impacted by the sourcing decision | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14G) Sourcing arrangement (contract, process) clearly defined and easy to follow | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14H) Careful attention provided to those personnel impacted by sourcing decision | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Other(s) | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

APPENDIX B

Definition of Terms

Department of Defense, "Glossary: Defense Acquisition Acronyms and Terms", Defense Acquisition University Press, Fort Belvoir, VA, Tenth Edition, Jan 2001.

Conversion To Contract

A conversion to contract is the change of performance of a commercial activity from in-house performance by Federal employees to performance by a commercial source.

Conversion From Contract

Conversion from contract to in-house performance means the change of a commercial activity from performance by contract with a commercial source to performance by Federal employees with Government resources. It also includes the conversion of expansions and/or new requirements (work) from contract performance to in-house performance.

Cost Comparison

A cost comparison is the process whereby the estimated cost of Government performance of a commercial activity is formally compared, in accordance with the principles and procedures of this Circular and Supplement, to the cost of performance by commercial ISSA sources.

Facility Maintenance

Facility management is the practice of coordinating the physical workplace with the people and work of the organization. It integrates the principles of business administration, architecture and the behavioral and engineering sciences.

Inherently Governmental Activity

An inherently governmental activity is one that is so intimately related to the public interest as to mandate performance by Federal employees. Activities that meet these criteria are not in competition with commercial sources, are not generally available from commercial sources and are, therefore, not subject to A-76 studies.

Management Plan

The Management Plan is the document that outlines the changes that will result in the Government's Most Efficient Organization (MEO) to perform a commercial activity in-house. It provides that staffing patterns and operating procedures that serve as a baseline for in-house cost estimates.

Most Efficient Organization (MEO)

The MEO refers to the Government's in-house organization to perform a commercial activity. It may include a mix of Federal employees and contract support. It is the basis for all Government costs entered on the Cost Comparison Form. The Most Efficient Organization (MEO) is the product of the Management Plan and is based upon the Performance Work Statement (PWS).

Outsourcing

Transfer of a support function traditionally performed by an in-house organization to an outside service provider, with the issuing organization continuing to provide appropriate oversight (Deavel, 1998).

Performance-based contracting

The practice of structuring all aspects of an acquisition around the purpose of the work to be performed with the contract requirements set forth in clear, specific, and objective terms with measurable outcomes as opposed to either the manner by which the work is to be performed or broad and imprecise statements of work (FAR,2003).

Privatization

The transfer of ownership of a function, business asset, or both from the public to the private sector (AFMIA, 2001).

Sole Source Acquisition

A contract for the purchase of supplies or services that is entered into or proposed to be entered into by an agency after soliciting and negotiating with only one source (FAR 2.101).

Strategic Sourcing

Strategic sourcing is the cornerstone of the Air Force approach to outsourcing and privatization. Overall, strategic sourcing seeks to balance military effectiveness (the ability to fight and win) with the incorporation, where possible, of increased efficiencies from best business practices. The selection of the optimum source and process is central to strategic sourcing and should result in improved performance, efficiency, quality, cost effectiveness, and savings for modernization, quality of life, or other Air Force priorities. Strategic sourcing is not limited to commercial activities, but also includes inherently governmental and military essential functions. When internal sources are required, strategic sourcing ensures that mission performance requirements are met or exceeded in the most cost-effective way. When an external source is available, strategic sourcing facilitates the identification of the best way to either compete with private or public sector suppliers to achieve performance and cost advantages, or to directly outsource or

privatize the function under existing policies, procedures, and statutes (AFMIA, 2001).

Warranty

A promise or affirmation given by a contractor to the Government regarding the nature, usefulness, or condition of the supplies or performance of services furnished under the contract. (FAR 2.101)

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| 14. ABSTRACT Health care providers are faced with two critical issues in today's evolving marketplace: lowering operational costs and achieving more efficient, cost-effective methods to deliver high quality patient care. The rising costs of healthcare and decreasing budgets have placed additional strain on the United States Air Force Medical Service to aggressively lower its facilities' costs. With fewer funds and less personnel, the Air Force medical service is re-evaluating its current maintenance outsourcing implementation practices and reexamining how these strategies might be implemented and sustained more successfully. This research offers some of the foundational needs for designing, implementing and sustaining any type of outsourcing effort. Additionally this study highlighted some DoD specific issues to program management, focusing on some of the unique attributes associated with successfully managing and sustaining a DoD medical facility maintenance program. Content analysis was used to determine the ingredients for successful outsourcing implementation and sustainment. Several problem areas in this area were identified as well as best practices and lessons learned. | | | | | |
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