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CORPORATE INFORMATION MANAGEMENT AND
BUSINESS PROCESS IMPROVEMENT UNDER
THE UNIT COST PROGRAM: AN ANALYSIS OF A SYSTEM
FOR THE AIR FORCE INSTITUTE OF TECHNOLOGY

THESIS

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THESIS

**Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Information Resource Management**

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Kevin D. Kettell

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Abstract

DOD has been undergoing major changes toward a competitive "business-type" environment as a result of the Packard Commission and the Goldwater-Nichols Act. As a result of the Goldwater-Nichols Act, two programs directly affect the Air Force Institute of Technology (AFIT): Defense Management Report Decision 971, better known as the Defense Business Operations Fund (DBOF); and the Corporate Information Management (CIM) initiative.

DBOF requires that organizations provide unit cost per output figures as the basis for organizational funding. Unit cost resourcing changes the way federal managers manage and allocate resources, and promotes quality management and continuous improvement principles.

Defense Information Management recognizes information as a resource to be managed. CIM initiatives use information as the basis to improve the way organizations operate.

This research effort purports to identify strategic-level requirements that will allow the establishment of an integrated information system which will provide AFIT insight into the cost and value of their products and services. This information system would identify which products or services are profitable and provide insights for business process improvement.

CORPORATE INFORMATION MANAGEMENT AND
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I. INTRODUCTION

General Issue

Over the past thirty years, the rapid evolution and spread of information systems technologies have created a major new set of managerial changes (184:41). Information resource managers continuously strive for the best method to provide a unified, comprehensive, integrated strategic organizational information systems plan that will take advantage of the immense power of the computer and provide the desired direction for the development of information systems within an organization. According to Hackathorn and Karimi:

Without a solid grasp of how the organizational goals are translated into an overall architecture, an organization pursues the development of the information systems according to a short-term perspective of isolated applications. Thus, a fragmented information system results that hinders the ability of the organization to respond to changing environments. (92:203)

However, an effective strategic plan doesn't just pop up complete and ready for implementation, ready to tackle the future all by itself. It takes a lot of hard, frustrating work to create, implement, and maintain. Everyone in the organization must have a clear understanding of the mission and its objectives in order to sense and support the organization's direction.

Higgins and Vincze add, "Two major problems in a nonprofit organization are the absence of a clearly defined mission and the absence of related, clearly defined objectives" (99:270). Peter Drucker adds that "a mission statement has to be operational, otherwise it's just good intentions" and also "it has to be simple and clear" (62:4-5).

Background

The Department of Defense (DOD) has been undergoing major changes toward a competitive "business-type" environment as a result of the President's (Reagan) Blue Ribbon Commission on Defense Management (Packard Commission) and the Goldwater-Nichols Department of Defense Reorganization Act of 1986 (Goldwater-Nichols Act). The Packard Commission emphasized specific reforms in two areas:

- (1) Substantially greater reliance on commercially-available products, often well-suited to DOD's needs and obtainable at much less cost; and
- (2) Adoption of competitive practices predicated more broadly on a mix of cost, past performance and other considerations that determine overall 'best value' to the government. (37:20)

On the basis of civilian business practice successes, DOD is attempting to implement proven and tested business practices in military programs. As outlined in Secretary of Defense Dick Cheney's Defense Management Report (DMR), July 1989, if DOD managers are to reduce costs and improve performance, management of programs must emulate the characteristics of the most successful commercial projects (37:8).

DOD decision-making and business practices should embody the following management characteristics as proposed by the Packard Commission:

- Organization - A streamlined organization with centralized policy making and decentralized execution
- Decision making - Processes that:
 - • Provide adequate and stable funding,
 - • Make informed cost-performance trade-offs that yield 'affordable' programs,
 - • Involve military operators in decisions, and
 - • Employ extensive prototyping and testing;
- Acquisition policy - Simplified and unified acquisition regulations and the policies that delegate authority to the working level; and
- Management - Policies that promote excellence in the work force, and ensure an adequate technology and industrial base. (85:ES-1)

The Packard Commission also cited six features of successful commercial programs:

- Clear command channels
- Stability
- Limited reporting requirements
- Small, high quality staffs
- Communications with users
- Prototyping and testing (85:I-3)

For military organizations to survive in a competitive environment, they will have to do business more effectively and more efficiently (11:2). In practice, there must be "increased use of commercial-style competition" (37:8).

As a result of the Goldwater-Nichols Act, two follow-on programs will affect the way the Air Force Institute of Technology (AFIT) currently does business: the Defense Management Report Decision (DMRD) 971, better known as the Defense Business Operations Fund (DBOF), and the Defense Corporate Information Management (IM) program.

Defense Business Operations Fund (DBOF). President George Bush directed DOD to "develop methods and rationale for reductions to improve efficiency and realize direct and indirect cost savings" (37:15). DBOF requires

that organizations provide unit cost per output figures which will be the basis for their organizations' funding. All expenses of the organization are figured into the unit cost. Principal Deputy DOD Comptroller, Donald Shycoff, explains that under DBOF "all direct, indirect, and general and administrative costs incurred shall be collected and identified to the product or service benefiting from the costs" (154:Attach 1,1).

Unit cost resourcing will change the way federal managers manage and allocate resources. Unit costing promotes quality management and continuous improvement principles since managers are accountable for efficiency in business decisions (64:22). Basso states, "Not all of the wrinkles have been addressed and many questions are unanswered; however, the program [unit costing] is going forward, and it is here to stay" (24:15).

Developing unit cost figures is a formidable task due to poorly documented activity based cost data. The Council of Graduate Schools (Washington DC) recognized this problem. Powell and Lamson reported difficulty in analyzing unit cost data supplied by universities because of poor data reporting and collection procedures:

Certainly, a great deal more thorough attention must be given to the construction of higher education cost models and gross inconsistencies in the data must be eliminated before any confidence can be placed in further statistical analyses and before the results from such analyses can be considered as potential input into higher education resource allocation and policy decision. (144:255)

The need to link activity costs to outputs to improve effectiveness and efficiency of operations is one of the major efforts of the Defense Corporate Information Management (IM) program.

Defense Corporate Information Management (IM). The Defense Corporate Information Management (IM) program recognizes that information must be managed, just as capital, materiel, and people must be managed (10:2). Within the Defense IM program, corporate IM (CIM) initiatives are being used to improve the way organizations operate through "business case analysis" in which product and service expenses (labor, materials, and any proposed or existing information system) are analyzed. Alternative ways of improving the quality, efficiency, and effectiveness of that function are studied. Information systems will be considered only when justified by the total business case (10:2).

As outlined by Andrews, the information technology that will support the business comes into the information system "planning process only after business policies, procedures, and measurements have been considered" (11:6). The model shown in Figure 1-1 represents an examination of business strategies first, and an information management plan second.

The Packard Commission reported the need for better information systems in the DOD decision-making process:

It was pointed out that the data elements in the major DOD planning documents are not fully consistent. It is often difficult to even understand what the programmatic implications of some budget decisions are, because there is no clear relationship. Similarly, there is no correspondence between the objectives specified in the Defense Guidance and programs or budget elements. Hence, at each stage in the process different bookkeeping systems are used, and there is no clear crosswalk between them. (85:VI-6)

Therefore, an information system must have accurate, reliable, and readily available data to be both efficient and effective, i.e., a process that clearly delineates the competitive relationship that will exist between services provided and the costs that accrue.

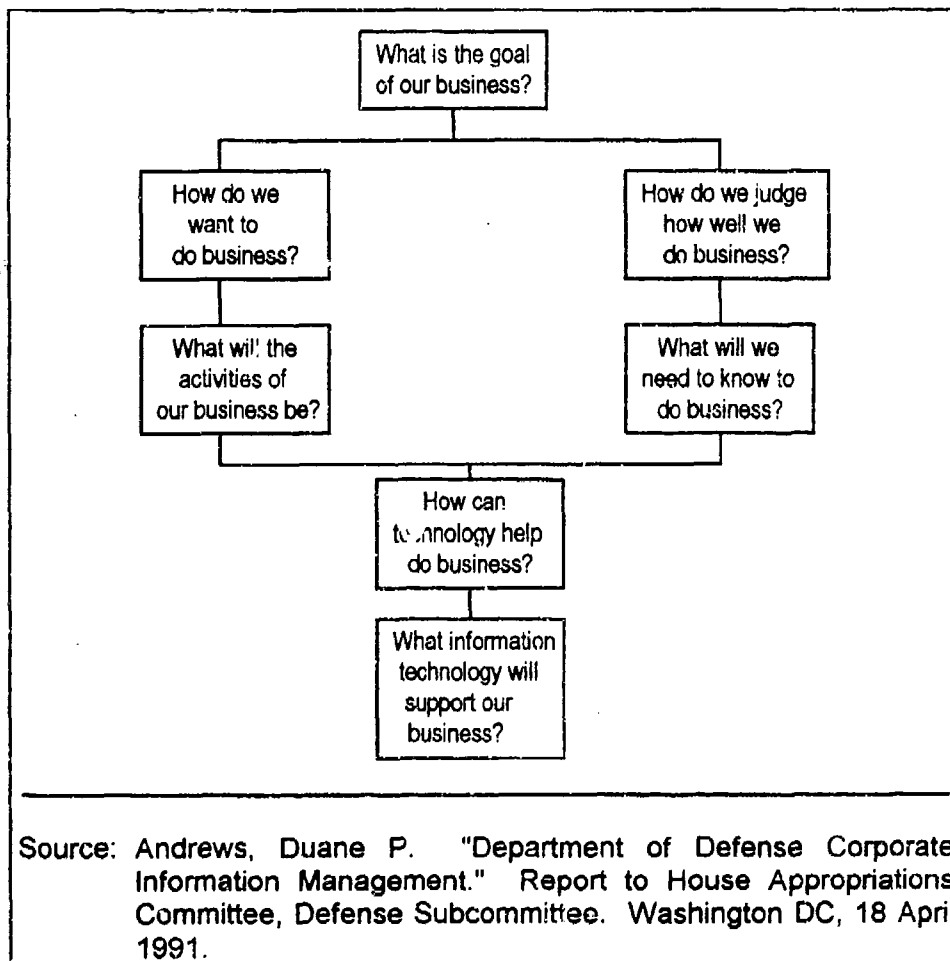


Figure 1-1

INFORMATION SYSTEMS PLANNING MODEL

The corporate IM concept of business process improvement uses business process, activity, and data models to understand how things work in the current environment in order to make informed business decisions and business process improvements (43:1-5). A model is a graphical representation of complex, real-world phenomena; it assists in understanding the current environment and is the mechanism professionals employ to improve business processes (43:2-4,A-15).

A business process: "is a collection of activities that work together to produce a defined set of products and services; exists to fulfill the mission of the enterprise; and must be related in some way to mission objectives" (43:A-7). This allows product quality, time, and quality of work life to be traced directly to business transactions and, therefore, to business activities and, ultimately, to business processes (43:A-7).

A business process model defines transactions that take place among activities performed by various elements in a business's environment (43:2-7). An activity model is a representation of related business functions, within a limited sub-set of the enterprise. Its primary purpose is to discover the information needs, inputs, outputs, mechanisms, and controls, within the enterprise which define the scope of a project or an enterprise; other uses include data discovery and validation (43:2-8; 56:iv).

A cost model (based on activity models) models the price or value of each resource assigned to an activity and consumed in the process of producing the products and services of that activity (43:2-9,2-17,A-10). A business rule model objectively describes the processes of a business, describes the symbology of the business and, as a result, controls the ability of the business to communicate within and among activities and processes (43:2-10,2-12,A-8).

And ultimately, a data model represents the data necessary to execute the business method (56:iv). The data model shows what data are required by the business activity by relating the data to the strategy of the organization. Business process improvement is accomplished on a foundation of these models to support future business improvement analyses such as functional economic analysis (FEA) (43:2-17).

As DOD continues to restructure to meet Congressional manning requirements, AFIT is required to meet the continuing, even growing, educational needs of tomorrow's Air Force—as it has throughout its history.

AFIT History.

AFIT traces its roots to the early days of powered flight when it was apparent that the progress of military aviation depended upon special education in this new science. (6:2)

AFIT was founded in 1919 when the Director of the United States Army Air Service authorized the establishment of the Air School of Application at McCook Field, Dayton Ohio. (70:I.1)

After World War II, the Army Air Force Institute of Technology was established as part of the Air Materiel Command. . . . When the Air Force became a separate service in 1947, the Institute was renamed the Air Force Institute of Technology. . . . In 1950, command jurisdiction of AFIT shifted from Air Materiel Command to the Air University. (6:2)

In 1954, the 83d Congress authorized the Commander, Air University, to confer degrees upon persons in the AFIT Resident College. . . . the first graduate degrees [were granted] in business in 1958. (6:3)

Under the AFIT organizational, operational, and educational umbrella are a wide range of activities that define the mission of AFIT.

AFIT Mission.

The mission of the Air Force Institute of Technology is to support National Defense through quality graduate and professional education, consulting, and research programs. (104:1)

This mission requires that the Institute identify, conduct, and evaluate graduate and professional education which maintains the effectiveness of aerospace power as an instrument of United States policy. In other words, the Institute provides coordination between academic means and DOD ends by analyzing, comparing, and matching higher education resources and Air Force educational requirements. (70:I.1)

AFIT Concept of Operations.

The mission is carried out through three schools and the Civilian Institutions Programs directorate:

The School of Engineering develops and conducts degree programs in science, engineering, operations research, and strategic and tactical sciences and conducts PCE [professional continuing education] programs. The school also conducts a master of engineering applications program.

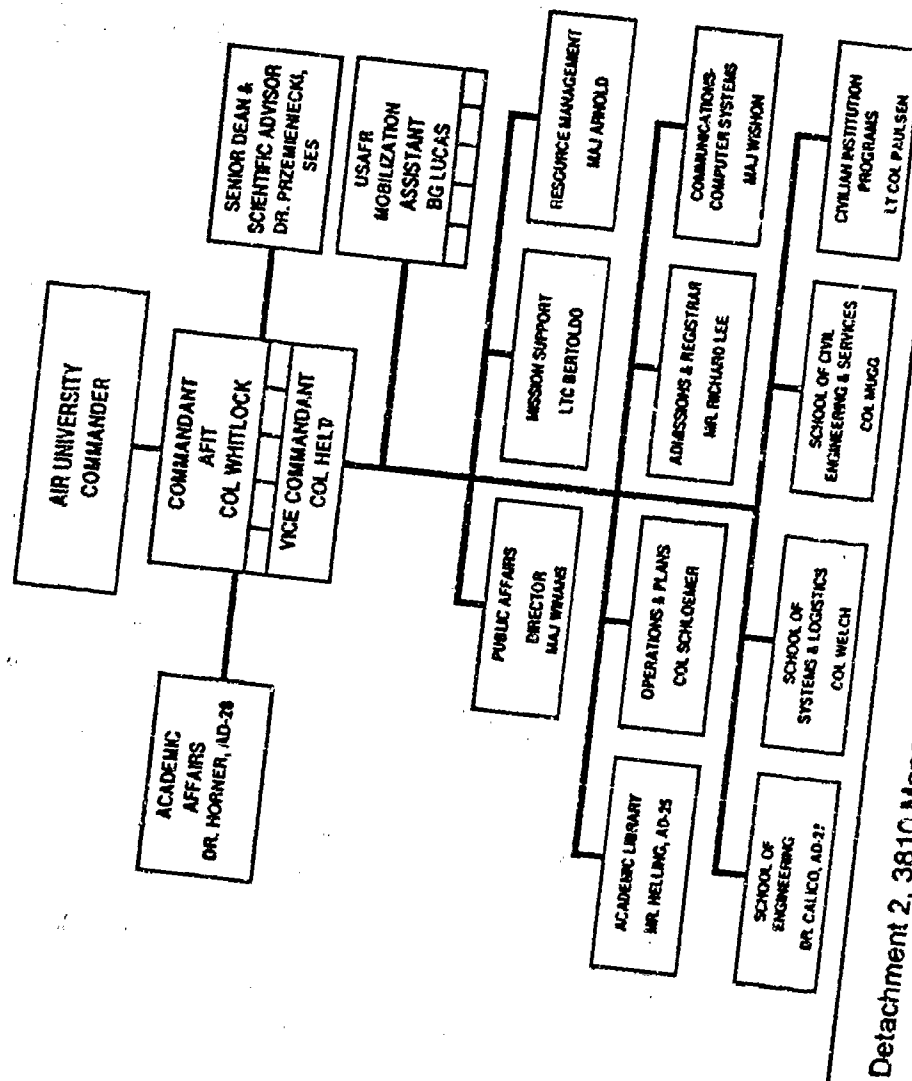
The School of Systems and Logistics provides graduate education in logistics, engineering and systems management leading to the master of science degree. The school also provides continuing education in USAF and DOD systems and logistics professional disciplines.

The School of Civil Engineering and Services develops and conducts . . . (PCE) programs, applied research, and engineering and management consulting services for the Air Force engineering and services communities worldwide.

Civilian Institutions Program manages education and training at civilian institutions and selected industries to meet Air Force educational requirements. (104:1)

AFIT Accreditation. AFIT is the sole graduate degree-granting school of the Air Force (70:I.1). AFIT is accredited through the doctoral level by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools (70:I.1;6:14). In addition, certain engineering programs receive accreditation from the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) (6:14).

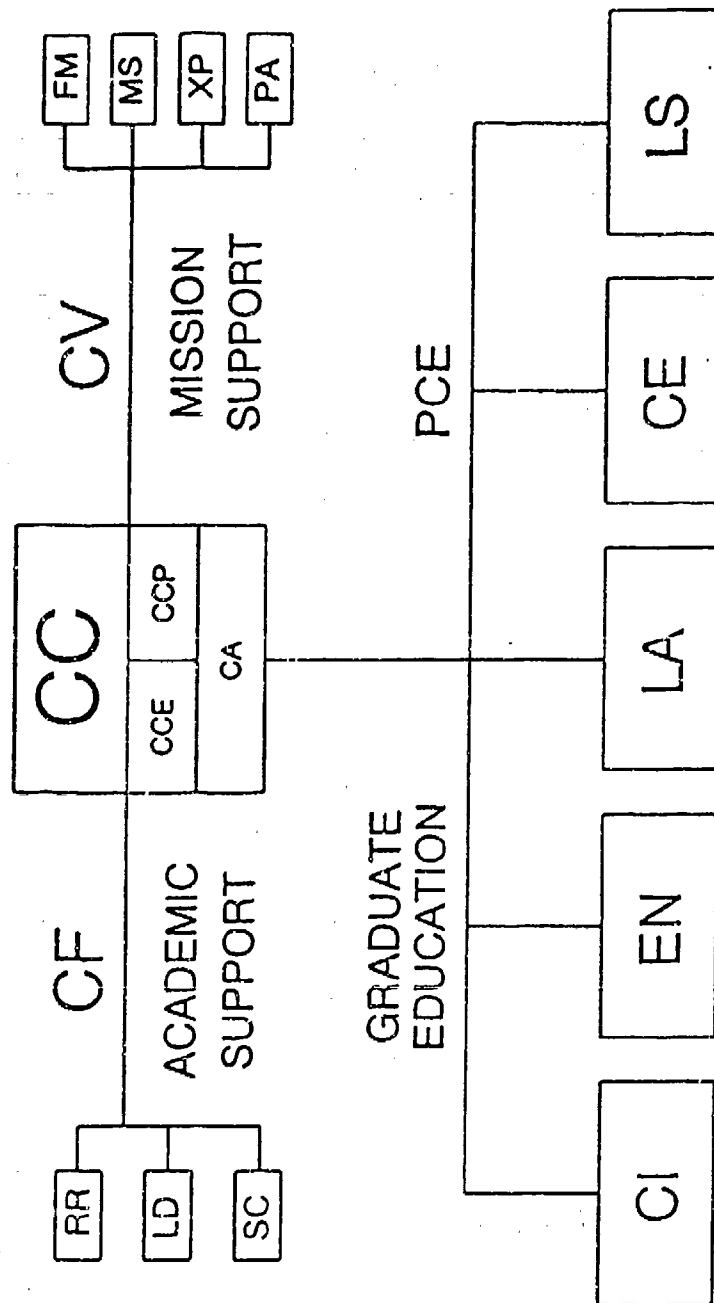
AFIT Organization. The Institute is simultaneously an academic institution and a military organization (70:II.5). AFIT organizational charts are provided in Figures 1-2 and 1-3. Figure 1-2 depicts how AFIT is structured under Air University and within AFIT as of March 1992. Figure 1-3 is a May 1992 reorganization proposal which, as of August 1992, is still under consideration.



Source: Detachment 2, 3810 Management Engineering Squadron, Wright-Patterson Air Force Base OH.

Figure 1-2

AFIT ORGANIZATIONAL CHART



Source: Detachment 2, 3810 Management Engineering Squadron, Wright-Patterson Air Force Base OH.

Figure 1-3

AFIT PROPOSED RESTRUCTURING CHART

The restructuring takes each school's PCE and graduate education programs and places each program under its own dean; currently each school administers its own PCE and graduate education programs. This organizational restructuring is an attempt to identify exact costs for singular, not combined, educational programs.

AFIT is ultimately governed by numerous Air Force, Department of Defense and other Federal Regulations and Directives (70:i). Discussion is centered, however, on AFIT's unique educational structure that encompasses a continuum of responsibility from the President to the AFIT faculty.

AFIT is an agency of the Department of the Air Force, and the powers normally held by the governing board of a civilian university are to be found in the command structure of the Air Force. The Secretary of the Air Force holds authorities similar to those exercised by university boards of trustees. As boards in an institution of higher learning generally are responsible to some larger public trust, so the Secretary is responsible to the Department of Defense, the President, and the Congress. (6:4)

The AFIT Board of Visitors [BOV] is comprised of a select group of eminent educators from prominent US colleges and universities and senior executives from major industries. The committee serves in an advisory capacity and meets annually [in the Spring]. (6:ii)

All members of the AFIT BOV are members of the AU BOV. . . . The AU BOV is responsible for reviewing matters pertaining to the educational, doctrinal, and research policies and activities of Air University and for advising the Secretary of the Air Force . . . The Board submits its annual report through the . . . Chief of Staff, USAF, to the Secretary of the Air Force. This report, . . . is discussed in person with the Chief of Staff, USAF, by . . . and the Chairman of the AFIT BOV during the summer. (70:II.5)

AFIT is a component of Air University (AU). In 1954, Congress authorized the AU commander to grant degrees [The authority to grant academic degrees is contingent on the accreditation of AFIT]. Degree requirements are established by the AFIT faculty and approved by AU and HQ USAF. (6:4)

AFIT Information Services. AFIT's information services are provided by AFIT/SC, Computers-Communications Systems and AFIT/IM, Information Management. Their official organizational alignment and functional statements are outlined in Air University's Organization and Functions Chart Book.

Communications-Computer Systems [AFIT/SC] provides life cycle management in direct academic and administrative support concerning requirements for and solutions to voice, data and specialized video communications, and centralized computer system capabilities. Represents AFIT mission and administrative elements at MAJCOM and Air Staff boards and panels relative to communications-computer systems issues. (103:3-12)

Information Management [AFIT/IM] implements AFR 4-1 (Functions and Responsibilities of Information Management Activities) and AFR 700-30 (How to Determine and Justify Information Systems Requirements in an Office Environment) policies. Plans and directs publications and forms management; provides consulting and implementation for administrative systems; processes administrative correspondence; controls Freedom of Information and Privacy Act requests; and manage the records management program. Provides modern office technology to administrative management support activities. (103:3-2)

AFIT's information processing activities are stand-alone "directorate-owned" systems. These systems serve separate financial and record-keeping functions. Programmatic (registrar functional data) and financial data are located on different systems in different departments.

AFIT Under Unit Cost Resourcing. According to Susan Grant of the DOD Comptroller's Office of Management Improvement, DOD educational institutions will be under unit cost resourcing in FY 93 (86). Additional studies directed by Shycoff's office are researching the feasibility of educational organizations operating under a fee-for-service cost accounting system (86). Under the FY 93 unit cost resourcing program, schools will be funded based on the projected number of students and a historical unit cost per graduate. Unit cost resourcing

is a three-part process that requires: identifying output, identifying the cost of producing the output, and resourcing based on work performed (86). Outputs are products or services provided in response to customer requirements--not controlled by the provider (86).

Data needed to determine the unit cost of educating students is not available on any one AFIT system, but is calculated from aggregate reports of school operating costs and graduates per year. For example, programmatic data is maintained by AFIT/RR (Registrar and Directorate of Admissions); and personnel data is maintained by AFIT/MS (Directorate of Mission Support).

Unit cost data is obtained from several offices. O&M financial data for AFIT's pro-rated portion of base funding is provided by base-level 2750 ABW/FM (Directorate of Financial Management) on the Micro Budgeting and Accounting System; some financial data is maintained by AFIT/FM (Directorate of Financial Management) while other financial data is maintained by AU/FM (Air University, Directorate of Financial Management) (132).

Once programmatic and cost data have been accumulated, they are sent to the Defense Manpower Data Center (DMDC), Monterey CA, where an aggregate unit cost is established (87). The DMDC will have the responsibility to define and establish unit costs for AFIT's educational programs (87).

AFIT's early computer applications were implemented without the aid of an explicit information system methodology. As a result, adequate information systems are not available within AFIT to operate effectively and efficiently in a unit cost resourcing environment--nor in a currently proposed DOD education and training fee-for-service program.

Problem Statement

The way AFIT budgets for "purchases" costs and justifies reimbursement for "services" costs requires a more sophisticated information system than is presently available. Current information systems do not report which products or services (or customers) are profitable (or unprofitable) and provide few insights about how to improve business processes. Before a more sophisticated information system can be developed, AFIT must identify strategic-level requirements for an integrated information system.

Research Objective

The objective of this research was to identify the strategic-level requirements for an integrated information system in order to facilitate decision making at the business process level. This would enable AFIT to develop a system that would provide staff, faculty, and customers with insight into the cost and value of AFIT products or services.

Investigative Questions

To satisfy the research objective, a review of the Defense Business Operations Fund (DBOF) and the Defense Corporate Information Management (IM) program was required. The review is documented in Chapter II. The following were questions generated from the research of these two programs:

1. Who are AFIT's customers?
2. Who will be AFIT's customers?
3. What are the products and services (outputs) provided by AFIT?
4. What should be the products and services (outputs) provided by AFIT?
5. What activities are required to provide AFIT's products and services?
6. What are AFIT's strengths and weaknesses?

Scope and Limitations

This study was limited to the Air Force Institute of Technology and reflects the information system planning requirements of AFIT under the Defense Business Operations Fund (DBOF) and the Defense Corporate Information Management (IM) program. Implementation procedures for these DOD-mandated programs have not been fully delineated. Program concepts are still evolving; therefore, vast portions of the programs remain "moving targets," with changes occurring constantly. The research and findings provide the most accurate information available at the time.

A simultaneous cost study is being conducted by Capt Darryl Walton, AFIT Cost Accounting graduate student, Class 92S, to determine for AFIT "full costs that can legitimately be charged to users/reimbursed from users, and derive appropriate 'fees'" (175:1).

The researchers were able to locate only two previous cost studies on AFIT graduate education. Haynes and Williamson (1977) provided a cost analysis of graduate education in logistics management. They compared the full cost to the Air Force for providing an officer with a Master of Science degree in Logistics Management from AFIT with the full cost of a similar degree from a civilian institution (95:3-5). Cox and Hotcaveg (1979) developed a cost model for AFIT programs. Their research intended to facilitate the accumulation of the full costs of individual AFIT education programs, using FYs 77 and 78 data to develop and illustrate their cost model (45:6-7).

There are numerous information systems methodologies. This research effort will skirt the impracticality of reviewing each methodology and will concentrate on two select methodologies currently advocated by widespread

business use and which support the requirements of the Defense Corporate Information Management (IM) program.

Definitions

A glossary (Appendix A) is provided with definitions of terms for readers unfamiliar with these subject areas.

Summary

On the basis of civilian business practice successes, DOD is attempting to implement proven and tested business practices in military programs. If DOD managers are to reduce costs and improve performance, management of programs must emulate the characteristics of the most successful commercial projects (37:8). For military organizations to survive in a competitive environment, they will have to do business more effectively and more efficiently (11:2).

Under the proposed FY 93 unit cost program, AFIT will be funded on a unit cost per student basis. Adequate information systems are not available within AFIT to operate effectively and efficiently in a unit cost resourcing environment--nor, importantly, in a currently proposed DOD education and training fee-for-service program. Under the unit cost program, education and training will be funded based on the projected number of students and the historical unit cost per student. Information needed to determine and manage the cost of education and training students is presently not available on any one system.

The objective of this research was to identify the strategic-level requirements for an integrated information system in order to facilitate decision making at the business process level. This would enable AFIT to develop a

system that would provide staff, faculty, and customers with insight into the cost and value of AFIT products or services .

The subsequent chapter provides a descriptive review of two recently mandated DOD programs: the Defense Business Operations Fund (DBOF) and Defense Corporate Information Management (IM) program. There is also a section on education that will provide a brief review of the impact these two programs may have on AFIT.

Chapter III provides a literature review of strategic information systems planning and two of the most popular systems planning methodologies: Business Systems Planning (BSP) and Information Engineering (IE). Included is a review of BSP and IE studies within DOD.

Chapter IV, the methodology chapter, provides the research methodology for systems development. A two-round, modified Delphi technique was used for gathering data to assist in developing strategic objectives and goals for AFIT.

The findings of an AFIT stakeholder questionnaire are reported in Chapter V and answer the research questions .

Finally, in Chapter VI, this research effort provides suggested recommendations designed to assist the Institute.

II. DMR OVERVIEW: A LOOK AT DBOF AND CIM

Chapter Overview

As discussed in Chapter I, the Department of Defense has been undergoing major changes toward a competitive "business-type" environment as a result of the President's Blue Ribbon Commission on Defense Management (Packard Commission) and the Goldwater-Nichols Department of Defense Reorganization Act of 1986 (Goldwater-Nichols Act). This chapter provides a descriptive research of two DOD reorganization directives, concentrating in-depth on the Defense Business Operations Fund (DBOF) and the Defense Corporate Information Management (IM) program.

This descriptive review was used to provide a baseline for understanding the requirements of AFIT as DOD implements unit cost resourcing to enhance cost visibility and contribute to better resource management.

Background

Changes in business operating procedures serve as the motivation behind the outcomes of the Packard Commission Report. This section overviews the changes that have been initiated from that report and relate the direction which DOD is heading in implementing the initiatives. To fully understand the reasoning behind cost per output, it is necessary to look at the recent historical milestones that brought this concept to the forefront. Two major efforts to reorganize DOD—one executive and the other legislative—came to fruition in 1986 after years of discussion, studies, and hearings (98:1). These

two events were the President's Blue Ribbon Commission on Defense Management and the Goldwater-Nichols Department of Defense Reorganization Act of 1986.

DOD Reorganization Directives

President Ronald Reagan signed Executive Order 12526 on 15 July 1985 to establish the President's Blue Ribbon Commission on Defense Management (144:27). This Blue Ribbon Commission became better known as the Packard Commission, named after former Deputy Secretary of Defense David Packard (and the Packard in Hewlett-Packard) who headed the Commission. (A complete list of the members of the Packard Commission is provided in Appendix B.)

The Packard Commission represented the thirty-seventh major DOD reorganization study to have occurred between 1949 and 1985—a span of thirty-seven years (156:3-7).

The President's Blue Ribbon Commission on Defense Management. The Packard Commission's primary objective was to study defense management policies and procedures, including the budget process, the procurement system, legislative oversight, and the organizational and operational arrangements, both formal and informal, among the Office of the Secretary of Defense, the Organization of the Joint Chiefs of Staff, the Unified and Specified Command system, the Military Departments, and the Congress (144:27). "The Commission had full license to look into any area of government related to defense that it chose" (139:v).

However, the Commission was directed to "focus its attention first of all on matters pertaining to defense procurement of equipment and materiel and

provide a report of its findings and recommendations in these matters" (139:1-2).

In particular, the Commission was to:

- (1) Review the adequacy of the defense acquisition process, including the adequacy of the defense industrial base, current law governing Federal and Department of Defense procurement activities, departmental directives and management procedures, and the execution of acquisition responsibility within the military departments;
- (2) Review the adequacy of the current authority and control of the Secretary of Defense in the oversight of the military departments, and the efficiency of the decision making apparatus of the Office of the Secretary of Defense;
- (3) Review the responsibilities of the Organization of the Joint Chiefs of Staff in providing for joint military advice and force development within a resource-constrained environment;
- (4) Review the adequacy of the Unified and Specified Command system in providing for the effective planning for and use of military force;
- (5) Consider the value and continued role of intervening layers of command on the direction and control of military forces in peace and war;
- (6) Review the procedures for developing and fielding military systems incorporating new technologies in a timely fashion;
- (7) Study and make recommendations concerning congressional oversight and investigative procedures relating to the Department of Defense; and
- (8) Recommend how to improve the effectiveness and stability of resource allocation for defense, including the legislative process. (144:27-28)

For approximately one year, the Packard Commission looked at all aspects of defense management. The Commission reported numerous problems with defense acquisition that it described as the largest business enterprise in the world, with 15 million annual contract actions expending \$170 billion (41:2). As noted by Gansler a few years earlier:

It is a surprise to no one that a 'business' as vast and complex as defense acquisition would lend itself to procedural improvements and better management. Hundreds of studies have been conducted on ways to improve the weapon acquisition process. Each administration has had its initiatives. Most of the studies and initiatives have been at the 'micro' level and within existing organizations and practices. Few have addressed the broad structural and institutional changes that are necessary. . . . (80:389)

According to Cohen and Manley, the Packard Commission's recommendations were unique in two ways: (1) They were not limited to the micro level but addressed broad structural and institutional changes as well as procedural changes; and (2) They were well-timed and had the attention of top management (41:2-3).

The Packard Commission provided four reports:

- (1) An Interim Report to the President by the President's Blue Ribbon Commission on Defense Management, 28 February 1986.
- (2) A Formula for Action: A Report to the President on Defense Acquisition, 7 April 1986.
- (3) National Security Planning and Budgeting: A Report to the President, 12 June 1986.
- (4) A Quest for Excellence: Final Report to the President, 30 June 1986. (139:v)

The first report was the most significant because it contained nearly all of the Commission's recommendations; later reports provided additional information and rationale (139:v). The recommendations of the Commission were among the most extensive reforms of the Defense establishment since World War II (144:33).

The Packard Commission's management principles and recommendations clearly intended fundamental changes and, in many cases, were at odds with long-standing DOD practices and very basic and strongly held philosophies

within the Pentagon (84:I-11). The Commission called for radical change in the defense acquisition process and made recommendations in several areas: organization, decision making, policy, and management (84:ES-1).

On 1 April 1986, President Reagan signed National Security Decision Directive 219 to implement virtually all of the recommendations presented to him in the interim report (144:33). The President chose to implement the Commission's recommendations without waiting for the final report (139:v). As outlined by Graham *et al*:

Much of NSDD 219 focused on organizational changes in the Department (military command and control and acquisition) and to a lesser extent on procedural changes (planning and programming). Packard Commission recommendations that focused on acquisition policies such as commercial products and practices, regulatory streamlining, and technical data rights or on management issues such as personnel and infrastructure investments are addressed in the directive only at the broadest level, or in many cases were not mentioned at all. Other recommendations addressing program stability and decision making such as the use of technology to reduce cost, the use of prototypes, program baselining, multi-year procurement, and Congressional milestone funding for programs are not specifically addressed in the directive. Guidelines for implementing Packard Commission recommendations in these areas were left up to the Secretary of Defense, or to the extent that legislation was drafted, to Congress. (84:II-2)

President Reagan then called on Congress in a President's Special Message to Congress, 24 April 1986, to help implement Executive Branch reform and also to make the important congressional reforms outlined by the Packard Commission (144:33). His message concluded:

Only meaningful Congressional reform can complete our efforts to strengthen the Defense establishment and develop a rational and stable budget process—a process that provides effectively and efficiently for America's security over the long haul. (144:50)

Congress followed suit and most of the requested changes were covered by the Goldwater-Nichols Department of Defense Reorganization Act of 1986 and the Defense Acquisition Improvement Act of 1986 (139:vi).

Goldwater-Nichols Department of Defense Reorganization Act of 1986.

As outlined in the 1986 U. S. Code Congressional and Administrative News, the Goldwater-Nichols Act was:

An Act to reorganize the Department of Defense and strengthen civilian authority in the Department of Defense, to improve the military advice provided to the President, the National Security Council, and the Secretary of Defense to place clear responsibility on the commanders of the unified and specified combatant commands for the accomplishment of missions assigned to those commands and ensure that the authority of those commanders is fully commensurate with that responsibility, to increase attention to the formulation of strategy and to contingency planning, to provide more efficient use of defense resources, to improve joint officer management policies, otherwise to enhance the effectiveness of military operations and improve the management and administration of the Department of Defense, and for other purposes. (166:100 STAT 992)

This Act rearranged the Air Force power structure and moved several critical functional areas to the civilian Secretary of the Air Force and away from the military Air Staff. In particular, it consolidated power over the acquisition process in the civilian offices of DOD while at the same time ensuring that the combatant commands had access to the decision process so that their needs would not be overlooked (84:II-5). As the Act legislates:

The Office of the Secretary of the Air Force shall have sole responsibility within the Office of the Secretary and the Air Staff for the following functions: (A) Acquisition; (B) Auditing; (C) Comptroller (including financial management); (D) Information management; (E) Inspector General; (F) Legislative affairs; (G) Public affairs. (166:100 STAT 1057)

The Defense Acquisition Improvement Act of 1986. This Act is otherwise known as Title IX of the National Defense Authorization Act for Fiscal Year 1987 (156:2-15). The Act makes the Under Secretary of Defense for Acquisition (USD(A)) the third ranking executive in DOD (156:1-11). The Defense Acquisition Improvement Act of 1986:

... laid out the broad authorities and responsibilities of the Under Secretary [of Defense for Acquisition], but relied on the Executive Branch to further support the Under Secretary with the necessary authority to reorganize DOD acquisition. . . . The Act also set out several measures designed to enhance program stability and streamline program management. . . . The bill also addressed other acquisition policies including establishing a preference for the use of commercial products. . . (84:II-5,II-6)

Thus far, Congress has been quite supportive of the Packard Commission; to encourage future support, DOD must enhance its credibility through a conscientious effort to effectively implement reform recommendations and legislation, complying with both the letter and intent of the law (156:v). In his July '1989 Defense Management Report to the President, Defense Secretary Dick Cheney pointed out:

While some progress unquestionably has been made since 1986, there is no basis for complacency. On the contrary, redoubled efforts will be required in order to realize improvement to the degree contemplated by the Packard Commission and the Goldwater-Nichols Act. Circumstances compel the utmost attention to prudent management of our defense program--and oblige the Executive branch, Congress, and industry, as seldom before, to join in husbanding available defense dollars, cutting unnecessary costs, and achieving new levels of productivity and quality. (38:1-2)

The Defense Management Report (DMR). President Bush, in a February 1989 address to Congress, charged the Secretary of Defense with undertaking a review of defense management practices (60:8). Secretary Cheney responded

in July 1989 with the Defense Management Report to the President, which provided a plan to implement fully the Packard Commission recommendations; improve substantially the performance of the defense acquisition system; and manage more effectively the Department and its resources (60:8). To accomplish the plan, an approach of centralized policies, procedures, standards, and systems was to be adhered to--but with decentralized implementation and execution.

One of the important tenets of the DMR was that members of DOD be encouraged to examine and improve continuously the processes in which they were engaged--and to raise, at all levels, new ideas and approaches that would contribute to a sound, affordable program to maintain adequate US military strength (12:2). One broad goal of the DMR was to reduce overhead costs. The Corporate Information Management (CIM) initiative, part of the Defense Information Management (IM) program, was one of the management methods for achieving DMR cost reductions while maintaining or improving the effectiveness of DOD military missions (12:2). The CIM initiative was undertaken as a way to develop more efficient and effective data processing and information systems, to eliminate duplication of effort in information management, and to ensure these systems support policy goals and timely decision-making (60:9). CIM acts as an enabler for many DMR initiatives and their associated cost savings (12:2).

A number of further study recommendations came from the Defense Management Report. One such study was the area of information systems.

The Department's 1,000 information technology facilities engaged in software design, systems modification and maintenance, data processing and administrative support. Savings through more efficient central operations, better use of resources and reduced staffing are anticipated. . . . The Department plans to implement

single management information systems to support major functional areas important to sound management. (60:15)

Change is constant, and resistance to change is a familiar problem. The strength of the Defense Management Report process, and its relative advantage over earlier efforts to change management techniques and structures within the Department, is that it is a product of the Department itself, not something forced on DOD from outside (60:13). The changes are not quick fixes but rather fundamental shifts or "cultural changes" that address the issues at the core of defense management (60:13). One of the greatest changes took place in the financial management arena in which there did not exist a uniform DOD accounting system to capture unit cost data. The Defense Business Operations Fund (DBOF) was an initial step intended to rectify this conspicuous absence.

Defense Management Report Decision (DMRD) 971: Defense Business Operations Fund (DBOF). The Services and Defense Agencies were advised in a 19 August 1989 memorandum by the Principal Deputy Comptroller of the Department of Defense that a DOD-wide unit cost resourcing (UCR) system would be developed for a number of major functional areas to enhance visibility of costs and contribute to better resource management (25:14).

As Sean O'Keefe, then DOD Comptroller, explained to the Subcommittee on Defense, Senate Appropriations Committee:

. . . we're trying to frame a financial system which reveals the true cost of operating the fleet, air wings and divisions. . . . The majority of the procedures necessary to implement DBOF will be based on those developed during the last 40 years from the industrial funds. (135:2-3)

DMRD 971 states that cost per unit output will be implemented within all organizations by 1993. According to Leroy Baseman, Deputy Assistant Secretary (Cost and Economics), "It becomes clearer to us every day that the

workload associated with Unit Cost Resourcing . . . will continue to increase . . . in the future" (24:14). The Defense Business Operations Fund, per Thom White, editor of Dimensions, "is guaranteed to spread DOD-wide faster than wildfire" (177:4).

The first functional area that received its FY 91 budgetary resources in unit cost terms was supply operations (25:14). The OSD Comptroller is developing goals for unit cost areas of Training, Recruiting, Commissaries, and Health Care; future functions to be covered include Accounting and Finance and Research and Development (25:14). Further examples of participants are: the Defense Logistics Agency (DLA) which came under DBOF in FY 92; and, the Defense Technical Information Center (DTIC) which began selling its services and products in FY 92.

White claims, "The idea behind DBOF is as old as civilization: you get what you pay for and you pay for what you get--and for everything involved in getting it to you" (177:4). As Major General G. W. Larson, Deputy Assistant Secretary (Budget), adds:

The basic concept . . . is not new. DOD has had revolving funds for almost 40 years. What is different, though, is the application of the revolving fund concept to such a large segment of DOD activities. It's an enormous undertaking and clearly different from today's operations. However, the advantages appear to outweigh the limitations. Customers will be better able to decide how to trade off limited resources between support and operations, while decision makers will have better information on the total cost to procure and operate weapon systems. (118:11)

White further provides a simple analogy of how DBOF will work through the following example:

Okay, so look at it this way. Remember the last time you went to the mall to get your hair done? The \$19.95 you paid covered the

costs of a lot of different things: the price of the shampoo, rinse, and conditioner the operator used on your head; the price of the scalp massager and other special gear; the dye to touch up the gray; the electricity to run the hair dryer and clippers; the rent for the mall space and store furnishings; the wages of the guy who cut your hair; his insurance and retirement benefits; the liability insurance premium for when you sue because he lopped off your left ear; and the price of bandages, your blood transfusion and his remedial training. The rest was pure profit. That's the way private industry does it. Cut out the profit margin and you have the way DOD . . . is doing it now with the Defense Business Operations Fund. In other words, . . . customers will be paying all costs associated with the support (supplies and services) they want. . . . (177:4)

Another major difference between the old way of doing business and the new way is that DBOF includes rolling all of the costs of doing business into one account. There will no longer be separate money pots for personnel, operations and maintenance, procurement, and military construction. The current revolving stock and industrial funds are combined in DBOF. The idea is to give managers better visibility of all of their costs and more flexibility to manage these costs. The emphasis is on cost-per-output rather than level of funding (177:5). As Larson further explains:

. . . support units will charge their customers for the costs of services provided. . . . In some cases, a support unit will provide services to other support units. . . . Since it's on a reimbursable basis, it becomes part of the second support unit's . . . total costs, which are subsequently charged to its customers. Funding for these support units, then, comes from the funds they collect from their customers and not from direct appropriations. Congress will maintain its control, though, by requiring congressional approval of the capital . . . portion of the DBOF. (118:11)

The basic impetus behind current unit cost resourcing initiatives is cost reduction (154:10). As outlined by Secretary Cheney:

The FY 92 DOD request is \$278.3 billion in budget authority and \$283 billion in outlays. Adjusting for inflation, DOD budget

authority is 1 percent below FY 91, 12 percent below FY 90 and 24 percent below FY 85. In FY 96, the cumulative real decline since FY 85 will reach 34 percent. Total budget authority for FY 91 through 95 will be \$131 billion less than estimated in the President's January 1990 request. After an 11.3 percent real decline in FY 91, DOD budget authority will decline, in real terms, to an average 3 percent per year through FY 96. (40:13)

Importantly, reducing available funding does not reduce the cost of doing business; a reduction in the cost of doing business requires a reduction in resources (154:11). To reduce resources, either the quantity or quality of the output has to change, or the process by which the output is produced has to become more cost effective (154:11). No savings are directly attributable to unit cost resourcing; they are only realized as processes are changed or eliminated and the effects of those changes are reflected in the actual cost per output (153:Attach 1, 2). Cost per output grew out of the unit cost concept developed at the Defense Logistics Agency. Shycoff explains that under DBOF "all direct, indirect, and general and administrative costs incurred shall be collected and identified to the product or service benefiting from the costs" (152:Attach 1, 1).

Unit Cost. Unit cost is nothing more than a concept that all of the costs incurred in an activity should find their way into some output measure. The specific justification, currently, for unit cost resourcing is threefold:

- First, Presidential Directive 12637, signed in 1988, directed all federal agencies to improve efficiency by aligning costs to outputs and establishing productivity goals.
- Second, the DOD needs to reduce the support budget. Inefficiencies in the support "tail" are being paid for with force structure.
- Finally, most O&M [Operations and Maintenance] funding is justified separately from forces. Proponents of unit cost resourcing maintain that this leads to an imbalance between resource requirements and resource allocation, and that by

explicitly associating costs with outputs this imbalance can be redressed. (154:10)

Under unit cost, the customer reimburses the provider for the requisitioned item's cost plus a surcharge to cover expenses associated with providing the item to the customer. Reimbursement covers all costs (including overhead) of all outputs.

Blandin and Melese explain that the development of a unit cost system requires six basic steps:

1. The identification and physical measurement of organizational outputs (goods/services).
2. The identification and measurement of the labor, capital, material and other resource inputs used in the production process.
3. The identification of input/output relationships that reveal alternative combinations of inputs capable of producing a given level and quality of output. This is the economist's definition of a 'production function.'
4. The costing out (cost accounting) of each unit of input (labor, capital, etc.).
5. The calculation of total costs associated with a specific level of output; this is accomplished by aggregating current levels of resource usage (step 2) by the cost of each input (step 4).
6. Finally, dividing total cost by a specified level of output yields unit cost, or 'cost per output.' (28:14)

The unit cost concept is based on the logical assumption that the cost of an activity should be related to its primary output(s) (64:17). Therefore, an advantage of unit cost is in encouraging management to look at all costs, including overhead, in terms of the output of the business (153:Attach 1, 2).

As Sims and Hough explain:

The resources available to produce any output are people, material, capital assets, and time. Dollars are not a resource, but rather, pay for resources. Resource requirements are driven by

the output's demand (how much of what is needed when) and how the output is generated. The demand for an output should be an external (to any organization) function. How the output is generated should be an internal function. The organization determines the resource mix and the procedures used to convert the resources to outputs. Different ways of producing an output will require different quantities and types of resources and will, consequently, have different costs. Knowing the total costs of the inputs to a process is, therefore, essential to effectively assessing the best method of combining those inputs to produce goods and services. (154:11)

However, according to LaCivita and Pirog, "Practical application of the unit cost concept requires careful selection of the activities chosen for analysis, the specification of the output measure, and an analysis of the cost categories relevant to the activity" (117:23). Decisions about expanding one activity while contracting another activity must be carefully analyzed since the decision could ironically have the effect of producing even higher unit costs in each affected area (28:15).

Costs Tied to Force Structure. The unit cost philosophy holds that DOD's output is operation of military forces; therefore, all costs should be tied to the weapons systems which comprise these forces (154:10). Keller and Raines point out:

. . . every dollar spent inefficiently or ineffectively on support activities is not simply a management crime; it extracts a far more serious price--a denial of that dollar for [combat] forces and their equipment. (112:10)

A key element of OSD's [Office of the Secretary of Defense] proposals is that the cost to produce an output should include all costs: direct, indirect, general and administrative, depreciation, amortization of intangible assets, and depletion of natural resources (154:11). Cost accounting principles are applied to allocate all of an activity's costs to the primary output(s). Subsequent

resourcing and allocation are made on the basis of an established unit cost. In its simplest form, unit costing takes the average total cost to produce an output and applies that cost to the future output levels to determine an activity's future budgets (64:17).

But as LaCivita and Pirog state:

Concentration on unit costs focuses the manager and the policy maker on the internal workings of the activity and the cost of doing business. Since unit cost data is difficult to use for comparative purposes, there is little incentive to try or to consider alternate ways of achieving the given objectives. (117:21)

Unit Costing is not Cost Reduction. As previously stated, no savings are directly attributable to unit cost resourcing; they are only realized as processes are changed or eliminated and the effects of those changes are reflected in the actual cost per output (153:Attach 1, 2). Unit costing only identifies costs—it does not automatically reduce or eliminate them but does provide the means to identify and reduce/eliminate the cost drivers (153:Attach 1, 2). Basso explains the cost reduction properties of unit costing:

The Unit Cost Program reduces cost by focusing on output. Total output of activity operations is comprised of primary outputs (those associated with the primary mission of a business area) and other outputs (those related to other business activities performed that are not in direct support of the primary mission). Unit cost then brings together all aspects of contributing to the real cost of providing a service. The output should measure the business of the operation. Each output further contains many cost elements (inputs) which include direct, indirect, and general and administrative expenses. By recognizing these elements, unit cost then provides maximum visibility and flexibility in making tradeoff decisions between cost elements. (25:15-16)

According to LaCivita and Pirog, re-allocation of resources based on the visibility of unit costs is what will ultimately reduce overall costs.

It is planned that the unit cost approach will provide guidance that will improve operations, allow evaluation of performance and budgets, support budget decisions, and sanction work re-allocation decisions. These re-allocations based on unit cost efficiency data should provide the ultimate in reduced costs of operation. (117:20)

Basso further explains how unit cost can become a multi-use tool for the organization:

As a resource tool, it focuses on cost of operations; it provides the basis for determining and allocating resources. By determining what actions cost now, we will be smarter about deciding/analyzing/forecasting for the future. Unit cost lays the foundation for justifying budget adjustments through accurate specificity of cost and output.

As a productivity tool, it measures improvement. Productivity has been defined as 'The efficiency with which resources are used to produce a government service or product at a specified level of quality and timeliness.' Productivity can be achieved by a change in organizational culture. Management will be responsible for improving the environment to affect the culture by applying process improvement techniques, organizational redesign, job enlargement, and motivation initiatives. Teamwork should be emphasized, increased responsibility and authority should be delegated, and recognition should be generously distributed.

As a management tool, unit cost focuses on mission. It incorporates (into the mission statement) total cost of operations. [It] increases productivity by recognizing trade-off decisions, encouraging innovation and reducing costs. (25:15)

Further, as a management tool, Sims and Hough explain that cost visibility provides managers the ability to make more cost-effective decisions:

Total cost visibility can lead to better informed, and thus, more cost-effective decisions about how to produce an output. Allowing customers to determine how much of what support is produced can better match resources to peacetime operational requirements. And successfully aligning costs to outputs will enable decision-makers to reduce costs by either changing the output or changing

the process--rather than simply reducing the funding and 'betting' that balanced programs will result. (154:11)

LaCivita and Pirog, however, warn that care must be exercised when using unit cost as a management tool (see Table 2-1).

Unit Cost is Customer Focused. According to Basso, unit cost is a tool to make government work at the lowest possible cost. By analyzing data relative to the cost of each individual unit of cost, it is possible to affect the total cost of operations and implement reductions successfully (25:14). She further explains:

The basic concept is simply that the customer we serve ought to be able to make decisions about the support they receive. The support we provide them should address those decisions, and the financial system that is in place should allow the customer the choices necessary to make those decisions. Freedom of choice for the operating forces is the goal. (25:14)

Requirements/Initial Implementation Under DBOF. Eventually all support functions (including those at base and Headquarters levels) are to be "unit priced" (25:14). However, before business areas can be included under DBOF, they must meet the following requirements:

1. Have identified the outputs of the business;
2. Have a cost accounting system that relates cost to those outputs; and
3. Can identify the customers of the business (50:2)

If fully implemented, unit cost resourcing promises to fundamentally change financial management throughout the DOD (154:10). The Defense Manpower Data Center (DMDC) in Monterey, California, has been designated as the data collection agency for the cost per output initiative (109:13). Jeffcoat provides further insight into the initial steps of the DOD Cost Per Output program:

Table 2-1

UNIT COSTS AND ECONOMIC THEORY

From an economic point of view, the key point in using unit cost as a managerial tool is that unit costs are output level specific. This means that, in general, unit cost varies when the output (workload) of an activity varies. Because of this, care must be exercised when using unit cost data as a guide for managerial policy. Cross-sectional comparisons across work locations, as well as comparisons of different workloads at the same locations, are difficult to set forward.

For example, suppose that a school graduates 120 students per year at an average unit cost of \$100 per graduate. This unit cost level is conditional on the fact that the school produces 120 graduates per year. If the same school were generating some other level of output—greater or smaller—it would have a unit cost which, in principle, could be higher or lower than \$100.

Fixed costs do not vary with the level of output; therefore, average fixed costs decline steadily with increases in output. This behavior yields unit costs that are very high for small levels of output and which decline quickly as the output level increases. The effect of the law of diminishing marginal returns is thus realized.

Variable costs change with the level of output, but there is no reason to assume that they change at a constant rate. In fact, average variable costs usually decline as the output increases from zero, reach a minimum, and increase thereafter.

In terms of marginal costs, unit cost declines as long as the marginal cost is less than the existing unit cost, and the unit cost increase when the marginal cost is greater than the existing unit cost. This behavior is caused by the changing underlying productivity of the variable inputs. Productivity and costs bear an inverse relationship to one another.

When variable inputs are first added to the fixed inputs, the marginal productivity of each additional unit of variable input is greater than the last unit added, due to the specialization and division of labor. At some point, as more of the variable inputs are added to the same quantity of fixed inputs, the marginal productivity of the additional variable inputs decline. This pattern of changing productivities and costs implies that the marginal cost and, therefore, the unit cost of additional output varies with the level of output.

The managerial implication of the output specificity of unit cost is that it must be used with care in re-allocation decisions whether the re-allocation is one of workload or budget. If the requisite care is not taken, its use may lead to higher rather than lower total program costs.

Source: LaCivita, Charles J. and Robert L. Pirog. "Using Unit Costs to Promote Effective Management," Armed Forces Comptroller, 36: 21-22 (Winter 1991).

Effective FY 91, most MAJCOM/SOAs are mailing their monthly Command On-Line Accounting and Reporting System (COARS) Base-Reported Master File tapes to DMDC. DMDC is 'mapping' the COARS accounting data to DMDC models for the functions of training, recruiting, supply operations The main purpose of the 'mapping process' is to relate cost accounts, which in the Air Force is the responsibility center/cost center (RC/CC) code, to the Cost Per Output functional category codes (FCATs) of direct, indirect, general and administrative, and other output. Output measures have been defined by the DOD Comptroller for the functions listed above; e.g., cost per graduate for the training function. . . . DMDC is also developing Cost Per Output reports by function. Because the RC/CC code is the basic building block used by DMDC for Cost Per Output measurement, it is imperative that Accounting and Finance ensure all obligations are recorded against proper and valid RC/CCs. (109:13)

Though not all issues have been addressed and many questions are unanswered, the program is going forward; and it is here to stay (25:15). So why the rush to implement unit cost so quickly? As Basso points out:

- (1) We continue to operate under fiscal constraints and pressure to reduce the budget deficit. Defense budgeting is coming under intense scrutiny as world political and strategic postures change, affecting defense priorities.
- (2) Costs are rising. Unit cost provides a mechanism to help cope with this phenomenon.
- (3) In this environment, survival will go to the fittest programs and cost managers. Those quick to work the unit cost program will ensure the survival of their interests through higher-quality preparation. (25:16)

Unit Cost Constraints/Risks. Automated cost information is accumulated with the intent of being used by decision makers in making strategic, tactical, and operational decisions. Inaccurate cost information can lead to a wide variety of problems. Automated costing inaccuracies, in either direction, can lead to substantial, unintentional competitive mistakes. Inappropriate automated cost systems can cause management to focus attention

in the wrong areas, thereby, unintentionally increasing costs, reducing flexibility, and reducing quality.

Sims and Hough, Dunlap, and LaCivita and Pirog, all supportive of unit cost resourcing, point to possible critical shortcomings of this program. Sims and Hough note the importance of focus:

Peacetime vs. Wartime Focus: UCR [unit cost resourcing] focuses on peacetime efficiencies. Some peacetime 'inefficiencies,' however, are wartime capability (e.g., communications, civil engineering, and depot maintenance surge capability). Decisions on sources of input based solely on cost could very well reduce wartime capability. (154:12)

Fixed vs. Variable Costs: Under UCR's 'rules of engagement,' budget authority must be earned; is based on quantity of output times cost per unit of output; and assumes that all costs are variable. If fixed costs are significant, however, then the function would be chronically underfunded in an environment of declining output. Note that the problem is not unit cost resourcing—the problem is being able to identify fixed and variable costs. (154:12)

Dunlap provides further support concerning the shortcomings of fixed and variable costs (see Table 2-2).

Sims and Hough also raise concerns regarding end strengths, existing laws, directives, and regulations, and the need for education and training.

If military personnel costs are allocated across functions, how will end strengths be managed? Another problem is how to make postulated incentives work. Specifically, one of the anticipated benefits of UCR is to 'incentivize' wing commanders by decentralizing financial execution. Yet, items (and increasingly, functions) are centrally managed. It's unlikely that decisions will change much if it takes years to see the results. Yet another area which will require attention is changing existing laws, directives, and regulations. UCR can be overlaid onto existing financial management processes, but only with a significant increase in workload—and confusion. Finally, and perhaps most significantly, education and training (or more precisely, retraining) is an enormous problem. The necessary training is 'doable,' but will take time. (154:12)

Table 2-2

SHORTCOMINGS OF COMPARING UNIT COSTS

As fixed costs are introduced into a production process, the accuracy of unit cost resourcing declines. Unit cost resourcing implies a horizontal average total cost curve, which is unrealistic. The magnitude of the problem brought about by fixed costs in unit cost resourcing is a function of how much output changes and the point on the average cost curve at which the unit cost was determined. A solution to this problem would be to provide resources based on output and average variable costs, and add or decrement the fixed costs separately. Managers should monitor average total cost, but funds should not be allocated by it. In an environment where funds and output levels are expected to steadily decline, unit cost resourcing based on average total cost runs the risk of cutting into the fixed costs of the activities. This would make it very difficult for activities to fulfill their missions.)

Variable resources such as labor and capital can be increasingly employed with no diminishing marginal products. This implies a perfectly linear average variable cost function. It is assumed that a producer can continue to add more and more of a variable input such as labor, with each successive unit contributing the same amount to total output. This is an unrealistic assumption.

The variable inputs of labor and capital do not have to be highly skilled or specialized. It is implicitly assumed that the labor force and capital base can be "turned on" and "turned off" in a short period of time with no significant impact on the activity's mission. An activity that requires a pool of highly skilled technicians, researchers, scientists, engineers, or other professionals, could not effectively use the unit cost resourcing scheme.

An activity can determine its current and maximum operating capacities and cost structure. The unit costs of two identical activities producing identical outputs are comparable only if they are operating on identical cost curves. It will be a rare situation when two or more activities producing similar products or providing similar services have identical cost structures.

The primary products of comparable activities are homogeneous. Extreme caution should be observed when comparing the unit costs of different activities producing "similar" products or providing "similar" services. It is easier to assume similarity of products or services than to assess the qualitative differences in them.

Source: Dunlap, Scott W. "A Theoretical Perspective of Unit Costing as a Resourcing Scheme," Armed Forces Comptroller, 36: 22 (Spring 1991).

As LaCivita and Pirog point out, unit cost resourcing will require a change in business practice and philosophy:

From a budgeting point of view . . . an emphasis on unit costing for managerial decisions implies a change in philosophy from that implicit in PPB [Planning, Programming and Budgeting System]. Planning and policy analysis will decline in importance while managerial efficiency within the existing institutional structure will grow in importance. (117:21)

AFIT will soon find itself under unit cost and conducting business "differently." If an AFIT customer wants a certain level of service, AFIT will need to provide a cost figure up front specifying what that customer will have to pay for education; and AFIT will, just like other agencies, have to justify in its budget why that level of service costs what it does. AFIT, itself, will become the customer, too, as it purchases services and products from other defense agencies. "Thus, DBOF becomes a network of the military operating forces and defense support agencies reimbursing each other for products bought and services performed and passing on direct and indirect costs to their customers" (177:6).

Therefore, the way AFIT budgets for "purchases" costs and justifies reimbursement for "services" costs will require a more sophisticated information system than is presently available.

This section on the financial side of the DOD reorganization is only part of the picture. Though budgetary concerns may be most visible and take priority in the planning process of an organization, many organizations according to Ackoff "mistakenly equate financial planning and corporate planning. Although it is important, it is only a small part of the process" (4:66).

The Packard Commission, and other studies, also found significant problems and long-term neglect in managing the DOD infrastructure (84:VI-1).

An issue that was raised was the need for better information systems in the DOD decision-making processes (84:VI-6).

Defense Information Management (IM)

In establishing policy for the Defense Information Management (IM) program, the Department of Defense Directive 8000.1 (working draft) assigned responsibilities for information management implementation and oversight. Process improvement is a major foundation for information system implementation. As policy, "Information management will be achieved in the DOD through emphasis upon process improvement of functional activities, supporting information systems and information services" (53).

The Defense IM program continues to change and progress daily. New manuals and directives are being worked in several areas to clarify, define, and standardize the Defense IM program's mission.

The relationship of the information resources management (IRM), information management (IM), and corporate information management (CIM) within DOD are explained in DOD Directive 8000.1:

In the past, information resources management [IRM] in DOD tended to concentrate primarily on automated information systems and their associated technology. Through the Defense information management [IM] program, the Department will emphasize the primacy of functional requirements and the supporting role of information technology. The Defense corporate IM [CIM] initiative implements this Defense IM program emphasis, as well as traditional information resource management requirements. (53)

DODD 8000.1 explains that the Defense corporate IM initiative provides the policy and procedural framework to guide the improvement of processes, data requirements, and supporting information systems (53).

Corporate Information Management (CIM). CIM is one of the major strategic initiatives identified as a result of the Secretary of Defense's July 1989 Defense Management Report to the President (11:6). As Defense Secretary Cheney pointed out in a 16 November 1990 memorandum, Implementation of CIM Principles, "The objective in implementing the corporate information management initiative is to establish strong centralized policies for implementation through decentralized management structure" (39). This memorandum also assigned the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C3I)) the responsibility for establishing an organization to implement CIM throughout DOD and provide, for approval, a detailed plan to accomplish CIM throughout DOD (39).

Spearheading the CIM initiative was Deputy Secretary of Defense Donald J. Atwood, Jr., who, in announcing DOD would use CIM to ensure more effective management for and use of DOD's information, directed that DOD move towards systems and software that support joint needs; most importantly, find improvements in information management to realize saving both in the \$9 billion spent annually by the Department on information technology and, more importantly, in the billions more spent on associated business areas (16:2).

It is widely acknowledged that the United States is changing from an industrial to an information economy. And, not surprisingly, information is becoming the strategic and transforming resource of our post-industrial environment. Information is becoming recognized as a fourth resource; just as capital, material, and people need to be managed in order to achieve effectiveness and efficiency, so does information (56:i).

Today, however, labor and capital are less crucial factors to . . . success than information (178:17). In fact, according to Jackson, information is a

corporate resource of such critical importance that a directed strategy for its management is essential (10:1).

DOD leaders became convinced they must treat information in its broadest context as a vital resource, and that the rising costs and complexities of information systems required centralized control, direction, and professional oversight (178:17). DOD Directive 7740.1 governs the DOD Information Resources Management (IRM) Program. The Program was established to promote coordinated and integrated information management functions (54:2-1). The DOD IRM Program covers a myriad of information management activities to include:

The planning, budgeting, organizing, directing, training, promoting, controlling, and management activities associated with the burden, collection, creation, use and dissemination of information by agencies, and includes the actual management of information, as well as the resources (hardware, software, and human) used to manipulate, store and disseminate the information, such as automated data processing, telecommunications and related equipment. (54:2)

It is DOD policy "to implement IRM aggressively in ways that enhance mission performance through the effective, economic acquisition and use of information throughout its life" (54:3). Efforts to achieve that policy are directed by the procedures outlined in Table 2-3.

DOD Directive 7740.1 also provides an extensive list of assigned responsibilities from the ASD(C3I) to the heads of DOD components for implementing and managing the IRM program and a listing of DOD IRM policy issuances--DODD 7740.1, 20 June 1991, Enclosure 3-2. Recognition of information as a vital resource led Deputy Secretary of Defense Atwood to undertake CIM as a program of necessity for DOD.

Table 2-3

PROCEDURES TO EFFECT DOD IRM POLICY

- Support DOD operations and decision making with information that sufficiently meets the needs in terms of availability, accuracy, timeliness, and general quality.
- Provide for the economic and effective acquisition of information resources emphasizing maximum practicable competition and most advantageous alternative consistent with mission requirements.
- Structure information systems in ways that encourage horizontal, as well as vertical, sharing of information with the DOD, with other government agencies, and with allied nations, consistent with security and privacy requirements.
- Ensure that information planning becomes an integral part of the management process at all levels.
- Require user responsibility and accountability in the development of effective information systems.
- Manage information, information technology, and information systems using a disciplined approach from inception through acquisition and use until discontinuance.
- Use regular reviews and evaluations to identify opportunities for improvement, to increase the usefulness of information, to reduce the cost of information activities, and, in general, to further DOD IRM Program goals and objectives.
- Create a broad awareness of IRM concepts and practices and provide necessary training.
- Organize and integrate information management functions to accomplish mission goals.
- Collect information that is non-duplicative and that supports essential mission needs in a cost-effective manner.
- Establish and maintain effective working relationships within the DOD and with Congress and the Federal central management agencies, such as the Office of Management and Budget (OMB), the General Services Administration (GSA), and the General Accounting Office, with respect to IRM matters.
- Encourage users and information managers to plan effectively for the sustainability and readiness of information resources in both peacetime and wartime conditions.

Source: Department of Defense Directive 7740.1, 20 June 1991, pp 3-5.

DOD has already established a chief of information position that reports directly to the Secretary of Defense level. Paul A. Strassmann, who led a successful corporate information management program at General Motors, was appointed to lead the DOD CIM initiative.

DOD must take a new view of the business process and its role in creating a more effective and efficient way of conducting business. CIM was established to reduce non-value added work and costs, as highlighted by the DMR (11:1). It calls for a major reengineering and restructuring of business methods and administrative processes in DOD (160:1).

The primary objective of CIM is business process improvement (12:2). As McCashin points out, "the principle underlying CIM is that improving business practices is more important than applying information technology" (131:81). Bob Brewin, in an article on CIM, provides support for this same idea when he writes "CIM is not about technology; it is about business processes and managing information" (34:3). And as Turney adds:

To achieve continuous improvement, you must be informed. You need accurate and timely information about the work done (the activities) and the objects of that work (the products and the customers). (165:171)

As Davidson points out:

Traditional business and organization models are being swept away. Indeed, if you plan on conducting your current business with current practices over the next five to ten years, you will certainly be out of business. (48:6)

The first step in the CIM process establishes policies that govern the business operation (131:81). The DOD CIM Model is illustrated in Figure 2-1 and its elements are described in Table 2-4. According to the Executive Level Group for Defense Corporate Information Management:

Executing the Corporate Information Management Model from the top down can lead to dramatic improvement in business effectiveness and efficiency of an organization whether private sector or government. Driving this model from the bottom up, that is, beginning with change to the computing and communication infrastructure, re-automates old ways of doing business and potentially institutionalizes ineffective and inefficient ways of doing business. (56:v)

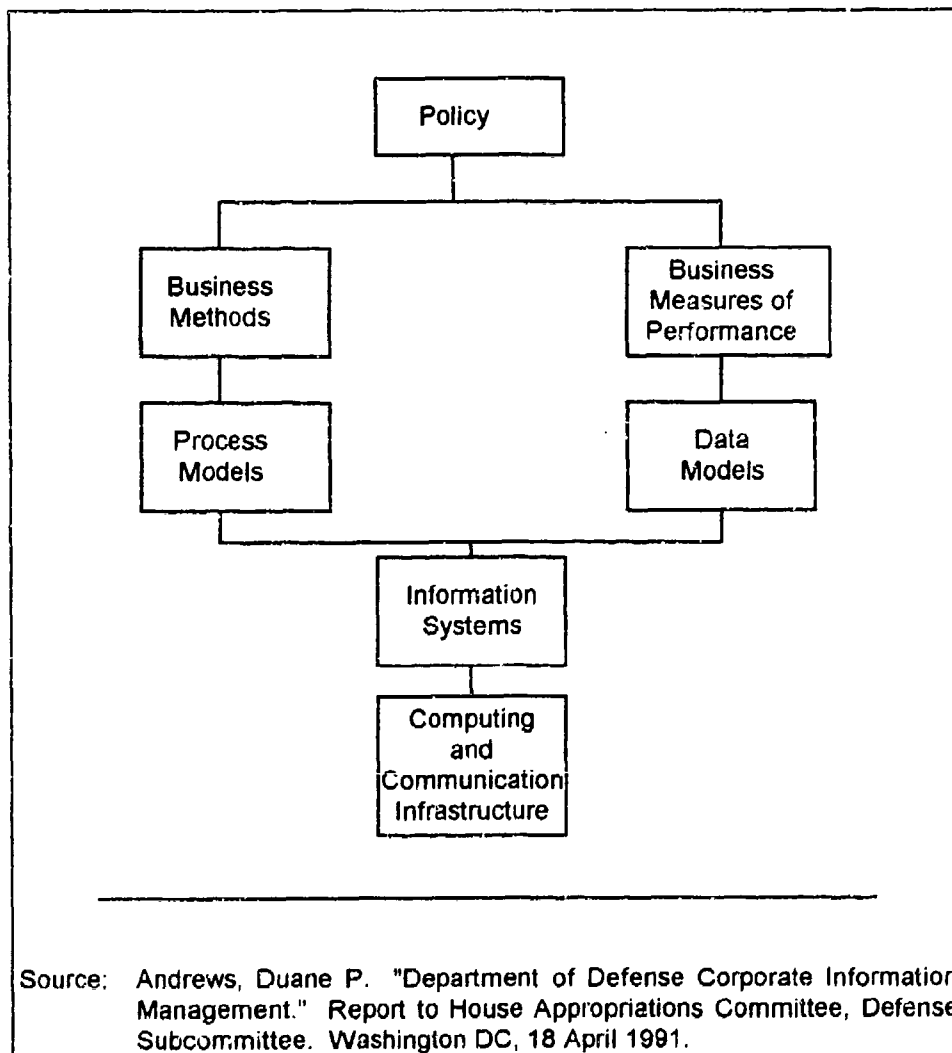


Figure 2-1

CORPORATE INFORMATION MANAGEMENT (CIM) MODEL

Table 2-4

CIM MODEL ELEMENT DESCRIPTIONS AND RELATIONSHIPS

POLICY. Management of information begins with policy. Policies are the guiding principles and operating fundamentals that determine the direction the organization shall take. Policies represent a choice among alternatives, and they frame the business methods and performance measures to be employed by the organization.

BUSINESS METHODS. These are the formal way in which business is conducted. They represent a selected and defined approach to executing the operation of a business or government agency. It is essential business methods be continuously be reexamined and redefined in order to effect improved operations. The end goal is simpler, integrated methods for organizations to adopt.

MEASURES OF PERFORMANCE. Measures of business and mission performance must also be defined. They provide the framework for evaluating effectiveness and efficiency of an organization's business methods and the resulting operations. These measures permit comparative evaluation and provide insight to the strengths and weaknesses of operations. Measures should regularly reexamined and refined.

PROCESS MODELS. These models document business methods by graphically describing the tasks performed and their sequence. They are used to describe present methods and are essential to continuously evolving improved methods. Process models reveal better ways of doing business and are valuable as training aids.

DATA MODELS. While process models represent the activities of a business method, data models represent the data necessary to execute the business method. Data models formally define the data used in a business method. Terms and relationships, once defined, comprise a business language, and like natural languages, are to be captured in a dictionary. Together the data models and dictionary comprise a corporate information standard. An information standard is essential if data are to be shared among organizations and the systems through which data flow are to be common.

INFORMATION SYSTEMS. Business methods and performance measures are implemented through information systems. New methods require new information systems. Process and data models must be built before development of an information system begins. Applied in that sequence, these models facilitate integration and commonization of systems. Together, process and data models provide the how and what, respectively, of an information system.

INFRASTRUCTURE. Infrastructure is constantly undergoing change as new computing and communication technology becomes available.

Source: "Plan for Corporate Information Management for the Department of Defense," Draft Report. Executive Level Group for Defense Corporate Information Management, Washington DC, 11 September 1990.

DOD must be constantly looking for new possibilities for the use of information technology: not to view its hardware and software assets as a set of individual computer systems, but as a related chain of activities, and thoroughly examine the value added toward improved business methods.

Restated as a series of questions, the CIM Model provides a framework for evaluating an organization's business methods (see Figure 2-2). That framework combines knowledge of the business with knowledge of computing and communication which becomes an examination of business strategies.

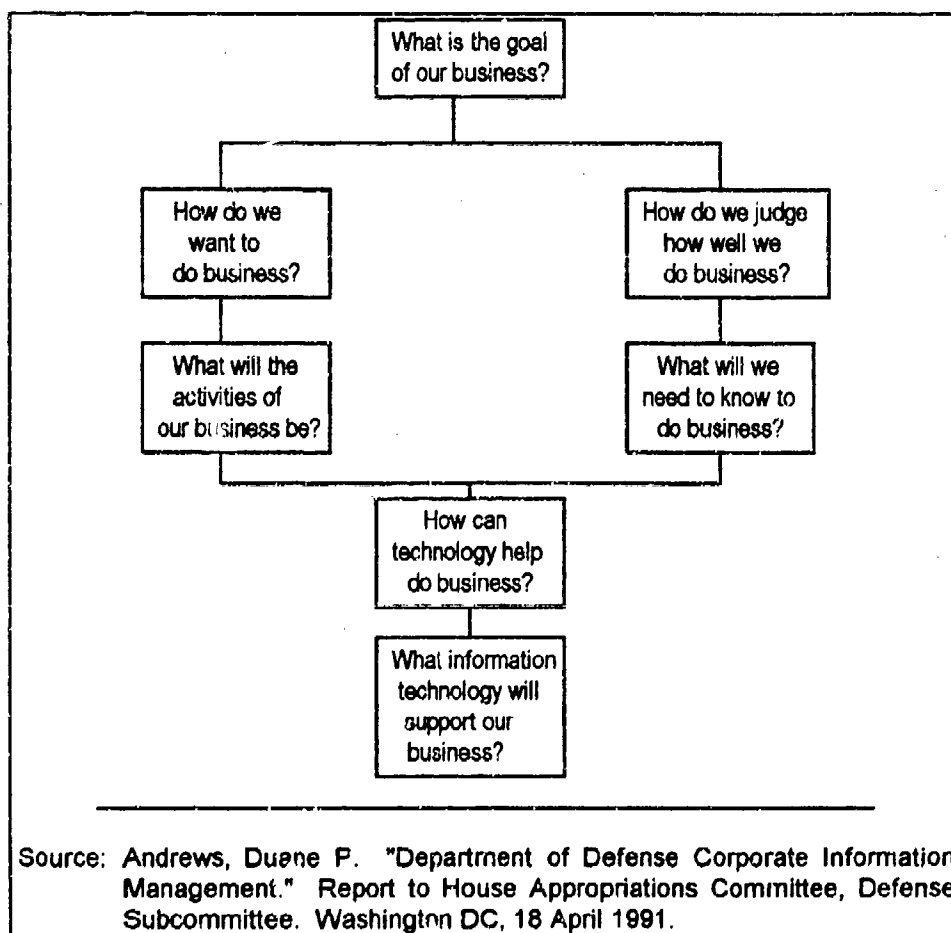


Figure 2-2

INFORMATION STRATEGY MODEL FOR BUSINESS IMPROVEMENT

Information Technology (IT). Information technology has become a prime vehicle for effecting business change (105:139). IT is supportive and allows the adoption of more efficient and effective business area management policies (11:1). Specifically, computing and communication technology make possible new business methods which are not otherwise practicable--benefits and competitive advantage accrue to those who apply that technology to improve new ways of doing business (56:i). Direct CIM technology reforms will center on reducing inventories of hardware and software, data-center consolidations, software reengineering and centralized fee-for-service business operations. (43:36-37).

When companies are able to register improved business processes that generate tangible cost savings or profits in nanoseconds (a billionth of a second), old ways of doing business just won't do. As an example of what can be done in half a second, a mainframe computer can:

- Debit 2000 checks to 300 bank accounts, and
- Examine the electrocardiograms of 100 patients and alert a physician to possible trouble, and
- Score 150,000 answers on 3000 examinations and evaluate the effectiveness of the questions, and
- Figure the payroll for a company with a thousand employees.
- And a few other chores. (103:6)

And this example provides functions performed by technology over ten years old--computers we now consider excruciatingly slow.

In the past, most government agencies and corporations viewed information management as the automation of existing business methods in order to reduce costs--little effort was made to improve the methods themselves (56:i). As Green points out, Strassmann immediately went in search of existing

ideas and programs that could be expanded to streamline defense administrative processing and end duplicative systems (88:34). Corbin believes that "CIM's applications extend to almost every aspect of Pentagon operations" (43:36).

New technology applied to old methods only produces disappointing results; superior business methods evolve from primary emphasis being placed on continuously improved business methods (56:i). When a current method of conducting business is not effective, do not automate it and expect the power of new technology to mysteriously make it become effective. The practicality of this concept has numerous supporters. The HQ ATC/IM, (Air Training Command, Director of Information Management), Colonel Frederick Hallsworth, stated in the 1990 ATC/IM Strategic Plan:

Many tools that promote and enhance automation are in the hands of users which cause us to rethink our current way of doing business. Should certain functions remain centralized? Should other functions be deleted or created? Automation is causing us to continually evaluate these kinds of questions. . . . My challenge to the IM community . . . is to shed the cloak of tradition in search for streamlined and perhaps nontraditional ways to do business more effectively. Let's be sure we don't just try to automate 'existing processes.' Instead, let's keep our minds open to new methods. . . (100:ii)

Businesses gain strategic advantage by modifying the way they meet their responsibilities and increase productivity (131:81). This problem was also recognized in Air Force Pamphlet 700-30:

The potential benefits of information technology frequently aren't achieved. We acquire information technology without clear objectives, so we don't know in advance how we expect the technology to help. It usually doesn't help when technology is acquired without first identifying clear objectives. We often fail to streamline our poor procedures before implementing information technology. We therefore often perform our poor procedures

better but they are still inefficient. Streamlining procedures often helps managers achieve their objectives without acquiring additional technology. (52:1)

Principles of CIM. CIM is both a pathway and a set of principles (see Table 2-5) to help organizations achieve corporate objectives; it focuses more on an organization's business needs and uses information technology in the context of the business problem to be solved (131:81). As Sprehe clarifies:

... the CIM methodology calls first for a policy definition of mission goals, then for a series of questions about business methods and performance measures, culminating in a query about what information one needs to reach the mission goals. Only after these steps are completed will the CIM approach permit anyone to ask how information technology can help and what information systems to build. (157:30)

To achieve its objectives of transforming the DOD business practices, the CIM program will follow the principals of:

- (1) Centralized direction of functional methods, but decentralized execution;
- (2) Application of business case analysis to functional and information technology decisions;
- (3) Centralized guidance on how to apply standard information technology;
- (4) Managing risk through the evolutionary migration of existing systems, salvaging and revising existing know-how and software to the maximum extent possible; and
- (5) Benchmarking new business methods and systems against the best accepted practices. (12:3)

As with any program, regardless of sophistication of associated electronic or mechanical machinery, success depends on the human factor. Unless users are persuaded that the information system and its associated computers can help them perform their duties in a more efficient and effective manner, they will not be receptive to computer solutions to problems (182:44).

Table 2-5

GUIDING PRINCIPLES OF CORPORATE INFORMATION MANAGEMENT

- Information will be managed through centralized control/decentralized execution
- Simplification by elimination and integration is to be preferred to automation whether developing new or enhancing existing information systems
- Proposed and existing business methods will be subject routinely to cost-benefit analysis which includes benchmarking against the best public and private sector achievement
- New business methods will be proven or validated before implementation
- Information systems performing the same function must be common unless specific analysis determines they should be unique
- Functional management will be held accountable for all benefits and all directly controllable costs of developing and operating their information systems
- Information systems will be developed and enhanced according to a Department-wide methodology and accomplished in a compressed time-frame in order to minimize the cost of development and achieve early realization of benefits
- Information systems will be developed and enhanced in the context of process models that document business methods
- The computing and communications infrastructure will be transparent to the information systems that rely upon it
- Common definitions and standards for data will exist DOD-wide
- Wherever practicable, information services will be acquired through competitive bidding considering internal and external sources
- Data will be entered only once
- Access to information will be facilitated, and/or controlled and limited, as required. Information will also be safeguarded against unintentional or unauthorized alteration, destruction, or disclosure
- The presentation between the user and the system shall be friendly and consistent

Source: "Plan for Corporate Information Management for the Department of Defense," Draft Report. Executive Level Group for Defense Corporate Information Management, Washington DC, 11 September 1990.

As Strassmann points out, the success of the overall program rests entirely on taking care of what appear to be minor procedural matters and remembering the necessity to prepare people for change:

Accumulation of such diversity makes it mandatory to change business practices and reorient people prior to attempting a systems consolidation that has a chance of succeeding. Precipitous consolidations without consideration of human and procedural complexities have resulted in well-documented administrative disasters. We shall avoid taking such risks. We shall specify improved business methods before proceeding with any standardization. (160:6)

Role of Management. Strassmann also emphasizes the role of management in information technology. He states, "Measuring managerial productivity is the key. . . . Improve management before you . . . automate" (158:xvii). Qualified management has proven to be a real dilemma. Most information managers are former data processing personnel that have great technical expertise in the computing field, but lack formal education in management techniques (182:44). Management quality has become a key to success; and information and its supporting technology have become essential for success (178:17).

Also, information systems add value only to the extent that these systems and their products have direct access to and are controlled by management (178:17). Most studies indicate that information systems that succeed were precisely those in which top management participated (182:43).

Information technology, computer systems, and software management tools and techniques can add value to business processes, but by themselves they do not deliver strategic gains (131:81). Brewin agrees by adding, "Businesses . . . gain strategic advantage by changing the way they work, not by

automating old or inefficient methods. A key to this approach is to strip all processes down to basics, to unit costs, so managers can see what works and what doesn't. . . " (34:3).

CIM Support War Fighting Mission. One of CIM's major goals, according to Strassmann, is to create an information management system to support joint war fighting by linking administrative advanced data processing (ADP) systems to war fighting systems; Green explains, "Strassmann's fiefdom quickly was expanded to include the role in linking administrative ADP and wartime systems- in part because Desert Storm had shattered the notion that DOD should maintain a barrier between administrative ADP and military systems" (88:26).

Endoso further adds:

Strassmann plans to reduce information overhead to abide by DOD objectives to make more reductions in information resources management funding compared to military spending. DOD does not want to compromise the readiness of fighting forces. Strassmann hopes to create an information system that is able to support joint war fighting. Strassmann believes information systems will have to be used in the field where joint task chiefs can organize troops quickly. Command and control systems will be of particular importance, while financial and logistics systems will be less important. In addition, DOD information systems must be customized to a fighting environment. Strassmann created an information document in November 1991 that emphasizes military readiness. All information systems operations must be directed toward war requirements. (68:59)

CIM calls for a major business process reengineering and restructuring of business methods and administrative processes in DOD. As Green explains:

'Business process reengineering' is a phrase describing the improvement of business methods as support systems are improved. The DOD is using business process re-engineering to facilitate change as it institutes its new Corporate Information Management plan and an IRM doctrine linking all systems to its war fighting mission. Key aspects of the IRM doctrine include rapid

prototyping, incremental system building methods and easily deployable systems. The DOD will test the systems through peacetime war games. (88:40)

Endoso states Strassmann is busy trying to tie together the information support and operational activities of DOD:

Strassmann believes that the CIM initiative must be used to help the DOD's administrative and military systems work in tandem. Strassmann would like to create a formal information doctrine to shape and manage the DOD's strategy towards data management, computer security, system design and data during a time of rapid deployment. He would make sure that the core of the system doctrine would be developed directly from war requirements. One of Strassmann's specific goals is to ensure that DOD information systems are technically integrated to fulfill military missions. (67:34)

In terms of expense, the CIM initiative is the largest information management program ever conceived by any U.S. business organization; in terms of schedule, it will require every moment of the five-year period for which savings were initially targeted (160:1).

The full importance of reducing the cost of information in DOD is clearly within the framework of the CIM model; in that context, the computing and communications infrastructure: is a homogeneous utility, is managed cost effectively, is operated efficiently, and is transparent to users (131:86). An infrastructure, as envisioned in the CIM model, would yield significant and substantial benefits; DOD could eliminate redundancies while increasing use of its communications and computing capacities (131:86).

Shortcomings of CIM. DOD is committed to the CIM initiative--realizing that much is at stake with the program's success or failure. As with any program, not everyone is a true believer.

While merit exists in the DOD CIM initiative, skeptics remain throughout the government. Those in industry who have seen

previous initiatives in the DOD produce less than spectacular results remain doubtful. A few members of Congress continue to question whether the Pentagon's bureaucracy will be able to achieve progress in standardizing information systems and in obtaining savings. To illustrate independence . . . the Air Force is decentralizing information resources management. This not only seems inconsistent with the theory underlying CIM, but it also goes against the flow. . . . Recent federal law also complicates the situation. . . . The Office of Management and Budget has released guidance on the Act [Chief Financial Officer Act of 1991] that suggests that given the broad scope of the chief financial officer's authority and responsibility . . . the chief financial officer should have line responsibility for agency information resources management. (178:17)

Robert Head, President of FEDINFO, a federal information systems marketing service, provides further support:

Until last year [1991], the idea of a chief information officer [CIO] had been making modest headway within the federal government although not at the same rapid pace as in private industry. . . . But with passage of the Chief Financial Officer Act, the whole scene has shifted. Not only have CIOs been designated by law within 23 agencies, they have been given prime responsibility for information systems in many cases. Thanks to ill-considered guidance from the Office of Management and Budget, information systems people have been subordinated to CFOs [chief financial officers] in many agencies. . . . CFOs will be the dominant players in information resources management in 1992. (94:49)

However, according to Rogers, while not all defense organizations have welcomed the fundamental changes CIM will bring in the way they do business, the Army seems to be adopting it with enthusiasm (149:45).

Mr. Duane Andrews, Assistant Secretary of Defense (Command, Control, Communications and Intelligence), acknowledges implementing CIM is a tough job, and has asked for Congress' continued support:

The success of CIM hinges in large part on the ability to standardize processes and data and to install an open systems architecture as we move the Department [of Defense] into an era

emphasizing information management. This is a strategic move and will take several years before execution is completed. Your continued support for CIM and these related activities will go a long way towards making CIM a success. (11:14-15)

It appears, however, that Congressional support will be a continuous battle. As Endoso points out:

Debate continues in the US Congress on whether to move \$1 billion in EDP [electronic data processing] funding from military service budgets to the DOD CIM program: the Senate Defense Appropriations Bill for FY 1992 favors giving the funds to CIM, while the House bill favors leaving it with individual services. In 1990 Congress decided to centralize CIM funds at the urging of the Senate, but in 1991 the impact of funding consolidation has been discussed by DOD officials and lawmakers. The Senate has voiced concerns to the DOD that CIM programs may not be ready to continue without DOD control of funds, although its approach allows some flexibility. The consolidation is seen by the Senate as a temporary measure; decentralized management of CIM program funds is the long-term goal. (66:21)

Measures to Assure CIM Initiative Results. Under the DOD CIM initiative, there are concepts from the business world that are being applied to DOD functions to improve effectiveness and efficiency. What makes CIM different from other attempts to streamline the Pentagon is the power given to the mission manager (34:3). As Denis Brown, Director of the Center for Information Management at the Defense Information Systems Agency (DISA), states:

The functional manager brings to the table his requirements and his dollars. The technical person looks at those requirements and recommends what equipment to obtain. But it is the functional manager who chooses how to spend his budget, who decides how much added speed or security is worth to him. (34:3)

As Andrews points out, "By letting functional users define their information technology needs, the Pentagon will avoid throwing systems and hardware willy-nilly at the problem" (34:6).

CIM Savings. Improved information management acts as an enabler for many DMR initiatives and their associated cost savings (11:1). Strassmann presented the main objectives of CIM to the House Appropriations Committee, Defense Subcommittee, 24 Apr 91:

Program managers will show expected cash flow, adjusted for risk and the time value of money. This approach follows industrial practices of business analysis in justifying productivity improvement projects. In each case, we shall ask for expected financial results and for operating measures prior to approving full implementation. (160:6)

The targeted savings as a result of the implementation of the CIM initiative is \$35 billion; fully half of the \$70 billion DOD is to slash from its budget from 1991-1997 (159; 34:4; 136:1-2). Whereas approximately \$2 billion is from a reduction in data center costs and software, the rest of the savings are expected from improvements in the delivery of mission capabilities and efficiencies (34:4; 11:3; 136:1-2). However, a General Accounting Office (GAO) Report on CIM savings was not as optimistic. The report stated:

... there is presently no basis for the Department's claim that CIM will save a net \$2.2 billion ... it is misleading for decision makers to consider the \$2.2 billion as savings achievable through CIM until the Department can more clearly show what ... will be curtailed and how and when standard systems will be implemented. (170:5)

Adjustment for Risk. Due to cost overruns associated with projects, risk analysis is a way for managers to view the risk of exceeding the projected budget. Computer simulations project the risk associated with certain projects, thus providing managers a better decision making estimate. "Top management welcomes the articulation of risk in financial terms so that potential advantages can be balanced against the chances that predicted outcomes may not materialize" (158:193).

Program managers are required to compare their projected unit costs, order-handling delays, and transaction errors with comparable private sector business practices. . . . The CIM method requires performing value-engineering on individual transactions to find out how to revise existing DOD business policies and practices. (160:7)

Value-engineering. Value engineering's primary objective is to identify and eliminate unnecessary costs (74:XI-4). "Strassmann expects most of the projected CIM savings to come from changed business methods and revision in DOD policies rather than from more efficient computerization" (160:7). In some cases, DOD might discover it is quicker and cheaper to use a pencil than a computer to accomplish a particular task (34:4). Moreover, Strassmann exclaims, "There is no point in having a computer do something faster if it should not be done at all" (160:7)!

Activity Based Costing (ABC). "CIM requires managing and reducing indirect costs and overhead costs, also identified as overhead expenditures. Indirect support costs are attributed to operating results through activity-based accounting" (160:7). Activity based costing is an approach for understanding cost behavior in terms of human and other actions that cause costs to occur (93:23). An activity is a named process, function, or task that occurs over time and has recognizable results (35:A-5). Activities are determined by strategic choices, i.e., a successful business deploys resources to those activities that yield the highest strategic benefit (165:176). ABC is a methodology for providing information to help organizations improve; it supplies a combination of nonfinancial and cost information which work together to help manage and improve the performance of the company (165:57,74). The information provided makes it much easier to address questions such as:

- Which activities require the most resources?
- What types of resources are required by these activities?
- Where are the opportunities for cost reduction?
- What event trigger the performance of the activity?
- What factors negatively affect the performance of the activity?
- How efficiently, how fast, and with what quality is the work carried out? (165:100,107)

According to Harr, ABC presumes that:

- All activities in an organization cause costs, and
- All activities are incurred to create products . . . or to deliver services . . . ; therefore,
- All costs are product or service costs. (93:23)

Again, information crosses all functional and organizational lines and is vital as a strategic resource. Cost systems are information systems--nothing more, nothing less (165:27) As Turney indicates in his book, Common Cents: The ABC Performance Breakthrough:

Dealing with today's competition is challenging enough, even when you have all the right information. But if you are responding to wrong information, you could well be in a losing battle. . . . flawed cost information can sabotage your competitive position by encouraging you to set the wrong priorities and focus on the wrong problems. (165:1)

As Harr explains:

Basically, ABC determines the costs of organizational activities and the costs of products or services based on their usage of these activities. By contrast, traditional [or conventional] cost accounting systems typically identify costs incurred by responsibility centers and assign these costs to products or services based on direct labor content or a similar measure. (93:23)

Direct Costs.

Direct costs are those costs clearly identified to a product or output and are totally related to the output, such as hands-on labor or material used in a product. First line supervision over a function in sole support of a specific output is considered a direct cost. Similarly, second line supervision may also be considered a direct cost if solely in support of a specific output. Secondline supervision and activities above second line that do not provide direct benefits to a specific output are considered indirect costs. Costs related to Headquarters, regional offices, or support activities are not considered direct costs. (153:7)

Indirect Costs. "Indirect costs are those mission costs which benefit two or more outputs but not all outputs. Costs which benefit all outputs are general and administrative expenses" (153:7).

General and Administrative (G&A) Expenses:

General and administrative expenses are essentially overhead. These costs cannot be reasonably associated with any particular outputs and are allocated over all of the outputs. G&A costs generally include functions such as local comptroller, installation security, . . . legal services, fire protection, . . . refuse collection, snow removal and similar types of base support functions. (153:7)

Activity Modeling. An activity is "a named process, function, or task that occurs over time and has recognizable results" (44:3-8). To improve the effectiveness and efficiency of functional activities, six policies have been established within the Defense IM program. The first three deal with functional activities (also interchangeably called processes).

In the management and improvement of functional activities effectiveness and efficiency, the following apply:

- a. Functional process evaluation shall emphasize the elimination of non-value-added work and associated costs.
- b. Changes to functional processes shall be based on sound business principles and supported by functional economic

analysis. The functional economic analyses must evaluate total costs and benefits of all mission activities and operations of a functional area with investments, including information systems.

- c. Functional processes improvements shall be accomplished through activity modeling and business redesign methods and standard data models that document data and information requirements. (53)

Development of a process model requires the definition of the functional architecture (55). As process improvement proceeds, the functional architecture needs to show greater detail (55). The functional architecture:

1. Defines the overall scope and mission of the functional area and its subordinate functional activities . . .
2. Defines the current baseline ("as is") and target ("to be") methods, management processes, and data structure for each functional activity.
3. Established the long-term functional area objectives, and the performance measures and targets for the functional area, and each of its constituent functional activities.
4. Determines the functional management strategy to be followed in defining and implementing streamlined processes . . . (55)

As mentioned earlier in this chapter under unit cost resourcing, the unit cost concept is based on the logical assumption that the cost of an activity should be related to its primary output(s) (64:17). Activity costs are linked to activity models to provide data needed for preparation of functional economic analysis (FEA) which "is a decision package that evaluates actions proposed to achieve the functional area objectives and functional activity objectives" (55:44).

The Defense IM program uses a "standard methodology called IDEF (Integrated DEFinition Language) to develop activity models and data models, using procedures and standard software tools provided by the Directorate of Defense Information" (55).

Fee-for-Service Computer Centers. The CIM program requires fee-for-service implementation in computer centers. "Fee-for-service makes it possible to establish a measure of actual computer center productivity gains and a measure of competitive excellence for software efforts" (160:9).

Computer-Aided Systems Engineering. Productivity gains will be achieved by means of Computer-Aided Systems Engineering (CASE) methods (160:9-10). According to Strassmann: "All new DOD computer programs will be manufactured with a DOD standard set of software tools. The tools will provide interoperability between new systems while reengineering existing systems and reusing existing software" (160:13).

Reengineering. Reengineering involves the accumulation of specifications for a software program that already exists; the modification of these specifications; and the subsequent use of the new specifications to recreate the software (81:18). This method may be useful in situations where an enterprise has invested considerable time, money and effort into the current system and has limited funds to upgrade the system (111:37). Software reengineering is a three-step process:

- Step 1: Reverse engineer the existing application's process logic to a more general specification model that accurately reflects the system's current capability.
- Step 2: Revise the specification model to: incorporate new capabilities, remove unused functions, upgrade the implementation for new technology advances, and eliminate code and design redundancy that add to the maintenance costs and testing requirements without providing value to the user community.
- Step 3: Forward engineer the newly extracted or reverse-engineered application's specification to create the code for the new and improved application. (129:72)

McCabe and Williamson predict reengineering to become a primary information systems function in the 1990s, as companies attempt to contain costs for software system maintenance and maximize their investment in existing software (129:71).

Redundancy/Reusability. Redundancy is the multiple, repeated implementation of a function in an application, often implemented uniquely as discreet repetitive pieces of code for each occurrence of the function in the system (129:72). Redundancy is a common occurrence for systems constructed or maintained without the use of structured analysis and design techniques; it results in higher maintenance costs and testing requirements beyond what is necessary for the application's function (129:72). Reusability is the multiple use of a single implementation of a function in an application (129:72).

To reduce data redundancy and costs associated with performing multiple data entries into a system CIM requires: "all data in DOD to be entered into the information-handling system only once, with zero defects, so it can be reused as the information passes from its origin to its final source" (160:10). In this attempt to simplify DOD business methods, CIM requires: "automation of labor-intensive and error prone procedures" (160:11). Strassmann continues:

CIM requires elimination of unnecessary labor in transcribing, translating and reinterpreting the same data. Penalties for inconsistent and redundant handling of data are incurred primarily by clerical and administrative personnel. Poor data management practices show up as costly errors in the conduct of DOD business affairs, as excessive transaction costs, and as added management layers to monitor and control work. (160:10)

Open Systems Architecture. Open operating systems, per Corbin, enable dissimilar computers to exchange information and run on each other's software

(43:37). She adds that "standard interfaces make hardware non-proprietary, meaning the military can integrate a variety of off the shelf equipment without being tied down to particular manufacturers' products" (43:37). Likewise, military personnel need not be trained on several different computer systems as they rotate through peacetime or, more importantly, wartime assignments. According to Strassmann, DOD "is committed to establishing an open systems environment for its information systems (162:1). An open systems architecture has a higher probability of making information more accessible to the decision makers that need it.

"CIM will implement a standard, vendor-independent, and readily upgradeable information systems architecture known as open systems architecture" (160:11-12). This will allow systems developers to concentrate on software that will be more responsive to the needs of DOD users (11:3). "All DOD information systems will be constructed according to approved Federal Standards defined by the National Institute of Standards and Technology" (160:12). When dealing with information technology itself, Strassmann wants to set standards at the most basic levels possible: data elements and small packages of reusable code (34:6).

In his paper "Competition and Standardization--Natural Partners," Rear Admiral Stuart Platt stated, "What we require is standard products, not standard contracts, or standard contractors" (140:IV-1). One of the major benefits of CIM is to provide inter-operability between systems. This is done by standardizing definitions of data elements and data entities on a corporate-wide basis.

CIM requires all DOD data definitions to be standardized and shared assets rather than belonging to individual information handling systems. Data modeling and data control shall be under direct policy guidance of the office of the Director of Defense Information. (160:10)

Data Definitions. The Defense Information Systems Agency (DISA) is responsible for the DOD standard data dictionary. As of October 1991, the data dictionary included 7115 certified standard data definitions; projections for October 1992 are 50,000+ (163:4). DOD should treat data like any other commodity--reissuable, housed like a spare part in a data-definition warehouse (34:6). As Defense IM policy, "All information systems must use DOD standard data definitions" (53).

Data Standardization. The Packard Commission pointed out problem of data elements in the major DOD planning documents not being not fully consistent (84:VI-6). An article in Defense referenced DOD's commitment to improving the standardization, quality, and consistency of data from its multiple management information systems and to the adoption of single systems in each major functional area of management (60:14). Executive Agent responsibilities for DOD Information Standards were assigned to DISA by the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence). DOD directive 5000.11, "DOD Data Administration," defines policy and assigns responsibilities for DOD data administration.

Effective 1 November 1991, DOD components were required to register and standardize all new (including modified) data elements using the DOD standard data dictionary system (161:2). Additionally, effective 1 January 1992, all new initiatives to develop, modernize, or migrate and information system was required to use data elements registered in the DOD standard data dictionary (161:2). Appleton points out "most businesses assume that the rules controlling their data are consistent, when in fact they aren't. This is why management gets inconsistent, unreliable, conflicting, and contradictory information" (14:145).

Human Factors Program. One of the ways used to increase productivity is by standardizing the appearance of all computer screens. The benefit is gained through increased familiarity with the format and appearance. New systems will appear like previous standardized systems. Strassmann explains: "All new computer screens will have a standard graphic appearance as part of CIM's human factors program. Having standard screens for different systems will increase learning time and achievement and decrease the fear of something new" (160:14). Brewin's article provides further support that there should be one standard graphical user interface so personnel moving from base to base, or even from computer to computer, don't have to relearn software (34:6).

Strassmann concluded his presentation to the House Appropriations Defense Subcommittee with these words:

Even the most ambitious initiatives can succeed only by making steady progress, one step at a time. . . . Since 1955, I have managed many organizations in their quest to meet challenges of the electronic age. Although nothing in my experience - or anyone else's - compares with the scope and demanding schedule of the CIM program, I am convinced that it shall succeed. Our objectives are clear. The human resources at our disposal are equal or better than anything I have ever seen. The technical means are available. The need has never been greater. (160:14-15)

McCashin provides a less emotional synopsis for the success of CIM:

Success with the process requires that the organization embed CIM within virtually every organizational entity. The process requires CIM expertise in both line and staff functions. CIM expertise is not synonymous with automatic data processing skills. It is business expertise coupled with an ability to understand and critical technical issues, particularly those related to applying information technology to business processes. (131:83)

Education Review

The previous background information and discussion have only been a necessary precursor of the evolutionary chronology that provided the impetus for changes in the way DOD, USAF, and AFIT must conduct their financial and information management practices. This section specifically addresses graduate level education and the impact unit cost resourcing will have on the Institute.

Congressional Review of National Education Policy. In April 1989, the U.S. Congress published the Office of Technology Assessment's findings on maintaining the defense technology base. Since technology that ultimately winds up in weapons or other defense systems is either developed or directly sponsored by DOD, "how DOD runs its technology-based programs is therefore of major importance" (169:2). The report stated that the Air Force had recently adopted the position that technology-based programs should be "corporate investment" funded at some fixed fraction of the budget (169:2).

It was reported that the U.S. is not faced with a deep crisis concerning its defense technology base since funding of diverse research and development (R&D) projects takes place. The Services "run a large number of laboratories that do credible--and often outstanding--work and successfully exploit that technology and technology developed elsewhere" (169:4). On the other hand, the study reported that the Defense Technology Base funding has "shortcomings that may be amenable to significant improvement" but which without attention "threaten to intensify these shortcomings and magnify their importance" (169:5). This is why:

U.S. leadership in high-technology industries that are vital to defense is eroding in the face of strong international competition.

Budget restrictions predicted both by Congress and by the Administration will reduce funding for technology base activities at a time when the costs of research and development are increasing.

DOD's ability to compete successfully for key technical and managerial personnel is declining. (169:5)

Competition for key technical and managerial personnel in a market where "government salaries and benefits for technically trained personnel are not generally competitive with either industry or universities" was one of the seven major issues the study addressed. Alternatives for improvement included Congress: 1) loosening up the rigid civil service salary structure; 2) instituting a separate pay scale for scientists and engineers; 3) increasing the number of students in technical disciplines; and 4) attracting good managers of acquisition and technology base programs (169:9). The report blames shortages of graduates on the DOD's inability to take advantage of the large number of foreign graduate students due to security concerns (169:9). Higher Education for Science and Engineering referenced a study on educational alternatives. The study provides a detailed analysis of graduate education and funding. According to the study, "Federal and other support at the graduate level have two major purposes: to cultivate a new generation of scientists and engineers to meet national R&D needs, and to buy research and teaching help at the universities" (168:106). A June 1988 report, Educating Scientists and Engineers: Grade School to Grad School, states "Infrastructure, faculty, and students all need attention, and this intervention is timely" (167:67). The report summarized that Federal funding is needed but that "the Federal role [clarification between Federal and State influence] in alleviating shortages of particular engineering specialties is limited to assisting undergraduate and graduate education, technical training, and continuing education" (167:67). The following gives more detail:

The overall Federal role in science and engineering education, exercised through NSF [National Science Foundation], the Department of Education, and other mission agencies [National Institute of Health, Department of Defense, National Aeronautics and Space Administration, Department of Agriculture, and Department of Energy], is most prominent at the undergraduate and graduate levels. Graduate education relies heavily on Federal student, institutional, and research support. Financial aid programs, Federal research support, and the successive mounting and abandonment of research-intensive domestic and military programs influence the supply and demand for scientists and engineers. (167:18)

"It is impossible to calculate exactly the cost of a single student's graduate education, but an estimate of \$100,000 is not unreasonable" (168:106). "The tuition and fees charged to graduate students fall short of compensating for the actual burden incurred by the university" (168:106). Graduate students obtain support from many sources (see Figure 2-3).

Federal funding for graduate students is direct and indirect. Direct support includes fellowships and loans. Indirect support comes through separate university departments control and dispense the funds for graduate student support. Federal grants are awarded to departments that select students to receive traineeships under the grant (168:107). Other sources of funding came from state education funds, institutional grants, foundations, and corporations (168:109).

The factor driving educational institutions to perform efficiently in a unit cost system is competition. Competition is what OSD's Office of Management Improvement hopes will decrease the cost of higher education (85).

One must, however, be careful using cost as a sole indicator, thereby, allowing quality of education to become secondary. As former AFIT Commandant Colonel Frederick C. Bauer stated "We are concerned about

short-sighted investment strategies that demand instant return on investment" (27:3). Albion points out "the price of poor education will go up" (9:13).

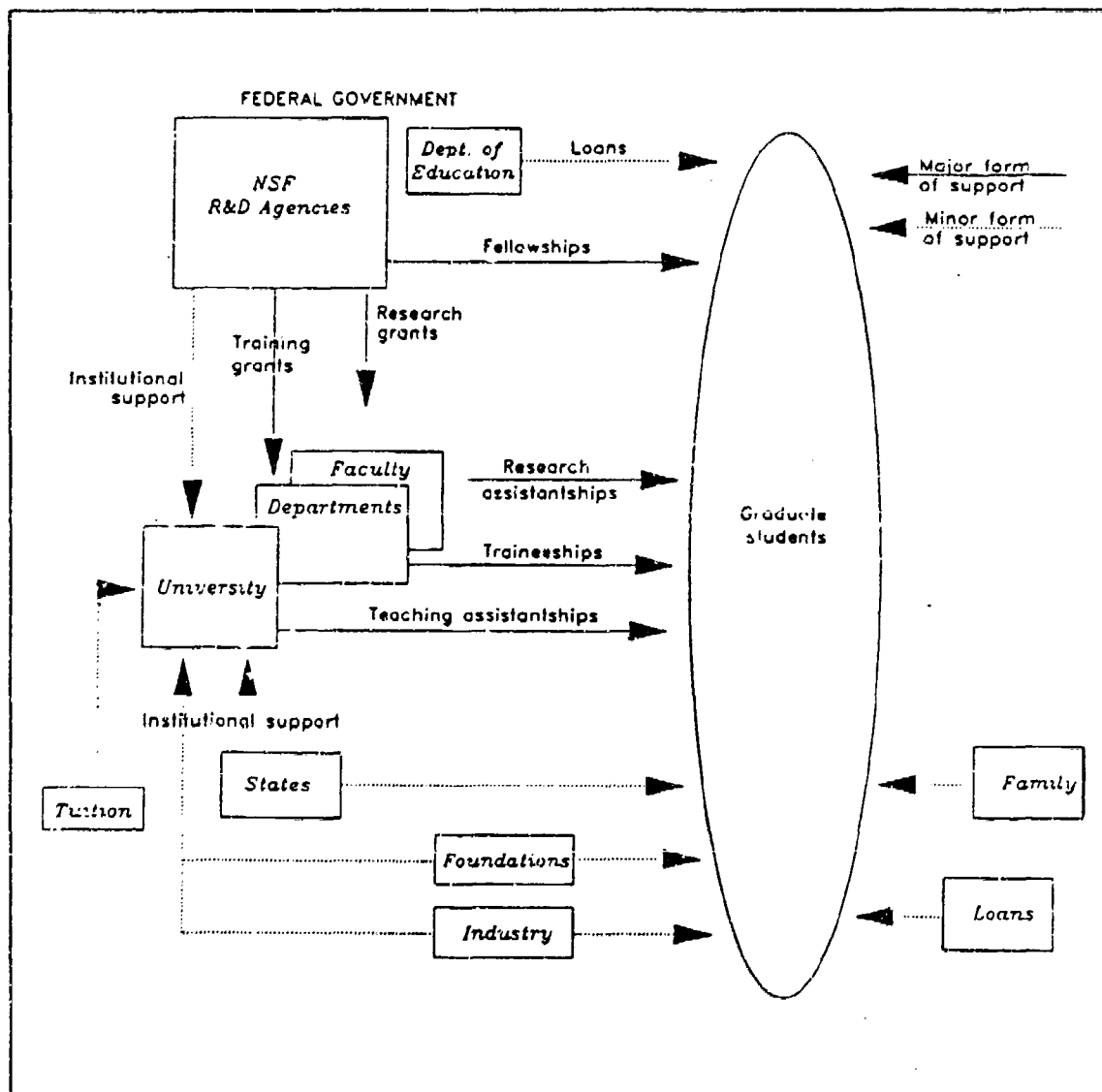


Figure 2-3.

PATHS OF SUPPORT FOR CIVILIAN GRADUATE EDUCATION

Performance Measures of Graduate Schools. Various measures have been suggested as possible indicators of university performance: graduates' first destinations, achievements of students while at the university, graduates' degree results and wastage rates, and unit cost (110:853).

In another study, Higgins examines internal, external, and operating performance indicators (96:358). He notes that due to financial pressures, British universities are undergoing cuts in their budgets in real terms. He defines performance indicator as "a statement, usually quantified, on resources employed and achievements secured in areas relevant to the particular objectives of the enterprise" (96:362). Unit cost is one of many indicators used to evaluate United Kingdom university performance. Higgins reports a list of performance indicators (Table 2-6) from the Report of the Steering Committee for Efficiency Studies in Universities (96:362).

Higgins review focused on the university system's "turbulent environment and some methods of analyzing possible strategies" of university performance (96:361). He noted the environment "indicated very clearly the need for a good management information system" (96:361). The information system should "help assess both inputs and outputs" (96:362).

Cost as a Performance Indicator. Johnes, in a 1990 study, attempts to compare inter-university performances by analyzing unit costs and to use unit costs as a performance indicator (110:853). Johnes defined unit costs simply as "ratio of costs to outputs" (110:853) and more specifically as "the ratio of general expenditure on academic departments to total full-time equivalent students" (110:854). After statistical analysis of university costs, Johnes concludes "there is little scope for using unit costs per se to indicate performance" (110:861).

Table 2-6

PERFORMANCE INDICATORS RECOMMENDED BY JARRATT COMMITTEE

Internal Performance Indicators

- market share of undergraduate applications (by subject)
- graduation rates and classes of degrees
- attraction of masters and doctoral students
- success rate of higher degrees (and time taken)
- attraction of research funds
- teaching quality

External Performance Indicators

- acceptability of graduates (postgraduates) in employment
- first destination of graduates (postgraduates)
- reputation judged by external reviews
- publications by staff and citations
- patents, inventions, consultancies
- membership, prizes, medals of learned societies
- papers at conferences

Operating Performance Indicators

- unit costs
- staff/student ratios
- class sizes
- staff workloads
- library stock availability
- computing availability

Source: Higgins, J. C. "Performance Measurements in Universities," European Journal of Operations Research, 38: 358-368 (15 February 1989).

Prior to drawing conclusions about the relative efficiency of universities by comparing unit costs, more needs to be known about the quality of each university's outputs (110:861). Ovsiew quotes Burke: "Unit costs require (1) a unit of measure which is unchanging, (2) a uniform cost-accounting system, and

(3) uniform standards or specifications for describing the good or service whose cost is to be compared" (138:287).

Organizational Directions of Education. Vicere states that forces of economic, technological, social, and political change have dramatically altered traditional measures of organizational effectiveness (172:xi). He goes on to state that:

As firm's struggle to develop new strategies, structures, and process to deal with these forces for change, the continuous renewal and development of executives throughout their careers have become prerequisites for organizational effectiveness and a core source of competitive advantage. (172:xi)

According to Fulmer, corporate internal efforts to train and educate their employees are "outpacing even the growth of university programs" (78:57). Fulmer cites a 1985 Carnegie Foundation report that estimated annual corporate educational expenses are approaching the US \$40-60 billion total expenditure of four-year colleges and graduate schools (78:57).

Nearly eight million employees are involved in corporate education programs rivaling the enrollment in all colleges and universities. Eighteen corporations have established post-secondary institutions, which offer degrees ranging from the two year AA degree to PhDs. (78:57)

Fulmer says the reason for a resurgence in popularity of business courses is "the complex interplay of technological, social, economic and political developments" (78:57). Several studies reported by Fulmer concluded that "technology is the key to regaining competitive superiority. Each new technological advance brings a need to teach new skills to those who will use it (78:57). "Education is a vital strategic resource that our Air Force needs (now more than ever) to manage in the long-term, no matter how fast changes come at us" (27:3). Fulmer documented a Columbia University Graduate School of

Business survey that explained one of the rationales for providing employee education: "stability in the workforce is one of the prerequisites for company success, and the expectation of promotion is a key to stability" (78:58).

Cost Model. Ackoff suggests that the benefit of a model is the ability to turn the decision making process over to a technical staff or put it on a computer (4:66). To plan successfully, to forecast, and to predict what amounts of money will be available, and what costs will be, Ackoff recommends a financial model:

Successful execution of financial planning requires the ability to forecast the financial position of the company for each year in the planning period and to do so under a wide variety of assumptions about policies and environmental conditions. A financial model of the firm is essential for this purpose. (4:66)

Spending on equipment and facilities is about 15 percent of academic science and engineering expenditures, with facilities taking the major share. . . . Most infrastructure funds come from non-Federal sources. Donations from individuals, foundations, and industry have been fostered by Federal tax policy. The Federal Government supports about 65 percent of equipment expenditures, the Federal share of facilities is now below 10 percent and is declining. (168:145)

Stanford University faculty revolted against the Stanford administration because excessive overhead charges (indirect costs) were levied against their departments' grants. The faculty was upset that "Stanford's overhead--already among the highest in the nation at 74%--would rise to 84% by 1993" (22:292). Federal funding policy permits "full cost recovery" which means that theoretically a university can recover all the money it has spent in support of research" (22:292). The funding policy would fund a \$100,000 grant plus the \$84,000 overhead costs for a total of \$184,000 (22:292). Top winners of research grants receive the following amounts for indirect costs associated with R&D:

Stanford	74%
Columbia	74%
Yale	68%
MIT	62%
Caltech	58%
Berkeley	49% (22:292)

Since funding agencies are pressured to get the most research for their money they may pass over Stanford and fund another university's research (22:292).

Budgeting for Education. "The budget does not itself achieve an educational program, but it is through the budget that achievement is realized" (138:20). The budget is a comprehensive plan for carrying out the strategic plan. The budget should be a functional instrument, purposeful in nature, yet not unnecessarily simplified (so as to be of no practical worth) (138:22). "The budget is not all there is to planning education, but the budget is where virtually all the planning is resolved" (138:20). Ovsiew suggested that the following purposes be "served by the budget:"

- Giving an account of financial stewardship
- Facilitating the control of expenditure
- Identifying key elements in the management of funds, facilities, and personnel
- Appraising the operation of the school program
- Specifying educational objectives in financial plans (138:23)

Special institutional support should be distinguished from another major vehicle of Federal support for university infrastructure, namely indirect costs or overhead--the light bulbs, heating, air conditioning, libraries, copy machines, sewer hookups, and, of course, support staff, which are necessary to all departments. Support for overhead is built into most research and training grants, and is now 25 to 30 percent of R&D support. Infrastructure--building operation and maintenance, building depreciation, and libraries--is about 42 percent of overhead. (168:145)

In every budget situation there ought to be two forces interacting, rather than one dominating force: the effort to reduce the budget and the drive toward improvement (138:46).

Because the budget should interpret the strategic plan in specific dollar terms, the diversity of the data needed to make the decision should be noted. The more data available for the budgeting process--the more certain the decision making process.

Quality Faculty Build a Quality University. "The budget is not only a distribution of money, it is a way to make money work for quality" (138:20).

Quality of personnel depends considerably upon economic well-being of school personnel greatly influence the attainment of educational objectives. Quality of personnel depends considerably upon economic and welfare provisions in the budget designed to attract, improve, and retain persons of competency. (138:256)

Selection and retention of incompetent personnel, lack of job specifications for teaching and administrative positions, schedules which do not utilize personnel efficiently, absence of adequate measures for coordinating and supervising personnel, and unwillingness or inability on the part of the administrative staff to appraise services being rendered are examples of the potential for dissipating funds. (138:256)

The greatest waste of public funds in education results from failure to employ personnel that are competent enough to attain the objectives of the service for which they are employed. It is far better to leave a position unfilled than to fill it with an incompetent or misfit. The fact that inefficient personnel are paid less than that of the efficient or that it was necessary to hire someone to keep an operation going does not indicate economy. If the purposes of the operation were not attained, there was no economy in the attainment of results with the minimum use of personnel. (138:260)

Distance Learning. As universities searched for non-traditional ways to meet the educational needs of part-time students, they found that the demand for such services increased and costs decreased. The Office of Technology

Assessment listed the following trends that are driving greater use of televised, computerized, and distance education:

- the high and rising proportion of students who are employed and studying part time;
- technical improvements;
- cost decreases and economies of scale as more users get on the systems;
- the high cost of release time and commuting time for employees to take courses in traditional classrooms;
- the higher demand for continuing technical education to maintain work force competence and improve productivity;
- employee and union interest in continuing education; pressure for education as employee benefits; worker satisfaction;
- market pressure on universities to find new sources of revenue and new services to provide; and
- the rise of non-university educational providers. (168:240)

Long-distance education has opened up new opportunities for graduate students, especially part-time and continuing education students. Videotaped electronic instruction can be transmitted at various times to distant classrooms or at job sites. The lecture can be transmitted live or taped for future transmission (168:215). "Video and electronic technologies make access to education convenient, flexible, broader, and less expensive" (168:216). The Association for Media-Based Continuing Education for Engineers (AMCEE), founded in 1976, offers more than 550 video courses from 33 universities to thousands of engineering students (168:216).

Established in 1982 as a long-distance educational institute, "televersity," the National Technological University (NTU), Fort Collins, Colorado, began offering courses by satellite. NTU offers courses by satellite communications to technical staff at corporate and educational centers. "Technical professionals can thus keep their skills up-to-date without the disruption and expense of

leaves of absence. Twenty-eight universities and 60 sponsoring corporations and government agencies nominate students for NTU course work" (116:34).

Summary

The Defense Business Operations Fund (DBOF) will incorporate a DOD-wide unit cost resourcing (UCR) system for several major functional areas to enhance visibility of costs and to contribute to better resource management.

DMRD 971 initially stated UCR would be implemented within all organizations by 1993. UCR is nothing more than a concept that all of the costs incurred in an activity should find their way into some output measure. The basic impetus behind current UCR initiatives is cost reduction; however, unit costing is not, in itself, cost reduction. No savings are directly attributable to unit cost resourcing. They are only realized as processes are changed or eliminated and the effects of those changes are reflected in the actual cost per output. Unit costing only identifies costs--it does not automatically reduce or eliminate them but does provide the means to identify and reduce or eliminate the cost drivers.

Corporate Information Management (CIM) is an effort on the part of DOD to reduce its information costs. The primary objective of CIM, however, is business process improvement. CIM is expected to have widespread cost savings across DOD. Improved information management acts as an enabler for many DMR initiatives and their associated costs savings. In fact, the targeted savings as a result of the CIM initiative are estimated to be fully half of the \$70 billion DOD is to slash from its budget from 1991-1997. DOD spends millions annually on education and training. Cost reductions through business process improvement are critical in this area and have a direct impact on the Air Force Institute of Technology.

The factor driving educational institutions to perform efficiently in a unit cost system is competition. OSD expects that competition will decrease the cost of its expenditures on higher education. However, it is imperative that cost not be the sole indicator in determining the comparative worth of education--as this allows quality of education to become secondary. In every budget situation, there ought to be two forces interacting, rather than one dominating force: the effort to reduce the budget and the drive toward improvement. Quality faculty and non-traditional ways of meeting educational needs (e.g., distance education) are methods to maintain a quality educational service at reduced costs.

As DBOF becomes a reality and unit costing affixes all costs to a product or service, DOD organizations will find it necessary to become more competitive in their specialties. CIM, using business process improvement, will be the DOD's major cost reduction enabler. These two programs will directly impact AFIT and force a complete review of the way it currently does business and identify improvements necessary to reduce costs and improve quality.

III. LITERATURE REVIEW

Chapter Overview

This chapter provides a review of strategic information systems planning needs, procedures, and potential benefits; comparison of two of the most common information systems planning methodologies; and an overview of how and why organizations determine their information needs through information requirements analysis.

Information Systems Planning

Background. Manual information systems have been used since the need to gather, classify, and store data and then process that data into information was first recognized. A breakthrough in the 1940s, an electronic computing device, began an evolutionary process that has placed information systems on the level they are found today. Technological advancements continue at an increasing rate. Each new generation of computers introduces improvements in design, speed, size, flexibility, and cost. As the capability of computers grows, we are pushed further into the "information age."

Although electronic computers were developed less than fifty years ago, they have quickly permeated every segment of society. According to Wilkes, "computers are becoming . . . ubiquitous" (181:49). But Kerr believes it is more than that by stating "for the first time since the computer was introduced to the workplace, failure to automate may lead to business failure" (116:1).

Computers are mandatory today--and with that comes the realization that information may be the most significant resource an organization has. The computer has transformed the way the world does business and is now forcing organizations to change their patterns of resource allocation. The information resource must be strategically planned for as have other more traditional resources in the past.

Why is information so suddenly important? Perhaps Johnson has the answer when he states, "Information is data of value to decision making" and, therefore, "Information becomes knowledge. Knowledge becomes power. Power controls, limits, and changes" (113:32).

Information Requirements Analysis. As computers have dropped in price, shrunk in physical size, and expanded in memory capacity, information systems have been developed to meet the needs of more organizations and more people within the organizations. Information requirements analysis has developed from a simple system of checking the out-basket to a series of systematic planning methodologies that have built upon the prior concepts during the last twenty years. In 1974 Alexander explained:

The formal process of information systems design is usually begun by specifying the desired information outputs first and then proceeding backwards through the system to determine the raw data sources and their content, the necessary data-processing systems and the structure of the supporting data files. (9:169)

Alexander's information requirements approach put the emphasis on the system's outputs. According to Alexander, this approach is the "most often followed" approach (9:169). Alexander believes that looking at the outputs of the present system leads "naturally to determining information systems elements and their peculiar interrelations rationally and logically" (9:169). The next stage

is an observation of inputs. To determine the inputs the system analyst should monitor operating personnel who are performing the activities about which data is being collected, staff personnel who originate input messages, and computer personnel managers (9:172). Alexander concludes his information requirements analysis with this summary:

The determination of the raw data requirements for each type of input is generally a straight forward, logical procedure. For every item of information in each report, there must be a corresponding source of raw data entered into the information system as input. Thus the specification of the output report and their contents determines the information inputs the system needs. (9:172)

The nature of an organization's business determines its information requirements. As Ginter and Duncan explain the need for information:

- Increases as the scope or magnitude of the decision under consideration increases.
- Increases as the urgency or timeliness of the decision increase.
- Increases when the decision involves a problem as opposed to an activity that is going well.
- Increases if the decision relates to something which we have less experience.
- Increases as the relationship of the decision to some major long-range plan increase. (84:94)

According to Burch: "information reflects the internal activities of the organization, competitive actions, environmental, and sociological interests, and political and financial trends" (35:31). Since "an exhaustive list of specific information needs appropriate for any and all organizations does not exist," the systems analyst should define and evaluate the organizational factors to provide a "framework for identifying specific information requirements, and use the framework to evaluate proposed changes in the organization and its information system" (35:31,35).

Burch uses a building block approach to show how organizational facts determine the information requirements of an organization. The four factors are nature, size, structure, and management style (35:31-35). The "nature" of an organization's business determines its information requirements. An educational institution requires different information than that of an airline, an insurance company, or a credit bureau. To define the information requirements of a specific organization, it is necessary to understand its business and the inherent relationships to data and information processing (35:33).

As an organization increases in "size," its data processing and information requirements increase. As organizations grow larger and more complex any one individual is limited to the amount of information he can effectively maintain. Burch suggests that this is because the organization is divided into standard business areas such as personnel, finance, security, planning and operations. As a consequence, specific information tends to be identified with that department (35:34). The level of activity within departments and management functions also drives an information requirement according to their needs. Each group has information requirements to meet their own needs and also those above and below them in the organization's hierarchy (35:34). The registrar of a university is responsible for providing information on the incoming student population, demographics, and educational status to the deans of the respective schools.

The "structure" of an organization is a third factor affecting information requirements. Structure describes the organization's physical framework. Is it centralized or decentralized? Is it a conglomerate, a franchise, or a subsystem of a larger system that mandates and directs (35:34-35). The educational institution may have schools located on one campus or at various locations

around the city or state. The structure of specific business functions also varies between organization. Is there a centralized personnel, administration, and finance office, or do each of the subunits have their own?

"Management style" or management philosophy is the fourth organizational factor affecting information requirements. A management style of intensive planning and research rather than intuition, or cost accounting and budgeting rather than spending till the pot is empty require different information. What styles require more data and information processing? According to Burch "a management philosophy incorporating budgets or standard costs concepts generally requires more data and information processing than operating in an environment where only actual costs are measured" (35:35).

After a model has been developed and the variables are defined, the next step is to determine the information needed to run the model. Ackoff says that "models enable us to identify information required to make a decision. Their use assures us that no more information will be provided than is required" (3:98).

The Need for Strategic Information Systems Planning. What information is needed, why, for whom, when, and where are questions that must be answered by management. Solutions must permeate every level of the organization, just as information does, and must be related to a goal, which, in turn, is related to the mission. From a list of do's and don'ts, Peter Drucker adds:

The most important 'do' is to build the organization around information. . . . Everybody . . . all the way up and down, should be expected to take information responsibility. Everyone needs to . . . ask two questions: What information do I need to do my job--from whom, when, and how? And: What information do I owe others so that they can do their job--in what form, and when? (62:115)

There is little doubt that organizations will continue to face risk and competition and, therefore, find it necessary to manage tremendous change and uncertainty. That growing uncertainty has raised the need for efficient strategic information systems. Strategic planning can provide guidance, coherence, and consistency. Importantly, an innovative strategy may: detect soon-to-be problems on the periphery before they adversely impact the organization; provide the solution for real-time problems; or, may reveal unforeseen opportunities. According to Porter:

The questions that good planning seeks to answer--the future direction of competition, the needs of the customer, the likely behavior of competitors, how to gain a competitive advantage--will never lose their relevance. (143:18)

And as King adds, "Strategic planning for the information needs of the organization is both feasible and necessary if the MIS [management information system] is to support the basic purposes and goals of the organization" (117:27). Without a defined, well-articulated strategy to ensure quality information is readily accessible for decision makers, seemingly innocent decisions can have profound consequences. Without relevant information, decisions may be based only on heuristics and the need for expediency--which may not provide the basis for optimum decision-making.

Additionally, it is the job of top management to perceive the enterprise not as it is today but as what it can become in the future (127:113). Strategic information systems planning is technologically important because it allows for future expansion; therefore, a future integrated system must be envisioned from the beginning and the system designed to permit growth (106:147). The strategic plan must be a: living document," providing desired direction, yet flexible enough to change as a dynamic environment dictates.

From Sun Tzu to James Martin, it has been accurately predicted that the transformation of information to knowledge and power is a significant factor which no organizational strategy can succeed without (183:16). Information systems are not a mere collection of hardware, software, and people; they should be structured to fit the organization's strategy and structure and must provide for the information needs of the operational level and the various management levels of the organization (5:142). Martin adds, "The corporation of the future will be a highly computerized enterprise; its competitiveness and its survival depends on how effectively it uses automation" (126:157).

Information systems planning begins with a strategic plan. Porter argues, "Strategic thinking rarely occurs spontaneously. Without formal planning systems, day-to-day concerns tend to prevail. The future is forgotten" (143:17). Without a plan, you risk losing control of your destiny. Adhering to a well-delineated plan keeps you on track, charted toward successful attainment of your goals. Strategic planning gives a consistent approach for assessing opportunities and comparing alternative strategies. It is also the basis for allocating resources to provide the greatest competitive advantage.

The strategic plan is "concerned with the goals and targets of the business" of which these "objectives [see Table 3-1] are normally of great interest to top management" (126:102-104). Ready access to quality, relevant information enables management to make decisions that solve problems or take advantage of opportunities and, in doing so, achieve organizational goals. Accessibility of information, according to Hussain and Hussain, will ultimately transform society as profoundly as did the invention of the jet or the internal combustion engine (105:5). Strategic planning is the process of deciding objectives for the information system function, determining resources required to

obtain these objectives, and on setting policies that are to govern the acquisition, use, and disposition of the resources (5:248).

Table 3-1

OBJECTIVES OF INFORMATION STRATEGY PLANNING

- Investigate how better use of technology can enable an enterprise to gain competitive advantage.
- Establish goals for the enterprise and critical success factors.
- Use critical success factor analysis for steering the enterprise to enable it to better achieve its goals.
- Determine what information can enable management to perform its work better.
- Prioritize the building of information systems in terms of their overall effect on the bottom line.
- Create an overview model of the enterprise, its processes, and information.
- Subdivide the overview model into business areas ready for business area analysis.
- Determine which business areas to analyze first.
- Enable top management to view its enterprise in terms of goals, functions, information, critical success factors, and organization structure.

Source: Martin, James. Information Engineering, Book I: Introduction (p 104).
Englewood Cliffs NJ: Prentice-Hall, Inc., 1989.

Is strategic planning really necessary though? Consider Johnson's statement: "The complexities of today's world are merely a foundation for tomorrow's anxieties" (113:32). In DOD's tumultuous environment that DOD is facing, "strategic planning is even more important in OSD than in the corporate firm" (51:5). However, "budget considerations, rather than strategy, have come

to dominate the functions of the OSD PPBS [Planning, Programming and Budgeting System]" (51:5).

If, as outlined earlier, DOD is committed to business process improvement under the CIM program, strategic information systems planning (see Table 3-2) would support this policy to the fullest. As Brimson suggests:

Organizations must have information to provide the necessary understanding of the factors they can influence. . . . In other words, organizations that have relevant and timely information have a much greater chance of making successful decisions. (34:4)

And, as pointed out, the CIM program will require a new mindset about how to conduct business to include how DOD conducts its strategic information systems planning. As Machiavelli stated:

It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order, and only lukewarm defenders in all those who could profit by the new order. This lukewarmness arises partly from fear of their adversaries, who have the laws in their favor, and partly from the incredulity of mankind, who do not truly believe in anything new until they have had an actual experience of it. (105:385)

Although information systems may provide intended results, many organizations give little thought to the potential value of serving overall organizational objectives with systems capable of sharing data among executives (32:19). As Jackson reported from a study conducted by Kearney, Management Consultants, "top management still feels uncomfortable with viewing information as a company asset or resource. Senior executives have a difficult time dealing with what they perceive as an intangible asset" (110:1). Lederer and Mendelow also provide support through their research. They found

Table 3-2

STRATEGIC INFORMATION SYSTEMS PLANNING

Phase I - SITUATION ANALYSIS

- A. Identify Business Issues and Objectives**
 - Describe business requirements, process, and functions
 - Describe and assess current business systems
- B. Identify Information Services Issues and Objectives**
 - Describe and assess current IS capabilities
 - Assess current and possible technology
 - Identify information services issues
- C. Develop Strategic Systems Objectives**

Phase II - BUSINESS PLANNING

- A. Analyze Business Plans**
 - Review business planning process
 - Describe plan business functions to be automated
 - Outline plans linkage between business and IS plans
- B. Describe Objectives for the System**
 - Identify operational business objectives
 - State management goals for the system
 - Make business forecasts of activity and volume
- C. Prepare Strategic Analysis**
 - Summarize strategic inputs and assumptions
 - Perform strategic analyses
 - Correlate strategic inputs with business issues
 - Summarize the strategic issues
 - Agree on the critical success factors

Phase III - INFORMATION SERVICES PLANNING

- A. Develop IS Issues and Requirements**
 - Correlate IS issues with strategic inputs
 - State IS objectives and opportunities
- B. Propose IS Options and Alternatives**
 - Alternative system solution strategies
 - Alternative organizational arrangements
 - Alternative equipment and software strategies
 - Alternative communications strategies
 - Describe strength and weaknesses of the options
- C. Create Impact Statements**

Table continued on following page

Table 3-2 Continued

STRATEGIC INFORMATION SYSTEMS PLANNING CONTINUED

Phase IV - SETTING STRATEGIC PRIORITIES

- A. Establish Evaluation Criteria**
- B. Perform Investment and Cost-Benefit Analysis**
- C. Establish Priority Ranking of Options**
- D. Make Funding Recommendations**

Phase V - REPORTING THE STRATEGIC PLAN

- A. Describe Proposed Architecture**
 - Business system architecture
 - Data processing systems architecture
- B. Describe Proposed Strategies**
 - Refine and tune business objectives
 - Strategic systems alternatives
 - Organizational strategy alternatives
 - Equipment and software strategy alternatives
 - Communications strategy alternatives
- C. Compare Systems to Available Resources**
- D. Develop Strategic Plan Document**
- E. Obtain Necessary Management Commitments**

Phase VI - OPERATIONAL PLANNING

- A. Enter Systems Analysis Phase of System Development Life Cycle**
- B. Proceed with System Development**

Source: Information Systems Planning for Competitive Advantage (pp 159-161).
Wellesley MA: QED Information Sciences, Inc., 1989.

that successful information systems planning requires senior management to fundamentally change their attitude about the strategic use of the information systems resource if the organization is to realize the potential strategic impact that the information system can deliver (122:245-247).

The traditional approach to strategic planning is planning in response to business initiative, while much of the current thinking is planning information systems to create business initiatives--the first approach is reactive, while the second is proactive (107:6). For an application to become a strategic advantage, technology follows mission; form follows function, similar to good architecture (160:165).

Greene points out that to realize value from information systems strategic planning management should:

- Define an explicit planning scope.
- Exclude issues and opportunities that can be handled as part of business-as-usual lines of responsibility.
- Restrain the amount of detail to only what is necessary to support the recommendations.
- Insist on measurable quality. The plan should be understandable to decision makers and decision implementers; make testable claims about problems, costs, and targets; and recommend concrete actions by specific people or organizations. It should also be flexible to implement, accommodating changing circumstances, and be protected by explicit contingency planning. (88:70)

Integrating management information systems into a business demands articulating systems strategies (160:161). No longer should information systems planning be driven by the internal estimates of machine size and systems analysts required for planned projects--it must be driven by the strategic needs of the organization to accomplish objectives and meet competition (107:55). As

Finkelstein relates, "Planning requires a deep knowledge of the business--not computers. The computers are only a tool. The business is the subject" (71:5).

Weishoff points out, "Long-range planning is a very complex and dynamic discipline that shows the interrelationship between many organizational variables, and a process where there is no one best answer" (177:1). Top-level managers are aware of the need for comprehensive strategic planning, but still shirk the task. As Wilkes puts it, "The perceived need for strategic use of the information system resource has been described widely in information system literature. But . . . there is little evidence of a 'track record' by organizations in developing strategic information systems (SIS)" (181:50).

Information systems technology places a burden on managers as they must understand what the systems can do and, importantly, participate in their development. Possibly, as Strassmann points out, "since the strategic uses of computers are so new, many executives misunderstand how to blend them into their organizations" (160:188). Possibly, because Strategic Information Systems Planning requires too many resources, top management commitment is not easily obtained (121:457). Also, strategic planning for information systems requires meticulous documentation (160:161). Linking business strategies, people, and information technology is one of the most challenging problems businesses face today (73:3). MacDonald highlights the awareness and recognizes the additional, but necessary task:

Today's enterprises are aware of the strategic value of information technology. . . . They recognize that today's technology is fast becoming highly integrated and recognize that this allows them, in turn, to adopt a highly integrated approach to their development of systems. . . . The thrust of information systems development today has moved away from the piecemeal, single-system-at-a-time, problem-driven approach to become planned, broadly-integrated,

and strategically oriented--providing a full range of information sharing capabilities for the whole enterprise. This does however impose additional demands. . . . A planned information system strategy is a fundamental requirement for producing enterprise-wide systems. . . . (124:393)

Top management is responsible for strategic planning and modifying organizational strategies to take full advantage of the information resource. As Martin points out, "As technology increases the opportunities and competitive threats, so it becomes increasingly vital for the CEO to work with his top computer executives to identify the new opportunities and how technology can best be put to work" (126:157). Martin lists several potential benefits from information strategy planning (see Table 3-3). Firdman also points out, "that the strategic planning process is much more important than the resulting strategic plan. The strategic plan will imminently change, and even the effects of successful plan execution will never be exactly the same as the planned ones" (73:33).

According to Wilmeth, "The technology of processing information is the technology that purports direction to all other technologies and determines the relative effectiveness of achieving organizational-related goals and objectives" (183:16). Jackson adds, "Information, apart from having direct value, may be viewed as a corporate resource in that it facilitates the management of other corporate resources" (110:6).

Firdman provides further support:

. . . information technology by itself does not guarantee success if it is not understood in the context of the enterprise's corporate-specific strategic objectives and the ways in which a certain combination of information technologies can help achieve these objectives. (73:xi)

Table 3-3

POTENTIAL BENEFITS OF INFORMATION STRATEGY PLANNING

To Executive Management:

- An assessment of the opportunities from new technology
- An assessment of how the corporation should be changed strategically to attack competition better
- An assessment of the competitive threats from new technology
- Adoption of the strategic business plan to accommodate five-year technology trends
- An assessment of the factors most critical for success
- Translation of the critical success factors into actions in building information systems, decision-support systems and manager motivations, and control mechanisms
- A defined logical approach to aid in solving management control problems from a business perspective
- An evaluation of the effectiveness of current information systems
- An assessment of future information system needs based on business-related impacts and priorities
- A planned approach that will allow an early return on the company's information systems investment
- Information systems that are relatively independent of organization structure

To Functional and Operational Management:

- An assessment of goals and problems, and identification of computing facilities that can help with these
- An assessment of the factors most critical for success
- Translation of these factors into actions in building appropriate systems
- A defined logical approach to solving management control and operational control problems

Table continued on next page

Table 3-3 Continued

POTENTIAL BENEFITS OF INFORMATION STRATEGY PLANNING

To Functional and Operational Management (continued):

- Top management involvement in establishing organizational goals and direction
- Increased probability of having the most valuable systems built
- Consistent data to be used and shared by all others
- Systems that are management and user oriented rather than data-processing oriented

To Information Systems Management:

- Effective communication with top management
- Top-management support and interest in systems
- Better planning of systems that respond to business needs
- A long-range planning base for data processing resources and funding
- Agreed-upon system priorities
- Higher probability of delivering systems that are really useful

Source: Martin, James. Information Engineering, Book II: Planning and Analysis (pp 31-32). Englewood Cliffs NJ: Prentice-Hall, Inc., 1989.

As Strassmann points out:

The CEO must have a personal and close understanding about the direction of information technology; not technical knowledge, but a thorough comprehension about its potential competitive impacts. The CEO should set the broad priorities for information technology investments and then get the finest talent in the industry to execute the strategic directions. After that, the CEO needs to allocate sufficient time to make sure that the information resources do not fail for lack of attention and money. (160:187)

Strassmann indicates that DOD has "chosen information technology as one of the tools to achieve DMR results" but emphasizes that "CIM should not be seen as an information technology program" (162:2). According to Diesem,

"Information technology, properly applied, can at least result in reduced operating costs, and, possibly, in new products or services" (58:44).

Information technologies are no longer a luxury—they are a necessity (25:3). This does not mean an organization must purchase all of the latest state-of-the-art technology that comes on the market. Nor does it suggest obtaining advanced technologies as "gold-plated" acquisitions by DOD. As Kerr states, "Gone are the days of implementing technology for technology's sake" (116:218). What this means is the organization must use the latest technology available that is economically feasible for achieving defined goals and responding to increased competitive pressure. Well-planned technology strategies reduce costs (160:162). One of the findings of the Packard Commission was that DOD was not employing technology to reduce cost as was being done in the private sector (85:ES-6).

But there are difficulties in applying strategic planning to the information technology and information resources areas. As Martin points out:

Information strategy planning has two overall purposes: to link information technology planning to strategic business planning, and to create an architectural framework into which further analysis and design will fit so that separately developed systems will work together. (127:18-19)

Strassmann further points out that "it should not come as a surprise that companies without concrete plans tie up much time in meetings about priorities (160:163).

Barlow, looking at the glass half empty, recognizes the need to also control the information technology acquisition nightmare by corporate strategic planning. He explains:

Although many companies have cost-cutting information systems in place, management is unable to evaluate the benefits in financial terms. Organizations are therefore formulating strategic plans of action to deal more effectively with information technology (IT), particularly as a means of gaining competitive advantage. (22:6)

Budget and acquisition authority had failed to manage the large number of different computer systems that were being requested by the users of the various systems. End user computer acquisition has one advantage: "It places responsibility squarely in the hands of the user department" (57:23). But this is also a disadvantage, "It lacks a conceptual approach to corporate information systems development. It makes it difficult to standardize related systems. And often, adequate support from data processing experts is not available. . ." (57:23-24).

The result of end user acquisition is chaos. "If information cannot be moved at will, analyzed, stored securely and economically, and recalled at will, then the organization might be better off without it" (57:35). Stapelton claims that NASA's computing environment is a classic example of what happens to an organization when it chooses not to plan its systems architecture:

Virtually hundreds of stand-alone applications are sprinkled throughout NASA. These isolated systems are difficult to integrate because they're built on incompatible platforms and use inconsistent data definitions. Scientists, in the midst of research, sometimes have to wait months for important information to be reformatted for their use—a delay that literally makes it impossible to get the space program off the ground. (116:12)

Higgins and Vincze expound that the "two major problems in a nonprofit organization are the absence of a clearly defined mission and the absence of related clearly defined objectives" (99:270). Though standardization controls in the procurement process have limited (to some degree) the variety of hardware

and software purchased, new systems are often incompatible with previously purchased equipment.

Over the past thirty years, the rapid evolution and spread of information systems technologies has created a major new set of managerial changes (184:41). Information resource managers wrestle with the best method to provide a unified, comprehensive, integrated strategic organizational information systems plan that will take advantage of the immense power of the computer and provide the desired direction for the development of information systems within an organization. According to Hackathorn and Karimi:

Without a solid grasp of how the organizational goals are translated into an overall architecture, an organization pursues the development of the information systems according to a short-term perspective of isolated applications. Thus, a fragmented information system results that hinders the ability of the organization to respond to changing environments. (92:203)

Over the last ten years many studies on information system planning methodologies have been published. The term information systems planning methodology is used in the sense of a methodological approach to information systems planning, analysis, and design (139:1). The focus of each study differs and brings out unique views, problems, and contributions for the information resources manager to weigh before beginning his planning operation.

The success of an organization's information system planning process depends on the organization's structure, the level of information technology experience, and the availability of information resources (22:7; 121:459; 47:130). Barlow concludes: "Since these factors are not the same for any two firms, it follows that there is no single best way to view information [systems] technology planning" (22:7). What is apparent is that technology decisions can no longer be delegated by managers to computer techies. As Davenport *et al* point out,

"Information technology affects the entire organization in delegating such important decisions doesn't ensure information technology will work—in fact, it practically guarantees it won't" (47:130).

Information technology continues in a state of rapid evolution. Change in this arena has been constant since the earliest computers began commercial operation and "will undoubtedly continue at an accelerating pace" (34:40). This rate of change implies management planning is even more useful in this area and should be applied. Top management must have the vision to see strategic opportunity for information technology. It would appear, however, that much planning is actually done via a bottom-up approach and defined by operational needs, i.e., not planning but a reactive mode to change requests. Because of its strategic impact, planning for information systems should be both top-down and bottom-up, closely integrated with the objectives of the organization.

According to Lederer and Sethi, Business Systems Planning (BSP) and Information Engineering (IE) have been proven effective for aligning strategic and information systems planning (121:448; 31:62-78). As mentioned in Chapter I, this research effort focused only on BSP and IE. Both of these approaches stress the planning involved in developing information systems. Regardless of the methodology used, however, it should be understood that the starting point of any methodology is an attempt to ensure that the information systems chosen to be developed are those that most warrant development in a competing environment (16:171).

Business Systems Planning (BSP)

BSP, developed in the late 1960s by IBM, was the first systems development methodology to emphasize data as a corporate resource and to

recognize the need to link information systems planning to strategic planning. One of the most important deliverables of BSP is the data model showing what data the organization needs to do its business (32:31). BSP looks at the organization's information needs "in the broadest possible scope, that is BSP is 'Enterprise Analysis'" (185:32-33). It does this by looking at the functions of the business, the data needed to perform those activities, and relationships between the two (185:33). Jackson provides a list of potential benefits from BSP (see Table 3-4).

Table 3-4

BUSINESS SYSTEMS PLANNING BENEFITS

- An impartial establishment of information systems priorities
- The management of data processing resources
- The development of long-life systems
- Increased confidence in information systems investments
- Better relationships between information systems and their users
- An awareness that data are a resource to be used by everyone

Source: Jackson, Ivan F. Corporate Information Management (p 86). Englewood Cliffs NJ: Prentice-Hall, Inc., 1986.

As Avison and Fitzgerald explain, BSP follows three principles:

- The first stresses the need for an organization-wide perspective... [of] strategic management.
- The second suggests analysis from top management downwards (but implementation from the detailed level upwards).

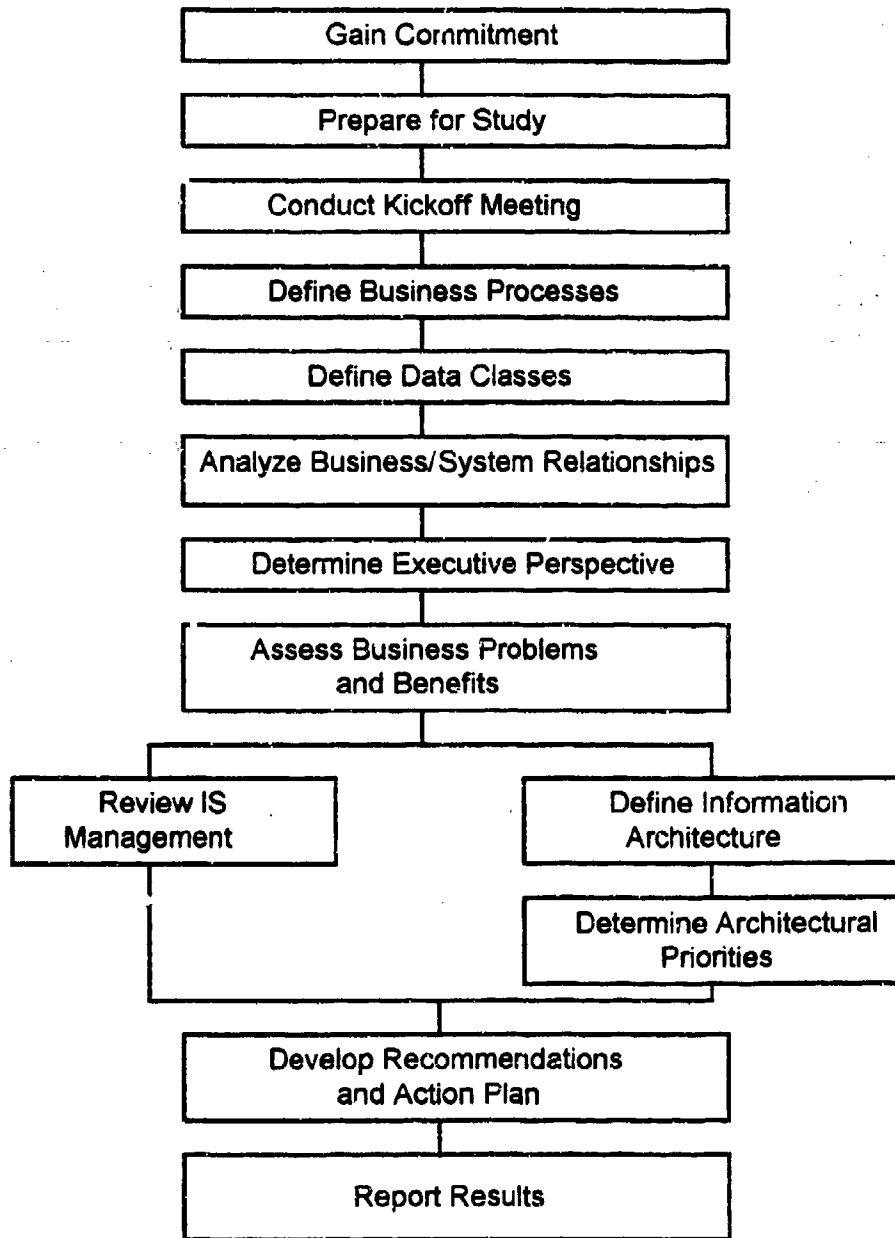
- The final principle establishes the need for independence of the business plan from the computer application systems. (16:32-33)

The key to the success of the BSP approach is in gaining the commitment of top management (110:86). Jackson explains that in using BSP "business processes are identified, defined, and grouped into logically related decisions and activities. Key areas are identified and form the basis for prioritizing developments" (110:86). The phases of BSP are:

- Identification of requirements.
- Definition of requirements.
- General design.
- Detailed design.
- Development and test.
- Installation.
- Operation. (16:33)

BSP provides a structured top-down design and bottom-up implementation methodology for organizations to deal with information flow within an organization (see Figure 3-1). It displays the information/subsystem relationships and the processes supported by each subsystem. The results provide a foundation for informed decision making (63:55). Davis explains BSP as a comprehensive IBM methodology for linking the data to the business processes:

Information requirements are derived from the object system in a top-down fashion by starting with business objectives and then defining business process. Business processes are used as the basis for data collection and analysis. In interviews to clarify processes, executives are also asked to specify key success factors and to identify problems. Logically related categories of data are identified and related to business processes. This information is used in defining a proposed information architecture. Based on current status and proposed architecture, application priorities are established and migration to data bases planned. (80:252)



Source: Jackson, Ivan F. Corporate Information Management (p 87). Englewood Cliffs NJ: Prentice-Hall, Inc., 1986.

Figure 3-1

BUSINESS SYSTEMS PLANNING (BSP) METHODOLOGY

BSP uses a top-down information needs approach and a bottom-up information system implementation (?2:9). BSP is an analysis of the organization's information needs and plan "to fill gap" between what it has and what it doesn't (149:84). Rockart adds:

In a two-phased approach, many managers are interviewed . . . to determine their environment, objectives, key decisions, and information needs. . . . The objectives of the process are to develop an overall understanding of the business, the information necessary to manage the business, and the existing information systems. Gaps between information systems that are needed and those currently in place are noted. A plan for implementing new systems to fill the observed gaps is then developed. (149:84)

Barlow explains that although BSP initially defines the processes of an organization, the processes are used to primarily determine data needs not as an analysis of the processes themselves (22:9). BSP is "data-driven rather than process-driven, i.e., data and data relationships are independent of process flow but dependent on business policy" (22:9). Table 3-5 describes the BSP study steps. Lederer and Sethi capture the total organizational involvement for BSP:

In this methodology, a firm recognizes its business mission, objectives, and functions, and how these determine its business processes. The processes are analyzed for their data needs, and data classes are then identified. Databases are developed by combining similar data classes. The final BSP plan describes an overall information system architecture as well as the installation schedule of individual systems. (121:447)

Zachman, an IBM Business Systems Planning Consultant, explained BSP this way:

BSP attempts to describe the business as it exists right now. BSP makes attempts to describe the business in not a generic fashion, but a fashion that eliminates some of the variableness of the business. In other words, BSP focuses on what the business is rather than how the business works. (185:22)

Table 3-5

DESCRIPTION OF BSP STUDY STEPS

- Gaining Executive Commitment:** A top executive sponsor and various other interested executives are identified as the major sources of information to the study. A team leader, perhaps the sponsor, is identified to spend full time leading the study team of 4 to 7 executives.
- Preparing for the Study:** Team members are trained in BSP. They compile data on firm's business functions and current IS support, and produce a work plan, interview schedule, review schedule, and final report outline.
- Starting the Study:** The executive sponsor reviews the study's purpose with the team. The team leader reviews the compiled business data and the top IS executive explains recent IS activities and problems to the team.
- Defining Business Processes:** The study team identifies the business processes which form the basis for executive interviews, the definition of the future information architecture, and other study activities.
- Defining Data Classes:** Data are grouped into categories called data classes based on their relationships to the business processes identified above. Charts are built to reflect those relationships.
- Analyzing Support:** The study team identifies how IS currently supports the organization. The team develops charts showing organizational processes and the responsible departments.
- Determining the Executive Perspective:** Executive interviews gain the commitment of additional executives and help the study team understand the problems whose solutions will be represented by the future systems.
- Defining Findings and Conclusions:** The study team develops categories of findings and conclusions and then classifies previously identified problems into the categories.
- Defining the Information Architecture:** The study team uses the business processes and data classes to design databases. The team prepares charts relating the processes to the classes and the systems to subsystems.
- Determining Architectural Priorities:** The team sets systems development priorities based on potential financial and non-financial benefits, likelihood of success, and the organization's demand for each system.
- Reviewing Information Resource Management:** The study team evaluates the current IS organization's strengths and weaknesses. A steering committee is established to set policy and control the function.
- Developing Recommendations and Action Plan:** The team prepares an action plan with recommendations about hardware, software, adjustments to current systems, and methods of strengthening IS management.
- Reporting Results:** The study team gives a talk along with a brief summary and a more detailed (usually very thick) report covering the study's purpose, methodology, conclusions, recommendations and prescribed actions.

Source: Lederer, Albert L. and Vijay Sethi. "The Implementation of Strategic Information Systems Planning Methodologies," MIS Quarterly, 12: 444-461 (September 1988).

The focus of BSP--what the business is--is one of the greatest differences between BSP and Information Engineering, which focuses on not only what the business is but what it should be.

Information Engineering (IE)

IE was developed in the 1970s by James Martin and Clive Finkelstein as a strategic information systems development methodology to support the entire life-cycle of information as a valued resource (121:449). Information Engineering is an integrated set of techniques based on corporate strategic planning, which results in the analysis, design, and development of systems which support those plans exactly (72:231-232). Martin states, "IE should not be regarded as one rigid methodology, but rather, . . . as a generic class of methodologies" (126:1). He further adds "these variants have in common the characteristics listed" in Table 3-6.

Brathwaite claims "the premise of Information Engineering is that data be at the center of modern data processing" (32:31). As Kerr explains, Information Engineering is composed of four interdependent analysis disciplines:

- Business modeling is used to determine the scope and boundary of a project proposal;
- Data modeling is used to discover the data required to support the business model;
- Process modeling is used to document the . . . rules for the data defined in the data model; and
- Enterprise modeling is used to create a repository of previously defined data and process models that promotes the reuse of application programs and data base designs. (116:136)

Table 3-6

CHARACTERISTICS OF INFORMATION ENGINEERING

- IE applies structured techniques on an enterprise-wide basis, or to a larger sector of an enterprise, rather than on a project-wide basis.
- IE progresses in a top-down fashion through the following stages:
 - Enterprise strategic systems planning
 - Enterprise information planning
 - Business area analysis
 - System design
 - Construction
 - Cutover
- As it progresses through these stages, IE builds a steadily evolving repository (encyclopedia) of knowledge about the enterprise, its data models, process models, and system designs.
- IE creates a framework for developing a computerized enterprise.
- Separately developed systems fit into this framework.
- Within the framework, systems can be built and modified quickly using automated tools.
- The enterprise-wide approach makes it possible to achieve coordination among separately built systems, and facilitates the maximum use of reusable design and reusable code.
- IE involves end users strongly at each of the stages above.
- IE facilitates the long-term *evolution* of systems.
- IE identifies how computing can best aid the strategic goals of the enterprise.

Source: Martin, James. Information Engineering, Book I: Introduction (p. 2). Englewood Cliffs NJ: Prentice-Hall, Inc., 1989.

According to Inmon:

The foundations of Information Engineering include the recognition of the separation of primitive and derived data, the notion of a target architecture, the need for a data model, the need to integrate

between the data and the process model, and the ability to gracefully migrate to the architecture from existing systems. (108:vii)

Leland Freeman points out that IE is "a top-down methodology which first identifies the application to be supported and should be used to initiate the evaluation process" and adds, "approaches such as Information Engineering studies will help to identify those applications that will yield the highest payoff." (76:18). Information Engineering is a systematic, top-down, planning methodology that is data oriented and objectives driven. Information Engineering was partially developed because traditional strategic planning did not provide management with the information that was needed. Traditional strategic planning:

- Presents limited alternatives.
- Provides ineffective communication, open to misinterpretation.
- Suffers from long feedback cycles.
- Fails to incorporate effective performance monitoring. (71:2)

Through interviews and questionnaires, Information Engineering identifies and models data required to run an organization. Information Engineering uses three levels of models to provide information and to support all the decisions makers in an organization:

1. Strategic: an architectural plan, providing the 'big picture' of what we intend to accomplish.
2. Tactical: a floor plan that begins to flush out the detail and lets us interpret the strategic model.
3. Operational: a detailed set of instructions on how to proceed (using this method, the operational model can be a collection of separate modules that are developed in parallel--thus reducing development time). (71:3)

The result is an integrated data model capable of being shared by all authorized members of the organization. As Finkelstein states, "The one constant we are experiencing in business today is change. Therefore, our plans should accommodate that phenomenon: 'We must design for change'" (71:2). Therefore, IE makes possible a high degree of reusable design and code because it identifies common data and common processes across an enterprise (128:40). Reusability, as discussed in the previous chapter, is the multiple use of a single implementation of a function in an application (131:72). The benefits of reusability, as outlined by Martin, are included in Table 3-7.

IE does not automate manual information systems or business routines but through systematic research of the organization's proposed activities of the future, it models the organization according to a new strategic plan (72:233-234). IE identifies data fundamental to an organization (72:33). In translating the corporate focus (the corporate strategic plan) into a logical data model, which is technology independent, IE can directly translate that model into an application and/or data base system(s) (110:90).

According to Kerr, reusability is the result of IE's enterprise modeling (EM) (115:29). EM ensures that data is reused across the organization. "By practicing EM's methods of data extraction and iterative integration," organizations build integrated systems through practice of data standardization and reusability (115:29).

The complexity of design of effective computer systems is increasing. Acquiring a set of IE tools is also expensive. The alternative, however, is piecemeal systems development which may leave an organization with numerous non-integrated, inflexible systems (32:19).

Table 3-7

BENEFITS OF REUSABILITY

- **Speed of Development.** Systems can be made operational very quickly
- **One-Person Teams.** Development can often be done by one person or by small team. The problems of large teams are avoided.
- **Documentation.** Reusable design should be well documented with workbench tools.
- **Higher Quality.** Reusable designs should be thoroughly thought out, tested, and comprehensive. The resulting product is less likely to have errors, instability, omissions, and misunderstandings.
- **Shared Expertise.** The reusable design may have a high order of shared expertise built into it.
- **Facilitates Learning of Good Design.** The reusable designs should employ the best techniques. Persons who work with them learn these techniques.
- **Complexity.** Algorithms, structures, or knowledge of great complexity may be built into the reusable modules, facilitating the use of powerful techniques.
- **Intercommunication.** The standards imposed by the reusable modules facilitate communication among different systems.
- **Ease of Change.** The reusable modules should be designed and represented by workbench tools such that they are easy to change as possible and as easy to link to other modules.

Source: Martin, James. Information Engineering, Book III: Design and Construction (p 40). Englewood Cliffs NJ: Prentice-Hall, Inc., 1990.

To succeed fully, IE, like BSP, needs top management commitment; it is a corporate-wide activity that needs firm direction from the top (126:26). Information Engineering is a methodology designed as a long-term investment for both acquiring the IE tools and the building of an effective information system. Martin lists multiple benefits of Information Engineering (Table 3-8).

Table 3-8

BENEFITS OF INFORMATION ENGINEERING

- IE helps to identify strategic systems opportunities and achieve competitive advantage by building such systems before the competition.
- IE focuses data processing on the goals of the business.
- IE enables an enterprise to get its act together. Different systems are coordinated. The same data is represented in the same way in different systems. There is integration among systems where needed.
- IE manages information so that key decision makers can have the best information available.
- New systems can be built relatively quickly, using power tools, within the IE framework.
- IE gives the capability to change computerized procedures quickly.
- IE facilitates the building of systems of greater complexity, and the understanding and control of complex links between systems.
- IE permits the long-term evolution of systems. As systems continue to evolve they become a vital corporate resource.
- IE makes possible major savings through the use of reusable design and code.
- IE drastically reduces the maintenance and backlog problems in enterprises that have converted old systems to IE form.
- A fully computerized enterprise cannot be built without IE techniques.
- Corporations trapped with manually built systems will become increasingly unable to compete with corporations with full information engineering.

Source: Martin, James. Information Engineering, Book III: Design and Construction (p.8). Englewood Cliffs NJ: Prentice-Hall, Inc., 1990.

Martin also provides a table of "Payoffs" that may assist in justifying required expenditures and in developing a financial estimate of return on investment (Table 3-9).

Table 3-9

PAYOFFS FROM INFORMATION ENGINEERING

SHORT-TERM PAYOFF:

- Management needs for information are identified and fulfilled rapidly where possible, for example with executive information systems or spreadsheet software.
- Attention is focused in an organized fashion on goals, problems, and critical success factors. Some immediate actions can be taken relating to these. Critical success factor measures are monitored. That which is monitored tends to improve.
- Certain information systems can be built quickly, using power tools, within the IE framework.
- Productivity tools and techniques enable systems to be designed and implemented more quickly, before data modeling and process modeling of the enterprise is completed.

LONG-TERM PAYOFF:

- Strategic uses of technology are identified, leading to the building of strategic information systems. This may have a very high payoff.
- Management understanding of the enterprise is improved, often leading to enterprise reorganization. This is also important but impossible to quantify in advance.
- The same data is represented in the same way in different systems, leading to integration among systems where needed. Without this integration some important information needs cannot be met. IE avoids a Tower of Babel in computerized data.
- Common usage of database systems leads to simpler, less expensive data flows.
- Major savings are made possible through reusable design and code.
- Designing and constructing systems with a workbench and code generator using the IE encyclopedia enables systems to be built much faster and less expensively.
- The costs of maintenance are lowered dramatically.
- Systems can be built quickly when they are needed by the enterprise, partly because of faster development methods and partly because the backlog is reduced. There are major business benefits from fast development when it is needed, such fast response to competitive pressures and the building of strategic systems before competition has them.
- An evolutionary life cycle is supported in which systems can steadily grow in comprehensiveness, becoming uniquely valuable to the enterprise.

Source: Martin, James. Information Engineering, Book I: Introduction (p. 146). Englewood Cliffs NJ: Prentice-Hall, Inc., 1990.

The future belongs to automated methodologies (124:400). Information Engineering holds much promise as a means for creating stable information systems (108:vii). Kerr believes "Information Engineering will become the de-facto development standard of the 1990s" (116:126). Experience with IE has already demonstrated major gains in clarity of expression of business requirements, adherence to standards, speed of progress, completeness of specification and flexibility in work patterns (124:400). Kerr sees that organizations are beginning to absorb the IE learning curve and position themselves to manage the cultural revolution brought about by change (115:35).

Though IE and BSP were developed by and for the business world, several US Government agencies and military services (primarily the Navy) have researched their applicability to the military organization. Since Air Force use of IE and BSP literature has not been published, this review will examine what other military services have written about the two methodologies and identify the shortcomings associated with each.

BSP and IE Shortcomings Review.

A. Training, Education, and Manpower. Data-driven Information Engineering requires not only an educational process to convince the upper management of its effectiveness, but a training process for employees. When developing an IE environment, businesses will often search for and hire people with strong business understanding and good analysis skills (109:92). Worley and Cronauer explain the difficulty of finding a qualified Information Systems Management (ISM) Officer in the US Navy:

Few, if any, commands will have an individual who is educated and trained to fill this position. The authors' intent in discussing this point is to emphasize that until qualified people are available, it is imperative that the position be filled by the most competent person available. . . . There is no specific answer to this question. . . . Ideally, it would be desirable to hire a qualified individual and assign this individual to the commanding officer's principal staff, but the cost, as well as finding one that is truly qualified, may inhibit this option. (184:110)

In 1984, the Purchasing and Contracting Division of Watervliet Arsenal, Watervliet NY, hired a consultant to conduct Computer Integrated Manufacturing/Business Systems Planning (CIM/BSP) and an arsenal-wide study of implementing an Integrated Information System. The head consultant, Cullinane, recommended in his final report that several of Watervliet's designers and engineers be trained in CIM/BSP. After the training course, the designers and engineers would refine the existing architecture and further define and model the areas of the organization which still remained to be studied. Additionally, every project manager would be required to have sufficient knowledge in the modeling technique to create a model for each project proposal. As a result, each project would be reviewed within the context of the arsenal architecture to be certain that all data flows were recognized and total project integration was achieved (82:1-2).

B. Software Rewrite. Because IE calls for sharing of data, many software programs in use will have to be rewritten. Hansel explains that his corporation has very limited sharing of data and as a result, has a lot of redundant data. The redundant data causes data integrity and reliability problems. As it stands now, updated information in one area is not updated in other areas. "Our direction is now toward a data-driven development

environment. Information Engineering methodology will be used to support this" (109:91).

C. Planning Integration. IRM needs to have more political clout. Integration of the IRM strategic planning function with other staff planning functions (on an equivalent level and with equivalent representation) provides the needed interface with organizational managers (25:24). As business becomes more competitive, developing plans and strategies requires brainstorming by business and systems planners together.

D. Network Standardization. IRM needs to establish standards for communications networks that will be capable of transmitting all forms of information throughout the dispersed organization (25:24-25). IRM should provide lead time and budget input for necessary changes needed to distribute data.

E. Environmental Change. Personnel may feel a loss of control. They may feel that they will lose their job, or that they will lose their power of knowledge in a specialized area. Managers may feel that they are being monitored since their department's data is now in the centralized data base. Battaglia recommends using a "change agent." A change agent should be sensitive to human engineering issues in order to promote both productivity and job satisfaction (25:25).

March writes that information engineering has been mis-labeled "the cure-all approach" (125:153). He claims that information engineered decision support systems fail to recognize the behavior of decision makers. "Information engineering might profit from conceptions of decision making and a blend choice theory, tradition, history and culture" (125:154). The value of such an article is

its clear reminder that any methodology or system will fail if the environment in which it is about to be placed is not ready for it.

F. Life Cycle Analysis. Johnson, IRM planner in the Information Resource Management Services Office of Technical Assistance at the General Services Administration, writes that "the life cycle of any information architecture is directly dependent on the measurement and use of information and knowledge as products of that system" (113:33).

A former computer-aided software engineering (CASE) manufacturer, HITECH, closed its doors when it failed to make a profit. It also failed to understand that organizations cannot justify expenses for information systems when they do not know what the information or the information system is actually worth. During 1986, HITECH flew in more than 170 of the nation's top executives to see its CASE tools in action, but only received three small contracts. The former HITECH president explains, "The assumption with our product was that the leading corporations had a common [or standard] life cycle for all their applications development and an effective measure of productivity. Many had neither" (36:23). Ironically, the longer a business waits, the farther it will fall behind. Not understanding the benefits of integrated CASE (ICASE), an MIS executive from a large company adds, "It seems like every new application we create ends up with its own data structure, and none of the data structures are compatible. We simply don't have the support organization for integrated CASE" (36:23-24). From the theory of constraints, the life cycle of the newest system is as young (or new) as the oldest component. Johnson gives an example of a software life cycle problem. Once a software language is obsolete, the usefulness of the information stored within the software is obsolete.

The U.S. Railway Association was set up in 1974 to protect the pensions of railroad employees. It acquired work records back to 1920 and compiled a computer index of the papers, which fill 200,000 cases. When the association went out of business in 1987, the National Archives got the paper and the computer index, written in a program called BASIC, Version 2. BASIC is up to Version 8, which will not read Version 2. The only way to find a record is to paw through the paper. (113:33)

G. Failure to Implement. According to Martin, the fate of many BSP studies is failure to implement. Similarly, studies are done once and never repeated. "The planning process should build a knowledge base that is updated continually" (126:147). The knowledge base that Martin refers to can be done by hand, but "the preferred method is with a strategic planning tool" such as Computer Aided Software Engineering (CASE) for Strategic Planning (126:147).

Military Use of BSP and IE Review.

A. Ho. In 1985, C. W. Ho recommended the use of BSP methodology to design a computer-based information system for the Chinese Marine Corps' Field Maneuver Controlling and Evaluation Operation (FIOP). Ho describes the current FIOP model and its functions. BSP is then defined including its background, underlying concepts and potential benefits. In conclusion, Ho recommends that a steering committee of FIOP users be established to provide guidance to the information systems planners. Secondly, a BSP expert would be hired to act as consultant and coordinator for the planning and implementation process. Lastly, Ho recommends that the implementation plan be evaluated annually for cost effectiveness (101: 49-50).

B. Mascarenhas. A year later, Mascarenhas recommended the implementation of the BSP methodology in the planning process of the Portuguese Air Force War College. He explained that the adoption of the methodology should be accomplished with care. Complex environments are

difficult to model and need experienced personnel to guide the process. Drawing the exact same conclusions as Ho, Mascarenhas explained that the Portuguese Air Force does not have any experienced BSP personnel and that outside help and training would be needed (130:62-63).

C. Lurhman. Lurhman proposes a combined BSP and Structural Analysis and Design Technique (SADT) for the US Navy. His methodology is called Naval Information System Methodology (NISM). It allows a naval base to develop organizational information models, determine command information requirements, and assess information and organizational structures.

Lurhman conducted a case study of Moffet Field. He found that due to the extended procurement cycle and external determination of products authorized for procurement, NAS Moffet Field purchased many different vendor products, few of which could communicate with each other. The next generation of ADP growth must be concerned with interfacing these systems (123:120). Lurhman concluded that a command level team should be developed to train and assist naval station Information Systems personnel in applying NISM. Due to the great effort required by each naval station to perform NISM, the success of the system becomes the responsibility of the naval station commander (123:127). Without high-level backing, IE will fail to bring in all organizational inputs and influences.

D. Duckworth. Duckworth analyzed the Naval Reserve and the use of IS planning and BSP methodology. The information needs of the organization were examined according to the ability and opportunity for BSP to make a significant improvement to Naval Reserve procedures. Duckworth provides four impediments to the success of BSP in a company-wide information policy. He explains:

... executive commitment and involvement have been absent from the planning process; that the company-wide systems have not been development as part of a comprehensive plan evolving from current systems; and that information resource management functions have not been put in place to adequately manage the resources. The Naval Reserve has exhibited, to varying degrees, all of those tendencies. (63:56)

Duckworth concludes by comparing the present Naval Reserve planning methodology with that of BSP. Understanding the planning methodology of BSP provides understanding for why the policy of the Naval Reserve will or will not work as a planning methodology. Duckworth openly says what others have politely alluded to. His research into the Naval planning system provides the following insight to problems that may occur in any organization:

The planning culture of the Naval Reserve has two faces: one is formal, as exemplified by the Planning, Programming, and Budgeting System (PPBS); the other is the informal, ad-hoc, and often reactionary planning that is part of the day-to-day operation. . . . The core of this type of planning, in the IS environment, is on specific projects vice the management of the overall data resource. The informal planning culture has a much more direct influence on IS planning because it is within the context of that culture that most IS planning is taking place. This is crisis-driven planning, personality-driven planning, planning that takes place as a byproduct of bureaucratic inertia. It is the desire to see immediate results, the kind that can be reflected on fitness reports. It is primarily due to the influence of this planning culture that little of no strategic IS planning is taking place. In fact, one would be hard-pressed to find reasonable examples of any type of strategic planning taking place with the Naval Reserve. (63:61-62)

Duckworth concludes with the observation that poor planning practices cannot be cured with a new planning methodology by answering the question, "How well does BSP conform to the in-place planning structure?"

BSP, and all that it stands for, is an anathema to the organizational culture of the Naval Reserve. There would have to be a substantive change in the perception and implementation of planning activities in the

organization before a BSP study could be of any real benefit. At this point it would probably be little more than an academic exercise with insignificant organizational impact. (63:79)

Unfortunately, the planning environment of the organization is short-term crisis oriented. The organizational culture is contrary to any kind of strategic thinking. This a major problem within the Naval Reserve; one which no planning methodology, by itself, can solve (63:78).

E. Zeiders. In 1990, Zeiders compared BSP to IE as a methodology for integrating the IS planning function into the Navy's strategic planning process. He concluded that both IE and BSP recognize the importance of data standardization and linking of information systems planning (186:40). In contrast, Zeiders concludes:

First, IE provides a set of interrelated systems development techniques that span the entire systems life cycle, from strategic planning to full systems implementation. On the other hand, BSP only provides techniques for organizational analysis and strategy-to-requirements transformation. It does not provide full life cycle support. Second, IS is a user-driven methodology, whereas BSP is essentially analyst-driven. . . . Third, whereas IE supports systems development through implementation, the deliverables of the BSP process are difficult to update, and provide no basis for system design. As a result, the IE process is considerably faster the same life cycle phases then BSP; a vital consideration in today's IS climate. (186:40-41)

Zeiders reports that Navy IS planning has historically missed the mark. Though strategic plans have been developed, the plans have not been implemented. Zeiders explains the barriers to effective IRM:

One of the primary reasons for these difficulties [huge cost overruns, unnecessary duplication, the inability to integrate existing systems, and overall program mismanagement] is a lack of understanding by top DON [Department of the Navy] management of Information Resource Management (IRM) issues, and in particular, the methodologies and tools available for aligning strategic and information systems planning. Uneasiness regarding

the need for IRM and IR planning, the organizational structure required to support IRM, and the relative strengths and weaknesses of the various IS planning tools and methodologies, all add to reluctance of top management to commit considerable resources to what is perceived to be an uncertain process, further complicate the IRM and IR planning process. (186:104)

To bring about the necessary change, Zeiders recommends that IE, automated with ICASE, become the standard for Navy IRM planning and implementation efforts. Zeiders analyzes three CASE tools and concludes that a combination of two systems, one for initial work and the second for the final stages, would be the best use of the tools for systems development (186:55-101).

Zeiders concludes with a series of commitments required from top-level officers a commitment to: education of both IS and line communities; investment in the IE approach (political as much as financial investment); top-level chair for manager to have political strength to plan and implement IS strategy; and formal planning procedures (186:105-106).

Summary

Information analysis is a methodology which incorporates top management strategic direction to identify the data required for effective organizational control. The purpose of such an analysis is to consolidate the information requirements from each functional area, to avoid redundancy of data if possible, and identify what data is required from each functional area to perform the decision-making process in a more efficient and effective manner.

Although electronic computers were only recently developed, they have quickly permeated every aspect of our society. In fact, they are mandatory for business survival and to handle one of the organization's most significant resources—information. That resource must be strategically planned for.

Strategic information systems planning assists in managing change and uncertainty. Properly applied, an innovative strategy can detect peripheral concerns before they can develop, provide solutions for current issues, or reveal opportunities that may otherwise go unnoticed. Without a defined, well articulated strategy to ensure quality information is readily accessible for decision makers, seemingly innocent decisions can have profound consequences.

Information systems help to transform information into knowledge and power. The strategic use of computers is new and also requires meticulous documentation and attention to detail. Linking business strategies, people, and information technology is one of the most challenging problems business face today.

Top management is responsible for strategic planning and modifying organizational strategies to take full advantage of the information resource. Technology allows taking advantage of that resource as never before.

Information technologies are not a luxury, but mandatory in today's competitive environment. Information systems planning methodologies serve as the systematic approach to systems planning, analysis, and design. There is no single best way to view information systems planning.

Strategic information systems planning efforts in this chapter focused on Business Systems Planning (BSP) and Information Engineering (IE). Regardless of the methodology used, it should be understood that the starting point of any methodology is an attempt to ensure that the information systems chosen to be developed are those that most warrant development in a competing environment.

BSP, developed by IBM in the 1960s, emphasizes data as a corporate resource and the need to link information systems planning to strategic planning. BSP provides a structured, top-down design and bottom-up implementation methodology for organizations to deal with information flow within an organization. The results provide a foundation for informed decision making.

IE, developed by Martin and Finkelstein in the 1970s, has as its premise that data be the center of modern data processing. IE is a systematic, top-down planning methodology that is data oriented and objectives driven. IE identifies data fundamental to the organization and is technology independent--designing the organization for change.

Several cases of BSP and IE usage in military environments and their shortcomings were discussed. Supporters reveal that modern technology, advanced applications, and the coming of age of the information resource make IE the select choice for information systems development during the 1990s.

IE is an information systems planning methodology that meets the requirements of DOD Corporate Information Management (CIM), provides information systems planning capabilities, and determines information requirements for the data model through strategic planning. Since IE models functional activities using the data required to support the business strategy, linking unit costs to processes is facilitated through modeling of the organization's activities.

IV. METHODOLOGY

Chapter Overview

This chapter reviews the methods used to solve the research objective, the population studied, the data collection method, the method used to analyze responses, the method used to determine statistical significance of the responses, as well as the method used to develop an organizational activity model.

The research method used in this thesis was systems development--an integrated research approach (136:94). Systems development research is found in a number of academic arenas, but is unique to business schools' Management Information Systems (MIS) departments (136:97). A combination of research methods was used: descriptive research (Chapter II) and a two-round, modified Delphi technique survey of top-level AFIT stakeholders. Qualitative analysis (with statistical significance) was used to analyze the responses.

Background

Problem Statement. The way AFIT budgets for "purchases" costs and justifies reimbursement for "services" costs requires a more sophisticated information system than is presently available. Current information systems do not report which products or services (or customers) are profitable (or unprofitable) and provide few insights about how to improve business processes. Before a more sophisticated information system can be developed, AFIT must identify strategic-level requirements for an integrated information system.

Research Objective. The objective of this research was to identify the strategic-level requirements for an integrated information system in order to facilitate decision making at the business process level. This would enable AFIT to develop a system that would provide staff, faculty, and customers with insight into the cost and value of AFIT products or services .

As reviewed in Chapter III, strategic information systems planning has two facets, external and internal. Strategic planning searches externally to understand the environment (customers, suppliers, and competitors) of the organization. It examines the organization internally to discern what the organization and its employees are capable of achieving. Senn states:

The strategic use of information will continue to create new opportunities in virtually all industries. More than money, the ability to use information to gain competitive advantage--through new products and services or through dealing effectively with customers, suppliers, and competitors--will determine which firms will be successful into the year 2000. (153:6)

With that thought in mind, systems development was the method selected to perform this research.

Systems Development. Nunamaker, Chen, and Purdin present systems development as a multimethodological approach to information system (IS) research: theory building, experimentation, observation, and systems development. Research methodologies such as laboratory experiments, surveys, and mathematical modeling are "very useful, but not sufficient by themselves to form a well-grounded IS research program" (136:93).

Systems development is considered an integrated research approach which is "necessary if IS research is to keep pace with technological innovation and organizational acceptance" (136:94). In IS research, one research method should not be regarded as a preeminent one, because no one research

methodology is sufficient by itself (136:95). Emory and Cooper support this concept in Introduction to Business Research. They explain: "By creating a design using diverse methodologies, researchers are able to achieve greater insight than if they followed the most frequent method encountered. . . ." (65:82).

Nunamaker, Chin, and Purdin explain the role of MIS researchers:

MIS researchers are more properly viewed as systems integrators whose research efforts span a multiplicity of methodologies. These integrated research efforts (often referred to as 'projects') can be identified by their relatively long lifetimes and the stages through which they grow (concept-development-impact). Consequently, systems development can be seen not only as a legitimate approach to IS research, but also as a critical contributor among the methodologies available. (136:93)

According to Senn, systems development has two major components: systems analysis and systems design. "Systems design is the process of planning a new business system or one to replace or complement an existing system" (153:9-10). Systems analysis, the investigative research phase, determines what the system should do; design carries out the objective (153:11). "Systems analysis, then, is the process of gathering and interpreting facts, diagnosing problems, and using the information to recommend improvements to the system" (153:10). Information gathered about the current activities of the system, the expectations of a future system, and recommended improvements to the business process are called a systems study.

The title "systems analyst" is given to those who conduct the systems study. Senn states that "the analysts' sole responsibility is conducting systems studies to learn relevant facts about a business activity. The emphasis is on gathering information and determining requirements" (153:12). Systems analysts are often charged with more than gathering information. Analysts

research what the future needs of the business will be and recommend alternative changes to meet those needs (153:10). With that objective in mind, the researchers began a descriptive research of requirements for an AFIT information system as DOD implements unit cost resourcing to enhance cost visibility and contribute to better resource management.

Descriptive Research. To satisfy the research objective, Chapter II provided a descriptive research of two DOD reorganization directives. The research was directed primarily toward definition and clarification of external influences on AFIT. The objective in a descriptive study, according to Emory and Cooper is "to learn the who, what, when, where and how of a topic" (65:148).

The researchers conducted a comprehensive review of the Defense Business Operations Fund (DBOF) and the Defense Information Management (IM) program, concentrating on unit cost resourcing and business process improvement, respectively. The investigative questions for the next phase of the research were generated from the descriptive research.

As covered in Chapter II, before business areas can be included under DBOF, they must meet the following requirements:

1. Have identified the outputs of the business;
2. Have a cost accounting system that relates cost to those outputs;
and
3. Can identify the customers of the business. (50:2)

Also mentioned earlier in Chapter II, under unit cost resourcing, the unit cost concept is based on the logical assumption that the cost of an activity should be related to its primary output(s) (64:17). Activity costs are linked to process models to provide data needed for preparation of functional economic

analysis (FEA) which "is a decision package that evaluates actions proposed to achieve the functional area objectives and functional activity objectives" (55).

Development of a process model requires the definition of the functional architecture of the organization (55). Functional architecture: (1) defines the overall scope and mission of the functional area and its subordinate activities; (2) defines the current baseline ("as is") and target ("to be") methods, management processes, and data structure for each activity; (3) establishes long-term objectives, and performance measures and targets for the functional area, and each activity (55).

Business process improvement requires the scope and mission of the organization be defined, as well as the baseline and target activities. An understanding of the business process improvement program and unit cost resourcing led to the development of questions to help identify the strategic-level requirements for an integrated AFIT information system.

Investigative Questions. The following investigative questions were generated from the descriptive research.

1. Who are AFIT's customers?
2. Who will be AFIT's customers?
3. What are the products and services (outputs) provided by AFIT?
4. What should be the products and services (outputs) provided by AFIT?
5. What activities are required to provide AFIT's products and services?
6. What are AFIT's strengths and weaknesses?

According to Brimson, activity-based accounting requires the definition of activities within the functional area: "An organizational analysis normally uses a Delphi approach in defining activities. The Delphi method queries the most

knowledgeable experts (such as department heads) to identify current activities and the resources to accomplish them" (34:85).

Delphi Technique

To accomplish the research objective, a strategic planning questionnaire was administered using a modified Delphi technique to survey AFIT's top-level stakeholders. A Delphi approach was chosen to obtain qualitative responses from the respondents, responses that were the thoughts and opinions of top-level decision-makers. According to Quade and Boucher, researchers at The RAND Corporation who investigated the use of the Delphi technique under a US Air Force research program:

Systems analysis must depend a good deal more on informed judgment than do most types of engineering. The analyst must be assisted by others, civilians as well as military, and depend on their judgment, not only for facts, but for opinions about the facts. (145:41)

Because [the Delphi questionnaire and feedback technique] can be used to allocate resources rationally and to force explicit thinking about the measurement of benefits, it offers a hope of introducing cost-effectiveness thinking into these problems. (145:343)

The RAND Corporation generated the Delphi technique in the early 1950s as a forecasting method. The basic idea behind the Delphi technique is that many experts, focusing on the subject in a systematic way, can produce a more comprehensive strategic view than a single expert (157:72). Three main characteristics of the Delphi technique are:

- (1) Respondents to the formal questionnaire are experts in the subject area;
- (2) There is more than one round, i.e., the experts are asked their opinions more than one time; and

(3) Controlled feedback is provided by re-surveying the respondents using the group's responses from the preceding round. On round two and later rounds, respondents with extreme answers are sometimes asked to provide reasons, and these reasons are summarized anonymously for the next round. (14:117; 46:v)

Armstrong provides detailed consideration of experts, rounds, and feedback when using the Delphi technique. His findings suggest that:

- (1) experts are not required when Delphi is used to forecast change;
- (2) additional rounds and feedback contribute to accuracy, though gains made through use of additional rounds are modest; and
- (3) evidence proving more rounds are better is limited. (14:119)

A popular feature of the Delphi technique is that it can be used for mail surveys when groups are geographically dispersed (12:87; 14:119). Another advantage seen in using the Delphi technique is that "it is acceptable to organizations. It sounds fancy yet the users can understand it. . . . Most importantly, it is more accurate than group methods" (14:119).

Helmer documented the use of a Delphi technique applied to problems of educational innovation. He used this approach since it "eliminates committee activity altogether, thus . . . reducing the influence of certain psychological factors, such as specious persuasion, the unwillingness to abandon publicly expressed opinions, and the bandwagon effect of majority opinion" (97:1). The second round of the Delphi technique reduces or eliminates some disadvantages of open-ended questions, and takes advantage of the benefits when responses are compiled and returned to the respondents for a final review (59:87).

Though there are several positive benefits to using the Delphi technique, there are also several drawbacks. Quade and Boucher comment that the

principle drawback is the length of time it takes for respondents to answer and return the questionnaire (145:342). Another drawback is "digesting and collating what becomes an increasingly formidable amount of material" (145:342). The final drawback which must be considered is that the outcome of the Delphi approach "rarely produces unanimity, and it does not relieve management of the final responsibility" of decision making (20:312).

"The Delphi method queries the most knowledgeable experts (such as department heads) to identify current activities and the resources to accomplish them" (34:85). The Delphi technique is not a survey of the general population. It is a survey of those in key positions that influence the organization.

Ackoff suggests four ways that organizations cope with a changing environment:

- Inactivity involves ignoring the changes and continuing business as usual.
 - Reactivity involves waiting for something to occur and responding to that change; however, response must be stimulated by an external force.
 - Proactivity involves trying to predict the external changes that will occur and positioning the organization towards those changes before the fact. The proactive mode is anticipatory.
 - Interactive mode is active involvement with external forces and pressures that seek to create the future for all concerned.
- (4:1-10)

Therefore, for AFIT to be "interactive," it must seek involvement with "external forces and pressures that seek to create the future for all concerned" (4:1-10).

Population. The researchers' goal was to survey those individuals, due to their top-level positions, who would be able "to identify current activities and the resources to accomplish them" and the customers of AFIT products and services (34:85). A strategic planning questionnaire was administered to select

personnel who had a vested interest (a stake) in AFIT or represented an organization which had a vested interest in AFIT. The population included individuals who can, could, or will be affected by the achievement of AFIT's mission.

For organizations experiencing change, Freeman says that stakeholder analysis is necessary (77:189). Stakeholder analysis is used to help executive-level decision makers think through the affects that their actions have on their organization's stakeholders. Figure 4-1 provides only a representation of AFIT's stakeholder population and is adapted from Freeman (77:55).

Stakeholder Analysis. Stakeholder analysis, according to Ackoff and Freeman, is the best way to obtain information on what the goals and objectives of an organization should be (1:186; 77:91). In the commercial sector, stakeholder analysis is used to help executive-level decision makers think through the effects that their actions have on their organization's stakeholders.

For any strategic plan to be successful it must have full commitment from the top executives. Stakeholder analysis demands the same commitment and maybe more. According to Freeman, "If business organizations are to be successful in the current and future environment, then executives must take multiple stakeholder groups into account" (77:52).

Use of the stakeholder approach to strategic management assumes that the organization wants to surface difficult issues, which may or may not have workable answers. . . a stakeholder approach is likely to uncover 'sacred cows,' and managers who do the uncovering are not always the winners. (77:188-189)

The actual word "stakeholder" first appeared in an internal memorandum at the Stanford Research Institute referring to "stockholder as the group to which management needed to be responsive" (77:31). According to Freeman,

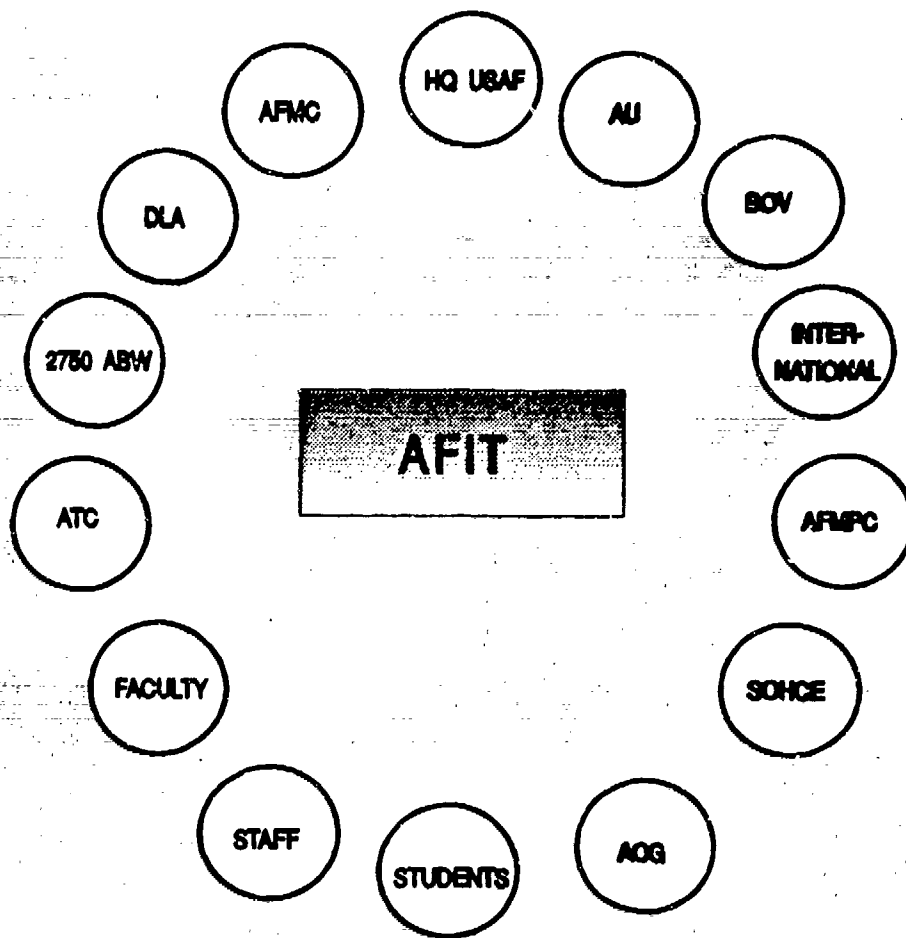


Figure 4-1

AFIT STAKEHOLDER DIAGRAM

stakeholders were originally defined as "those groups without whose support the organization would cease to exist" (77:31). His more recent definition of stakeholder is "any group or individual who can affect or is affected by the achievement of an organization's purpose" (77:53).

Freeman explains why considering stakeholders is an important management concept in today's business world: "by developing 'measures of

satisfaction' of those groups whose support is necessary for the continued survival of the organization, an important input into the corporate planning process is made" (77:34).

Likewise, Albion concluded that an organization's mission should include all groups of people who can significantly influence its future (8:14). He adds, "Strategies that strengthen relationships with stakeholders create opportunities for sustainable competitive advantage and long-term profitability and dramatically improve the cost/benefit relationship of doing business" (8:14).

Guthrie, Garms and Pierce (1988) suggest that public schools adopt "client opinion polling" since sampling of client views "contributes to allocative efficiency" and reduces public criticism and distrust of the present "oppressively bureaucratic and overly insulated" system. (91:332-333). Guthrie, Garms and Pierce state that:

The logic underlying this set of criticisms suggests that schools would become more productive, more efficient, if client [sponsoring or gaining command], parent [career progression/career field advisor], and pupil [student] preferences could be effectively expressed in a manner that attracted the attention of professional educators. (91:332)

Executives constantly need to assess stakeholders' interests, capabilities, and needs (152:63). Savage *et al* suggests classifying types of stakeholders which in turn will help delineate strategies for management. They explain:

Stakeholders' significance depends upon the situation and the issues and managers must have appropriate methods to deal with different stakeholders. Of all the possible stakeholders, the ones who will be relevant to the organization's executives depend on the particular issue. Both the stakeholder's willingness and opportunity to act are particularly sensitive to specific issues. (152:62)

The principles that define an ethical-moral business decision, according to Ackoff, must address two questions: "Who should be involved in making a decision? and Of what should their involvement consist" (1:186)? Adherence to this first principle assures decisions serve the interests of all involved. Ackoff points out, "Decisions should be made by consensus of all who are directly affected by the decisions, the stakeholders" (1:186). The second principle ensures that the final decision rests with those most qualified. Ackoff explains:

However unqualified people may be to participate in decisions that affect them, if able, they should participate in making these decisions. However, their agreement should not be required if it can be demonstrated that (1) they do not know what the consequences of these decisions are likely to be, and (2) their best interests will be taken into account by those making the decisions. (1:186)

Stakeholder involvement has facilitation of organizational change as a proven business benefit. "Organizational resistance to change is a familiar phenomenon. Decisions that involve significant organizational changes are often diluted or subverted during their implementation because those who do the implementing often do not 'buy into' the decisions" (2:11). According to Strassmann, "Human factors--not information technology--are the pacesetters for the rate of progress through application of CIM methods" (162:13).

The largest changes, reductions, and reorganizations are yet to occur. As a major emphasis, "CIM calls for changed work habits. Rapid changes expected under CIM initiatives will require retraining of perhaps as many as one million DOD employees" (162:14). Implementing a major change such as CIM requires a great deal of time and effort. Adequate time and training for personnel must be made available to implement CIM techniques in their jobs. An integrated strategic plan in which both CIM initiatives and personnel well are

considered must ensure adequate resources for achieving long- and short-term goals. Exploiting human resources to gain information resources may produce impressive results in the short-term, but long-term goals will suffer.

Sampling Frame. To be a panel member for the Delphi technique, the member was to have a vested interest (i.e., be a stakeholder) in AFIT's success. Delphi panel members are often limited to a workable number. The number of panel members is a function of the panel coordinator's ability to collate the first-round responses and return it for follow-on round(s) within a time frame where the panel members recognize and have familiarity with the initial survey.

With regard to sample size, Quade suggests that a representative sample is not as important as including members from all major relevant backgrounds (145:337). Quade makes the following comment:

Since the kind of survey being proposed is not a statistical survey of the Gallup type, but an attempt to generate ideas and to use the respondents to trace out the interrelationships among these ideas and the consequences of their adoption, it is immaterial whether the respondents form a representative sample of the initially known points of view. What matters is that the viewpoints of persons with all major relevant backgrounds have a chance of being voiced. (145:337)

Helmer's Delphi experiment, related to educational innovation, used three groups: Group A had 45 initial members and 22 at a later stage, Group B had five members, and Group C had 32 members (97:9). Quade recommends several panels of "six to twelve respondents" (145:337).

Thirty-three panel members were selected for the AFIT modified Delphi survey. A list of panel members, as determined by the AFIT Commandant, is provided in Appendix C. The members formed a representative sample of AFIT stakeholders. The sample included both command and functional representa-

tion. Members represented both internal and external AFIT stakeholder organizations.

The Delphi technique survey was administered through the mail. One week prior to the first-round survey being sent out, panel members were notified by letter that they would receive an AFIT stakeholder questionnaire. The Delphi technique was modified based on not securing panel members' commitment to participate ahead of time. Panel membership was voluntary and implied by receipt of a returned questionnaire.

Delphi Instrument Design

Advanced Notice Mailing. An advance notice of the questionnaire letter (Appendix D) was sent one week prior to mailing the questionnaire. Erdos recommended sending a letter of advance notice to the panel members: "Many tests have shown that the percentage of returns can be increased by an advance notice" (69:89). The cover letter for the questionnaire (Appendix E) was developed following Erdos' Accompanying Letter guidelines (69:101) and Dillman's Cover Letter recommendations (59:165-172). Dillman recommended the following: explain what the study is about, convince the respondent the study is useful, convince respondent that his or her response is important, promise confidentiality, reemphasize justification for the study, promise a copy of the results, and indicate a willingness to answer any questions that arise (59:165-172).

Measurement Questions. The questions for this research were selected from questionnaires that were designed to meet information requirements of organizations undertaking a strategic planning process. The questions were adopted from several sources: Drucker's "Business Purpose and Business

Mission" (61:74-94), Freeman's "Setting Strategic Direction" (77:88), Finkelstein's "Management Questionnaire" (72:213-219), Martin's "Executive Interviews" (126:80-83), and the Air Force (SAF/AQKC) "Information Resources Management Study--Senior Manager Questionnaire" (28:1-10).

First-Round Questionnaire. The measurement instrument used open-ended questions to provide the greatest breadth and depth of response from the respondents (59:87). Open-ended questions were used to "stimulate free thought, solicit suggestions, probe people's memories, and clarify positions" (59:87). According to the US Army Research Institute for the Behavioral and Social Sciences Questionnaire Construction Manual, open-ended questions have the advantages and disadvantages listed in Table 4-1.

The questionnaire (Appendix F) was primarily a series of open-ended questions. But, as recommended by Dillman, three preliminary, short-response time, closed-end questions were used as "ice-breakers." The questions were constructed and ordered under the guidelines of Dillman's Total Design Method (59:79-159) and Erdos' Questionnaire Construction (69:37-74).

Survey Pretest. The survey instrument was pretested by several AFIT personnel. A time of forty minutes was initially planned for the first-round survey; after the pretest, that time was reduced to twenty minutes. Several questions were reworded to provide a clearer intention of what the researchers were looking for. Some questions were renumbered to provide a more readable format and make the length of the questionnaire appear shorter. Some questions (see Table 4-2 for an example) were numbered numerically with alphabetical subheadings and two unnumbered sub-subheadings. The numbering scheme was changed for the second round.

Table 4-1

ADVANTAGES/DISADVANTAGES OF OPEN-ENDED FORMATS

<u>Advantages.</u> Open-ended formats:	<u>Disadvantages.</u> Open-ended formats:
- allow respondents considerable latitude in their responses - allow for the expression of middle opinions that a closed-ended item with two choices would not - allow for the expression of issues of concern that may not have been identified by the question writer - allow researchers to obtain answers that are unanticipated - are easy if the question writer either does not know, or is not certain about the range of possible alternative answers - make it possible to find out what is salient to the respondents, what their frame of reference is, and how strongly they feel - permit respondents to describe their real views more closely and fully - may provide more valid answers than may be obtained from closed-end formats - provide answers to open-ended questions that may be useful when treated as anecdotal material - allow respondents the opportunity to answer some questions in their own words	- are time consuming for the respondent - allow people to respond in their own words thereby increasing task difficulty which can affect the response rate - encourage only highly motivated respondents to take the time to write a complete answer to each question - often leave the respondents on their own to determine what is relevant - are generally less reliable than closed-end - are difficult to code for analyses; the data analysis task can grow into a major project - may be easier to misinterpret - obtained material which may be repetitious or irrelevant - are more time consuming, constraints must be placed on the number of questions that can be asked - allow inadvertent phrasing of questions may sometimes modify responses in unrecognized and unintended ways
	Source: Babbitt, Bettina A. and Charles O. Nystrum. <u>Questionnaire Construction Manual</u>, Research Project 89-20. Alexandria VA: U. S. Army Research Institute for Behavioral and Social Sciences, June 1989.

Table 4-2

NUMBERING FORMAT FOR AFIT QUESTIONNAIRE

12. What are AFIT's strengths and weaknesses in terms of:
a. Professional Continuing Education Programs?

Strengths:

Weaknesses:

The questionnaire was approved by the Personnel Survey Branch, Headquarters Air Force Military Personnel Center. It was assigned the following Survey Control Number: USAF SCN 92-12, with an expiration date of 1 October 1992.

A three-week turnaround-time was requested for the questionnaire to be completed and returned. Erdos reported "an average of 94% of the total 3-week response had already been received 14 days (2 weeks) after the mailing date" (69:262). Five days prior to the suspense date, a follow-up letter (Appendix G) was sent to panel members reminding them of "their importance" to the success of this research.

The survey responses were collated and printed as Pamphlet I, Verbatim First-Round Responses (Appendix H). The questions of the initial questionnaire were restated and responses were listed, numerically, below the question as depicted in Table 4-3.

Table 4-3

FORMAT FOR PAMPHLET I. VERBATIM FIRST-ROUND RESPONSES

6. What additional products or services should AFIT provide?

1. Blank (five responses)
2. I get lots of bright young Captains with cosmic technical degrees--what I need are more (some) senior civilians and Lt Col/Cols with formal advanced education in managing change.
3. Strategic planning for education and training. Education management (course evaluation and matching student needs with available courses).
4. Need courses that bridge gap between the pure technical type and the pure management type, i.e., someone that can effectively manage people in a technical environment. Live satellite education; correspondence courses. More (better) marketing/advertising of products and services. I don't know what all you do or can do!

Second Round Questionnaire. The second-round cover letter (Appendix I) thanked the panel member for support in the first round and encouraged participation in the second round which was the heart of the two-round process. The letter emphasized the importance of participation; noting however, that it was completely voluntary. The letter also encouraged those who were unable to participate in the first-round questionnaire, to "please feel free to comment in this 'second-round.' Your input is highly valued".

For each question, the respondents' answers were randomly ordered to help ensure greater anonymity. Respondent #1 for one question was not necessarily Respondent #1 for other questions. When panel members' identities were apparent, responses were neutralized and placed in brackets to provide even further anonymity

As mentioned previously, the questions of the first questionnaire were numbered numerically with alphabetical subheadings and two unnumbered sub-subheadings. The numbering format was changed for Pamphlets I and II. For example, the original question number twelve was divided into twelve separate questions numbering twelve to twenty-three.

For round two, panel members were sent both Pamphlets I and II. Pamphlet I was for information and reference only, and was not to be returned. To ensure continued interest in what would become a much longer survey for round two, special attention was given to professionally collating and reproducing the pamphlets. Pamphlets I and II were bound using two colors of spiral bind, black and white respectively. AFIT blue card stock was used for the front and back covers.

Second Round Questionnaire Construction. McClave and Benson note that opinion or preference surveys often produce a binomial distribution:

A common source of business data is an opinion or preference survey. Many of these surveys result in dichotomous responses . . . The number of Yes responses (or No responses) will usually have a binomial probability distribution. For example, suppose a random sample of current customers is selected from a firm's data base to evaluate a new product. The number of customers in the sample who prefer the product to its competition is a random variable that has a binomial probability distribution. (134:210)

Helmer suggests the use of "weighted opinions" to provide a more refined approach than Yes and No (97:4). "Weight opinions" asks the respondents to "rank their relative competence" regarding each question and "only the responses of individuals who ranked themselves relatively highest for a particular [question] were used" (97:4).

The researchers chose to format the questions for round two using a strength of agreement or disagreement rating. Respondents were given four choices when responding to comments from the first round: strongly agree, agree, disagree, or strongly disagree. This differs from the well-known Likert Scale which uses a fifth response, "undecided" (65:220). The options of selecting "undecided," "neither agree nor disagree," or "no opinion" were not made available. The researchers felt it best for the respondents to provide a "clear-cut" response, i.e., to either agree or disagree.

The original Pamphlet II was not included as an appendix due to its similarity with the tabulation document. The follow-up questionnaire, Pamphlet II, Second-Round Responses, was adapted from Quades' "Questionnaire 2" (145:340). The format depicted in Table 4-4 was used to construct questions from the panel members first-round responses. The panel members were asked to check the appropriate block, where applicable, to indicate their preference.

The format depicted in Table 4-5 was used to tabulate the second-round responses (Appendix J). A fifth category of "no response" was added to Pamphlet II for tabulating blank responses.

A "comments block" was provided with each question. The space was provided for panel members to: (1) respond to other panel members' first-round comments, (2) further expound on an initial point, or (3) make further suggestions. The block followed each question listing additional inputs from the respondents. Panel members were asked to refer to the area they were commenting on. If from Pamphlet I use, e.g., 6(1). If from Pamphlet II use, e.g., 6(A). The format depicted in Table 4-6 was used to tabulate the second-round comments.

Table 4-4

FORMAT FOR PAMPHLET II, SECOND-ROUND RESPONSES

4 <i>The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?</i>		S T R O N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y
A	As the Air Force becomes ever more dependent upon technology for its superiority, the mission of AFIT becomes more urgent.				
B	<u>Customer-focused</u> graduate and professional education. When customer pays, the focus has to be clearly on customer requirements. Work closely with the organizations from which AFIT's customers come. Focus the studies even further to ensure specific AF needs are addressed.				

Table 4-5

FORMAT FOR PAMPHLET II, SECOND-ROUND RESPONSE TABULATION

4 <i>The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?</i>		S T R O N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
A	As the Air Force becomes ever more dependent upon technology for its superiority, the mission of AFIT becomes more urgent.					
B	<u>Customer-focused</u> graduate and professional education. When customer pays, the focus has to be clearly on customer requirements. Work closely with the organizations from which AFIT's customers come. Focus the studies even further to ensure specific AF needs are addressed.					

Table 4-6

FORMAT FOR PAMPHLET II, SECOND-ROUND RESPONSE COMMENTS

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 6(1); If from Pamphlet II use, e.g., 6(A)).

6(G). Could be a place for correspondence courses in certain areas, but I'm concerned how productive correspondence courses are from an education standpoint [Disagree].

6(N). What is "formal advanced education in "managing change"? Where is this available? [Disagree]

Level of Significance

The research objective was to provide qualitative research results, not necessarily quantitative statistical results. This does not mean, however, that determining a question's response level of significance is not important. The researchers believed that it was important to know what the probability was of respondents making a response merely by chance. Brown, Hulswit, and Kettelle called this the "rare event" approach (134:220). They used this concept "to determine how likely it would be for . . . customers to make positive responses merely by chance". McClave and Benson explain the results of Brown, Hulswit, and Kettelle's approach:

Assuming that the probability of a positive response occurring by chance (.25) is the same for each of the 60 customers and that the response of one customer does not affect that of another, the number of positive responses observed has a binomial probability distribution. (134:220)

The formula used by Brown and colleagues is as follows:

$$P(x \geq 24) = \sum_{x=24}^{60} \binom{60}{x} .25^x (.75)^{60-x} = .004 \quad (134:220)$$

Williams recommended using the Binomial Probability Distribution equation to check and see if responses were really significant (with 90% confidence), i.e., that the responses were more or less than neutral.

$$P(x) = \binom{n}{x} p^x q^{(n-x)} \quad (x = 0, 1, 2, \dots, n) \quad \binom{n}{x} = \frac{n!}{x!(n-x)!}$$

where: p = Probability of agreeing (or disagreeing)

$$q = 1 - p$$

$$p = q = .5$$

n = Number of respondents

x = Number of agrees responses (or disagree responses)

(134:214)

Two examples are given below of how the level of significance determination is made with eighteen respondents to a question. The questions are asked:

Q1. Are thirteen "agrees" and five "disagrees" significant at the 90% confidence level?

Let x equal the number of "disagrees" in n=18 trials.

$$P(5) = \binom{18}{5} (.5)^5 (.5)^{13} = \frac{18 \times 17 \times 16 \times 15 \times 14}{5 \times 4 \times 3 \times 2 \times 1} (.5)^{18} = 0.048126$$

A1. The answer is "yes."

Q2. Are twelve "agrees" and six "disagrees" significant at the 90% confidence level?

$$P(6) = \binom{18}{6} (.6)^6 (.4)^{12} = \frac{18 \times 17 \times 16 \times 15 \times 14 \times 13}{6 \times 5 \times 4 \times 3 \times 2 \times 1} (.6)^{18} = 0.118942$$

A2. The answer is "no."

The Table 4-7 shows what ratios of questions are significant at a level of 90%. For example, if the number of respondents was 18, a ratio of 13 "agrees" and 5 "disagrees" was significant at the 90% confidence level, a higher ratio of "disagrees" was significant at a confidence level lower than 90%.

Table 4-7

LEVELS OF SIGNIFICANCE

n	Significance greater than 90%	Significance less than 90%
20	13 to 7	12 to 8
19	13 to 6	12 to 7
18	13 to 5	12 to 6
17	12 to 5	11 to 6
16	11 to 5	10 to 6
15	11 to 4	10 to 5
14	10 to 4	9 to 5
13	10 to 3	9 to 4
12	9 to 3	8 to 4
11	9 to 2	8 to 3

Activity Modeling

An activity is "a named process, function, or task that occurs over time and has recognizable results" (43:3-8). As mentioned in Chapter II under unit cost resourcing, the unit cost concept is based on linking the cost of an activity to its primary output(s) (64:17).

Activity costs are linked to activity models to provide data needed for preparation of functional economic analysis (FEA) which "is a decision package that evaluates actions proposed to achieve the functional area objectives and functional activity objectives" (55).

Using procedures and standard software tools provided by the Directorate of Defense Information, the Defense IM program uses a methodology called IDEF (Integrated DEFinition Language) to develop activity and data models (55). "Data modeling should not be accomplished without prior activity modeling, which provides a vital context within which to create and validate the model" (55). Modeling is used to define and document what the processes and information requirements of an activity are now ("as is") and what they should be ("to be") in the future (55). Within IDEF, processes, functions, tasks, activities, and component activities are all known as activities (43:3-8).

Activity models show inputs, outputs, controls, and mechanisms through which the functional activity is (or will be) conducted (55). It does this by showing the specific steps, operations, and information needed to perform an activity as well as showing how other organizations participate in the activity (43:3-4).

Components of Activity Modeling. Activity modeling (Figure 4-2) uses four diagrams to show how the activities relate with their environments:

- Node trees, which graphically portray activities in a hierarchical format
- Context diagram, a single diagram that illustrates the highest level of activity and its information or materials
- Decomposition diagrams, which represent refinements of an activity by showing its lower level activities and their information relationships

- FEO (For Exposition Only) diagrams, which are used to focus attention on a particular portion of a node tree, context, or decomposition diagram. (43:3-7)

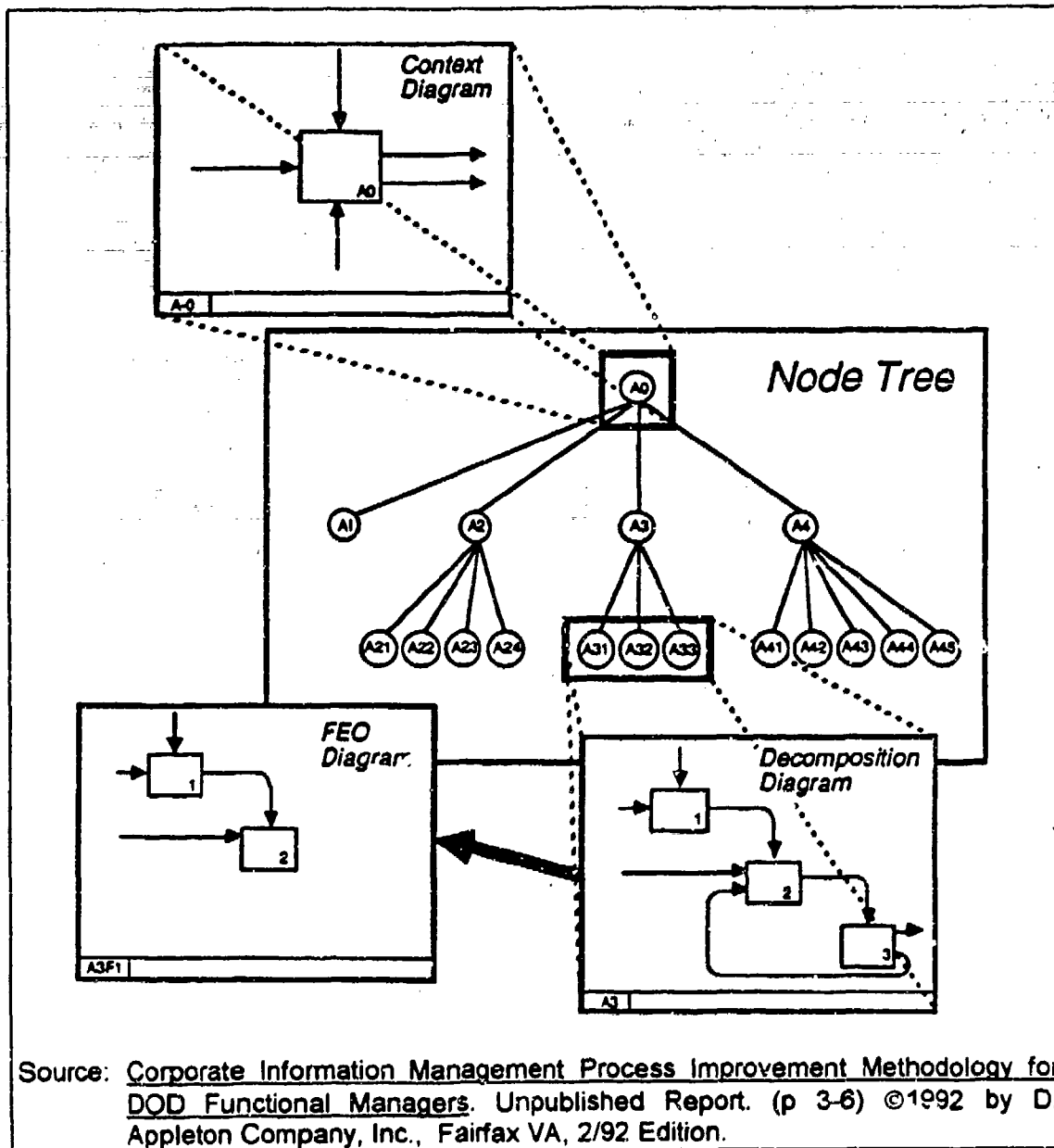


Figure 4-2

IDEF0 ACTIVITY MODELING DIAGRAM

Activities should be defined by present tense active verbs such as approve, process, submit, update etc. (43:3-3). Though activities are defined through knowledge of their current function in the organization, they should be defined independent of the any one functional area and not attempt to model the organizational structure (43:3-8).

The term ICOM is the acronym of four possible information roles (Figure 4-3) related to an activity:

- Input—information or material used to produce the output of any activity.
- Control—information or material that constrains an activity; controls regulate the transformation of inputs into outputs
- Output—information or materials produced by or resulting from the activity
- Mechanism—usually people, machines, or existing systems that perform or provide energy to the activity. (43:3-7)

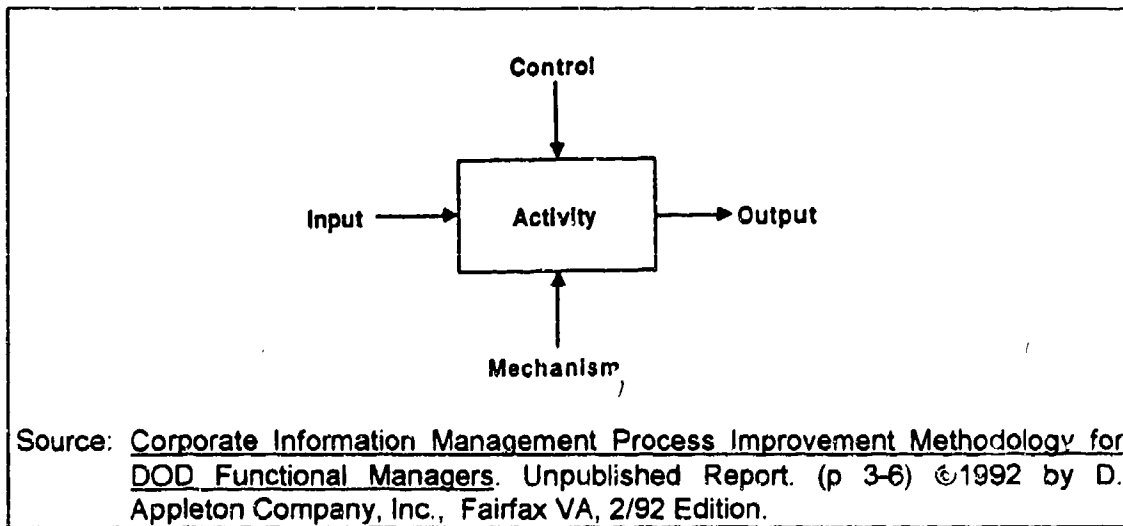


Figure 4-3

THE ACTIVITY MODEL LEGEND

Summary

The information gathering tool for this research was a Delphi survey of AFIT stakeholders using open-ended questions. The questionnaire was sent out in two rounds. The first-round responses were collated and developed into the second-round questionnaire. The responses were intended to be used by AFIT to assist in developing strategic direction. After a selection of critical success factors, AFIT must develop activity models to represent the business processes that will define their competitive products and services. Models help refine or develop additional strategic statements. Senior AFIT managers must review the final strategic statements. This systematic approach using information and information technologies should assist AFIT in defining and meeting the needs of its entire stakeholder population.

The results of the second-round questionnaire are reviewed in Chapter V.

V. FINDINGS AND ANNOTATIONS

Chapter Overview

The objective of this research was to identify and document the baseline strategic data needed by AFIT for implementing an information system that would eventually be capable of reporting which products or services are profitable and to provide insights for business process improvement. Additionally, an integrated information system would facilitate decision making at the business process level. This would enable AFIT to provide staff, faculty, and customers with insight into the cost and value of AFIT products or services.

AFIT will soon find itself venturing into a totally different marketplace. The Institute must now view the marketplace as a battleground, where it alone is responsible for securing its customers and, therefore, its resources. The way AFIT budgets for "purchases" costs and justifies reimbursement for "services" costs requires a more sophisticated information system than is presently available. Current information systems do not report which products or services (or customers) are profitable (or unprofitable) and provide few insights about how to improve business processes. Before a more sophisticated information system can be developed, AFIT must identify strategic-level requirements for an integrated information system.

Data Collection

A two-round, modified Delphi technique survey of top-level AFIT stakeholders (Appendix C) was administered through the mail. One week prior to the first-round survey being sent out, panel members were notified by letter

(Appendix D) that they would receive an AFIT stakeholder questionnaire. The Delphi technique was modified based on not securing panel members' commitment to participate ahead of time. Panel membership was voluntary and implied by receipt of a returned questionnaire.

Thirty-three panel members were selected for the stakeholder survey. The members represented both command and functional representation. Members also represented both internal and external AFIT stakeholder organizations.

Panel members returned twenty-four first-round surveys. Of the twenty-four surveys received, twenty were received prior to the requested return date and published in the original Pamphlet I. The four additional responses were not reviewed by the panel members in the second round. They were, however, marked as additional responses and added to the original twenty. All twenty-four survey inputs are found in Appendix H. The first-round response rate was 60.6 percent; with the four additional responses, the response rate was 72.7 percent.

Twenty second-round surveys were received. They were tabulated and are found in Appendix J. The second-round response rate was 60.6 percent.

Appendices F and J document the responses of rounds one and two. The responses provide the groundwork for AFIT to determine which responses will become discussion items in determining critical success factors, strategic direction, and quality, focused, customer-provider relationships. The findings in this chapter serve to answer the following investigative questions generated from the descriptive research.

1. Who are AFIT's customers?
2. Who will be AFIT's customers?

3. What are the products and services (outputs) provided by AFIT?
4. What should be the products and services (outputs) provided by AFIT?
5. What activities are required to provide AFIT's products and services?
6. What are AFIT's strengths and weaknesses?

Data Analysis

The intent of the first-round questionnaire's open-ended format was to receive a wide range and variety of opinions, that could, depending on one's perspective, answer each or several of the investigative questions. To assist AFIT in determining strategic direction, the researchers determined qualitative responses to be more valuable than quantitative responses.

The second-round questionnaire asked panel members to respond to first-round comments by checking a box which corresponded to their preference. The questions are repeated below with findings.

Question 1. Improved Business Practices Awareness

"In an effort to become more efficient and effective, DOD is encouraging, and in some cases directing, improved business practices. Are you aware of these recent initiatives?"

Twelve responded "yes"; three "no;" with five no responses.

This question, aside from serving as an "ice breaker," was intended to initiate a pattern of thought conducive to business process improvement--a theme throughout this questionnaire. It was also intended to help determine the extent of continuous improvement awareness by DOD senior leaders and how they would expect business to be conducted in the immediate future. As Brimson outlines, continuous improvement has several objectives:

- Elimination of waste (non-value added activities)
- Improvement of performance of value added activities
- Synchronization of lead time within new product introduction and production cycle
- Improvement of quality
- Elimination of process variance by correcting the source cause of the variance
- Simplification of activities (34:71)

Question 2. Unit Cost Resourcing for Education Awareness

"DOD recently mandated a Unit Cost-Per-Output Program that will require DOD organizations to reimburse AFIT for educational programs and services beginning in FY 93. Are you aware of this program?"

Nine responded "yes"; four "no;" with seven no responses.

A first-round response indicated, correctly, that this was a misleading statement. The suggestion was to have the statement read: "DOD recently mandated a Cost Per Output Program. Unit cost resourcing will make funding allocations to AFIT based on the average cost per graduate beginning in FY 93. Are you aware of this program?" All of the responses were to the original statement and not to the suggested change. Additionally, the statement was not reworded in Pamphlet II.

This question also served as an "ice breaker." It was also intended to help ascertain the extent of awareness of this program and the fact that AFIT is, among several entities, to begin unit cost resourcing in the next fiscal year. AFIT's educational programs affect several organizations DOD-wide and it is imperative that all stakeholders be made aware of the significant change unit costing will make in a customer-provider relationship.

Secretary of the Air Force Donald Rice says of DBOF:

To lower and better control costs and to allocate funds for the greatest need, we are improving many of our business practices. Our focus is on cost visibility, output, measurement, responsibility at the lowest levels of management, and improved provider-customer relationships. This is the basis for our participation in the Defense Business Operations Fund (DBOF). (148:28)

AFIT must accomplish its educational programs as cost-effectively as possible. While it wants to ensure it is a low-cost producer, that does not necessarily mean AFIT should be the lowest-cost producer. Being the lowest-cost producer is, sometimes, according to Brimson, achieved to the detriment of quality, service, employee satisfaction, and investment in the future (34:5). And, to paraphrase Drucker, nobody trusts you if you offer something at an unbelievably low price in comparison to your competitors (62:53).

Throughout these findings, there will be repetitive comments concerning the need for appropriate funding of AFIT. Under the current budgeting system, the comments concerning Air Force funding of AFIT are legitimate. However, under unit cost resourcing, aside from a yet-to-be-determined, Air Force-funded baseline, AFIT will become responsible for much of its own funding by providing quality products and services to its customer base. AFIT's destiny, therefore, is in its own hands. Again, it is imperative that AFIT understand its responsibilities to itself and DOD in a competitive environment.

Question 3. CIM Awareness

"Another DOD strategic initiative is the Corporate Information Management (CIM) Program, a business-oriented management tool for effectively managing DOD's information resources. Are you aware of this program?"

Eleven responded "yes"; two "no;" with seven no responses.

In previous chapters of this research, information was declared a strategic resource. AFIT's leadership must view its information resource as such.

Throughout the remainder of this chapter, a common theme must be at the forefront--business process improvement. Customer focus, information, and marketing must all blend together to assist AFIT in providing the highest quality, most cost-efficient educational programs and services available. William Giles advises that successful business strategies are based on the marketplace (not the ambitions of the organization) and the application of these five basic principles:

1. We must learn to see ourselves as our customers see us;
2. We should view the customer as the central focus of our thinking--we and our competitors revolve around our customers, competing to serve their needs;
3. We should avoid predicting the future as an extension of our past--we know that both the customers' needs and the competitors' offerings are changing;
4. Our customers do not buy products or services; they acquire benefits. We shall try to describe the market in this way, and
5. The market is not a homogeneous collection of customers. It is a collection of customer groups with different permutations of a wide range of needs. (83:10)

Question 4. AFIT Mission

"The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?"

The mission statement should be understandable and meaningful to both the lowest and highest positions in an organization. This mission statement will be responsible for carrying AFIT through the near-term tumultuous environment

of downsizing. The purpose of this inquiry was to determine how current the AFIT mission statement was. As Giles states:

One of the easiest traps to fall into is the one which presumes you know what your customers think about you. This is the classic 'inside out' perspective. Having defined and articulated a vision [mission] statement you must check to see if the customers' idea about you concurs and is consistent with what you think. If it is not, you must ask why. (83:18)

This was precisely the intent of question four. External input ensures that the vision truly reflects something which will be practical, realistic, and attainable in the marketplace (83:18-19).

As former AFIT Commandant General Stuart Boyd stated, "Technological superiority is a concept and reality on which the Air Force has come to rely. The commitment to education inherent in this superiority is the reason that the Air Force Institute of Technology exists" (30:iv). Respondents to this questionnaire supported that concept. They were in strong agreement that "As the Air Force becomes ever more dependent upon technology for its superiority, the mission of AFIT becomes more urgent." What is also interesting to point out is although respondents generally agreed "that many of the traditional AFIT-acquired skills can be obtained elsewhere," these senior policy/decision makers preferred sending their people to AFIT (despite a perceived availability of a more competitive price through a civilian institution) for the technical type of education that would lead the Air Force of tomorrow.

Of further interest, in terms of the proposed CIM and unit cost resourcing environments, many respondents agreed that AFIT must "provide proactive strategies in the new concept of business orientation." AFIT has been insulated from competitive pressures since its inception. Current economic conditions and DOD restructuring and business improvement efforts force that insulation to be

removed. Not only will AFIT have to be competitive in the future but it must also provide curricula that educate the Air Force on how to be competitive and conduct ongoing business process improvements. Along those same lines was very strong support for AFIT "to provide DOD/USAF managers and leaders with the thoughtware tools to continuously improve the combat capability of forces within an environment of ever constrained resources."

These services do not have to be provided solely in a conventional environment either. There should be "a variety of delivery modes" to accomplish the AFIT mission. Also, the survey showed extremely strong support for AFIT to "provide consulting services."

The responses from these senior policy/decision makers give AFIT several ideas for customer-based service. One such item was the response for sending senior enlisted to AFIT. The respondents were divided exactly in half for support/nonsupport of this idea. Seventy-two percent of the Air Force's enlisted career specialties require a technical background (44:6). In a competitive environment, AFIT may need to consider its entire potential customer base for innovative ways to meet the critical needs of a more complex tomorrow.

If the AFIT mission statement is to change, it is of primary importance that the formulation process include AFIT stakeholders.

Question 5. AFIT Services

"In your current area of responsibility, what types of products or services does AFIT now provide that you are aware of?"

As alluded to in the previous paragraphs, AFIT has a broad mission umbrella of graduate and professional continuing education, research, and consulting.

By a margin of five to one, our senior-level respondents felt that graduate education in highly relevant technological areas of interest to the Air Force was a very important service provided by AFIT. They favored, in descending order, graduate education in engineering, science, and logistics programs that provided a unique Air Force flavor.

Respondents also saw a valuable asset in AFIT's contribution to professional continuing education. They placed special importance on PCE for acquisition--noting that importance especially for the professional development of scientists and engineers.

Consulting services were also perceived as important--especially for Air Force-only applications and consultation to Air Force laboratories.

Research, both in-house and at Air Force labs by students, was noted by the majority of respondents as either very important or important. A very limited number of respondents found the research that AFIT provided to be only slightly important or unimportant.

Also under its products and services umbrella, but not all inclusive, were majority ratings of very important or important for such diverse answers as: publications by AFIT faculty/students; AFIT-held workshops/symposia/etc.; AFIT-provided inputs to studies/conferences/etc.; AFIT support to professional societies; and assisting customers in determining educational requirements.

AFIT's products and services must be clearly scrutinized by its faculty, staff, and customers for constant improvement and reduction in cost. As Brimson warns:

Continual cost reductions do not come automatically with experience or the passage of time. They require constant management attention in all matters to achieve productivity gains and cost reductions. Too often product cost, and consequently price, drift out of line with competitors and products become unprofitable without management's realizing the problem or taking appropriate action until it is too late. (34:71)

Constant improvement also includes abandoning the things that no longer work; being objective; seeking, demanding change and innovation; and working smarter, not harder.

Of note was the respondents' rating AFIT's responsibility as the Air Force Academic Records Repository as only slightly important. This repository:

. . . contains current documents submitted by each officer as evidence of educational achievement. Academic information is extracted from the records for use by HQ USAF, AFMPC, ATC, AU, AFIT, or agencies of similar and parallel interests. (6:9)

A staff of four maintains 50,000+ graduate student records and over 100,000 PCE transcripts (18:1).

Competition will also require better marketing strategies and skills. AFIT needs to design the right marketing strategy. But first, it needs market knowledge before it attempts to develop its marketing plan. Again, this requires knowing who the customers are—who the stakeholders are. After that, a plan with specific objectives and goals will prove its value.

Question 6. Additional Products and Services

"What additional products or services should AFIT provide?"

In a competitive environment, the pace is very dynamic, change is the key to success, and innovation the cornerstone of survival. AFIT will soon find itself in this arena. Listening to customer product or service requests will provide the

link to manage dynamic change through innovation. Ultimately, AFIT's competitive success will be measured by customer satisfaction--which will, in turn, be measured in terms of throughput.

AFIT may already be starting its competitive race with a handicap. Almost all respondents agreed/strongly agreed that AFIT needed to provide more and better marketing/advertising of its products and services. One respondent replied (to which the majority agreed) "I don't know what all you do or can do." Again, AFIT must realize that very soon it will be operating in a different market, against different competitors offering a variety of educational technologies, products, and services in a market that no longer recognizes the artificial boundaries that provided an element of protection, indeed, survival.

Also, despite the current widespread downsizing occurring, the majority of respondents called for an overall increase in AFIT's educational capability. This need will continue, if not grow, because of the fast pace of managerial and technological change that has mandated continuing education for all DOD professionals. Specifically, respondents called for an expanded PhD capability to meet Air Force laboratory and other needs. Also, they called for more seminars and workshops and showed very strong support for increased throughput in acquisition short courses. It's here that customer focus and customer relations will pay the biggest dividends for AFIT.

Another highly agreed upon item was for AFIT to provide strategic planning for education and training--education management. Another support service aspect was curriculum support services.

All respondents strongly supported AFIT's provision of distance education services to meet continuing education needs at lower costs. The respondents felt that due to limited course offerings "AFIT needs to do more distance

education (video, teleconference, and taking courses to the field)". They were split, however, on the idea of AFIT providing correspondence courses.

The respondents unanimously agreed that support of environmental sciences be an additional AFIT product/service. This is an area of growing concern and AFIT should seek every opportunity to maintain its DOD lead in developing needed educational and consultative programs. As Secretary Rice recently pointed out:

... we continue to increase our commitment to environmental compliance. ... Environmental expenditures will exceed \$1 billion. This includes an aggressive program to clean up contaminated sites by FY 2000, a commitment to comply with all environmental laws and a comprehensive pollution prevention program. That program involves designing out hazardous materials and processes in maintaining existing systems, and minimizing waste generation in all Air Force facilities. (148:29)

Question 7. Product or Service Elimination or Reductions

"What products or services would you prefer to eliminate or reduce in scope?"

A competitive environment will not only cause cost reductions but will also segment educational organizations based on empirical evidence of quality programs. Reduced budgets do not allow all programs to survive, despite the need. Respondents to this survey recognized this fact and agreed that if "AFIT wasn't the leader, recognized expert, center for excellence, etc., for a particular program then AFIT must either attain the status or drop the program."

They further agreed that AFIT should consider reduction or elimination of redundancy in courses presented in other DOD environments. One must assume, however, these program reductions or eliminations would not be effected without a thorough investigation to determine AFIT's ability to be the

quality leader, thereby, forcing competitors to undergo program reductions or eliminations. This is a critical concept. AFIT must decide if it will be the benchmark educational institution that all other DOD education and training activities compare themselves against—or if AFIT will settle to use another institution to measure itself, along with all others, against.

The panel suggested programs with an "unreasonable" amount of training be reduced or eliminated. Also, they agreed unanimously that PCE offerings must address valid needs or be dropped. A common theme that appears throughout this chapter is the realization of budget cuts. Respondents agree that in-house education programs can no longer be the way of doing business. These program offerings must be reduced and offset by an increase in mobile offerings.

Suggestions to drop AFIT research were not well received by the majority of the respondents. One suggestion went so far as to imply any degree that could be obtained at a civilian institution should result in program reduction or elimination at AFIT. The majority of respondents did not support this idea.

Question 8. Future AFIT Services

"Looking ahead 3-5 years, what current or future AFIT products or services will generate the greatest demands by DOD?"

AFIT's leadership must be prepared for the future as never before. That leadership must simultaneously seek business process improvements while questioning conventional truths. Vision, planning, and the ability to translate that vision into a comprehensive plan are paramount. AFIT must have a strong strategic plan. That strategy will convert the mission statement into performance—but how performance is to be defined must also be planned

(61:2:99,107,109). Much of this can be accomplished by close customer relationships. With the upcoming changes, such as Unit Cost Resourcing and the Corporate Information Management initiative, the demand for AFIT products and services will become increasingly market driven. Customers, not Air University or AFIT faculty/staff, will determine the products/services that AFIT will offer.

The ability to produce new curricula, quickly, will become increasingly critical. There will undoubtedly be demands from a multitude of organizations for parochial programs they needed to have started "yesterday." Expectations will change so rapidly it will be extremely difficult to know what customers will expect in the short-, mid-, or long-term. It will be even more difficult to anticipate what to expect from aggressive competitors.

The most agreed upon item for generating the greatest demand by DOD was distance learning capability. If AFIT ignores this one concept, fails to pursue it to the point of it being "second nature," it can not be competitive--it will not survive.

There will be a continuing, increased demand for acquisition and logistics PCE courses. There will be a great demand for personnel educated in information systems sciences, management, and engineering; and capable of incorporating the business process improvements outlined by the Corporate Information Management initiative. The respondents see a demand for integrated engineering courses, those that emphasize the relationship between design, manufacturing, and operational costs.

The respondents agreed that DOD will come looking for environmental engineers, financial managers, and technology managers. According to Brimson, technological advances will force organizations "to compete with three

resources: capital, technology, and knowledge. Knowledge is found in . . . pools of educated professionals . . ." (34:40-41). General Stuart Boyd reminded us:

Technology (and management of technology) is critical to the US Air Force. . . . Creation and management of technology require an educated workforce. . . . We will not be able to meet tomorrow's challenges unless we provide for appropriate education today. Of equal importance, is our ability to incorporate these technologies into effective weapons systems. (29:3)

The possibility exists that we are already too late. As John Correll stated, "The United States is losing its edge in technology" (44:6).

Courses in strategic planning and managing change will be in greater demand; also, courses in accepting, dealing with, and using business strategies.

Again, in the present-day environment that demands downsizing, these senior-level policy and decision makers suggest that DOD will need: more graduate education, including PhD graduates; more PCE, especially in acquisition; more distance education opportunities to reach a smaller force--TDY dollars won't be there; more research to meet the needs of a technically-oriented combat force; more consultation to improve the way DOD units conduct business; etc. DOD and Air Force leaders must realize that to remain competitive and to provide them the additional products and services that they agreed they needed, will require substantial, ongoing investment in education. That investment may not be in AFIT, but, nonetheless, it will still be required. Directing DOD dollars to AFIT may appear to some to be folly in the short run; in the long run, however, it will be a strategy that assists in effecting improved effectiveness and efficiency DOD-wide.

AFIT also needs to develop a strategic marketing plan to assist in "reading the tea leaves" for the products and services that DOD will demand in

the future. Giles provides a list of benefits to be reaped from a strategic marketing plan that receives an organization's sincere attention:

- Improvement in profit targets and investment return;
- Focus on the company's selected markets;
- Efficient use of scarce resources;
- Use of company and product strengths working together;
- Development of new products and markets for the future;
- A proactive approach to change;
- Additional business concentrated in areas of competitive strength;
- A renewed vigor and enhanced motivation of managerial staff; and
- A perspective on the need for cultural change within your organization. (83:7)

AFIT can grow tremendously in this environment--leadership and an innovative faculty and staff must meet the challenge. To remain competitive, AFIT must not become complacent. The Institute must become accustomed to change--again, being the innovator, recognizing the need for change before the competition does and, therefore, able to dictate direction in DOD education and training.

Importantly, AFIT should not restrict its strategic planning to envisioning only an Air Force clientele. With the successful consolidation of so many functional areas and regional work centers, it appears it may behoove AFIT to remove any and all blinders. AFIT must do planning as it is intended to be done, i.e., no restrictions--just brainstorming to meet the demands of the future, no holds barred. As an example, consideration should be given to the Armed Forces Institute of Technology (yes, AFIT) as the sole DOD provider of graduate education (while still maintaining current civilian institutions programs).

Question 9. Effective Delivery of Future Services

"What would be necessary to effectively develop and deliver products or services suggested in the previous question?"

As Brimson puts it, "excellence cannot be built on a weak foundation" (34:1). The previous paragraphs highlighted the ongoing, ever increasing need for current or suggested AFIT products and services. This is perhaps the most dominant reason for getting the viewpoint of the senior DOD officials that participated in this research effort. Increasing educational demands in DOD, particularly in the Air Force, need not be mutually exclusive of force and budget reductions. It does appear, however, this has been and will likely continue to be the case.

As a way of more accurately fulfilling its mission, a panel member's suggestion: "AF needs to do a better job of defining education needs" resulted in a high approval rating from the panel.

The respondents outlined, in their opinions, what AFIT could expect DOD to demand in the near future. They also agree that "AFIT needs to take a rigorous look at curricula to prune those [products or services] no longer needed and focus resources on those that are." Anyone associated with education is aware of its continuous and sharp rising costs. Costs of programs, however, are not always direct and, therefore, pruning for the sake of cost reduction may not be the answer. Supporting activities lend tremendously to the high costs associated with AFIT or any other learning institution. Toombs and Tierney call this phenomenon "cost creep" and explain:

Computer technology, library services, audiovisual materials, office services, and publication are entwined with the curriculum . . . the classroom, laboratory, and library are commanding more and more supplies, equipment, services, and facilities. The cost of keeping

and transmitting knowledge increases just as the more visible costs of generating knowledge through research rise. In short, the curriculum itself is a major cost center. (166:6)

"Rapid course development" was suggested and overwhelmingly accepted as a means of meeting demanding mission requirements from a multitude of functional areas. Accepting that AFIT will do this, what is required? The key requirement, of course, as the respondents pointed out, will be adequate resources--increased manning, including PhDs; experienced experts able to move in and out of AFIT quickly; state-of-the-art computers; adequate management information systems; and state-of-the-art equipment to master distance education's opportunity.

Other methods of increasing product delivery included an increased emphasis on: "on-sites, i.e., mobile training; circuit rider approach; more trained facilitators/associate professors at customer locations" and "some large classes" to lower the unit cost.

The area of resourcing remains a constant and bitter struggle for AFIT. Despite the voiced support for AFIT, there remain, almost yearly, studies to determine the necessity of the Institution. This type of constant turmoil has a demoralizing effect. Commitment must be a recurring theme in order to fulfill AFIT's mission.

Question 10. AFIT's Customers

"Who should be AFIT's customers?"

Respondents prioritized a list (not all inclusive) of who should be AFIT's customers:

Primary: Major commands (MAJCOMs), Students, AF Labs, Air Force Materiel Command (AFMC)

Secondary: DOD, the DOD acquisition community, AF Forward Operating Agencies (FOAs), Air Staff

Tertiary: Foreign/Allied nations, the Nation, accrediting bodies, the Secretary of the Air Force

Question 11. AFIT's Future Customers

"Do you expect the customers to be the same in the future?"

In defining whether future AFIT customers would remain the same, respondents agreed that the primary user of AFIT's graduate education and PCE courses would be the Air Force Material Command (AFMC). Most emphasis would also be placed on personnel in the "junior through middle structure" with "some careful senior courses" also offered.

A majority of respondents also agreed on the concept that:

Organizationally, [AFIT could expect its customers to be] the same; however, the customer pool will be much different. With force drawdown, our smaller work force will be required to be more highly educated than the work force of today. In order to handle the aspects of future jobs that allow productivity through technology, i.e., tomorrow's captain will be handling the jobs of what two or three captains are handling today. Additionally, the "operational" pull to keep these people on the job will be stronger than the foresight to send them for advanced/continuing education. We end up with short-term operational efficiency and, unfortunately, long-term strategic deficiency.

Keller and Raines provide further support by stating, "Where the number of workers shrinks, the importance of each remaining worker increases. Sound investments in this smaller stock of human capital become ever more crucial" (114:11). Education, like technology, is a force multiplier.

A large segment of the research questionnaire centered on identifying AFIT's strengths and weaknesses as perceived by participating stakeholders. With AFIT soon entering a new, competitive environment, no longer can it be

"business as usual." AFIT must continuously meet the ever changing needs of its customers while simultaneously improving its ability to do so. What must AFIT do to satisfy its customers? Turney states most customers want the same things:

- Customers are interested in quality. They want their purchase to work, to do the things they want it to, and to please them in the process.
- They desire good service. They want their products and services delivered on time.
- They want flexibility--the ability to obtain the specific product or service they want. And they don't want to pay a price that exceeds the value received from the product. (167:30)

Question 12. Professional Continuing Education (PCE) Strengths

"What are AFIT's strengths in terms of Professional Continuing Education?

Respondents overwhelmingly agreed they were satisfied with AFIT's PCE programs and their unique Air Force orientation. Additionally, the majority of respondents agreed AFIT provided high-quality, relevant courses with strong ties to their respective functional areas and could be tailored to meet specialized needs.

An additional strong point highlighted by the respondents was the professional quality of faculty, especially their currency and competency, and therefore, their credibility. Although, the majority agreed that AFIT had the capability to change curriculum on short notice to meet immediate Air Force requirements--and, importantly, be cost effective, one respondent is "not sure AFIT is positioned for rapid reaction to changing customer requirements."

It was also agreed that AFIT's facilities were a strength in its ability to conduct and support various PCE programs.

Question 13. PCE Weaknesses

"What are AFIT's weaknesses in terms of Professional Continuing Education Programs?"

The most noted weakness for AFIT's PCE program was out of the control of AFIT. This major weakness was "having more requirements than funds." This also translated to lack of manpower--or more appropriately, overall insufficient resources to do all that is needed.

An organizational structure problem was also identified. The vast majority of respondents agreed that "AU bureaucracy [was] making [AFIT] less flexible and responsive."

AFIT was criticized because of its lack of distance education delivery initiatives--failing to follow up on a perceived high quality at a lower cost delivery capability. Other problem areas were reflected by agreement on the "bureaucratic approval process for course initiation and attendant delay." The speed of adapting to new leadership/management disciplines and incorporating them into the curriculum was also noted.

Throughput, assigned quota allocations for special programs, is not monitored nor is assignment of student quotas handled by AFIT. It appeared, however, that AFIT was still held responsible for failure to provide enough throughput. AFIT needs to correct this misconception and provide comment to quota allocating bodies to facilitate improving this process.

Question 14. Graduate Education Strengths

"What are AFIT's strengths in terms of Graduate Education Programs?"

Respondents agreed that strongest suit in the graduate education area was that AFIT provided "Air Force-focused, student-oriented programs." This

"Blue Suit" environment was also praised for its "ability to meet Air Force needs," i.e., "solving Air Force problems, and to grant degrees in unique, relevant areas."

AFIT research efforts were seen to be directly attributed to tackling real current and future Air Force problems.

Strengths were alluded to for the effort to couple student theses with Air Force laboratories for "real world" research which, in time, provided well-prepared students to the laboratories. Thorough programs, especially the depth and breadth of scientific and engineering needs, were lauded as they are seen as meeting the need for required leading edge education to help the Air Force maintain its technological lead.

Overall, it was also agreed that AFIT's graduate education programs were strong due to close ties between faculty, staff, and students, cultivated with Air Force functional managers.

Question 15. Graduate Education Weaknesses

"What are AFIT's weaknesses in terms of Graduate Education Programs?"

The strongest agreement among respondents concerning AFIT's weaknesses in the graduate education program was tabulated as: inadequate resources to maintain civilian faculty numbers and quality. Inability to hire appropriate level expertise due to budget constraints. They agreed that if the graduate education programs were to be worthwhile, the AFIT faculty had to be competitive.

Earlier it was mentioned that the respondents agreed AFIT's graduate education program was cost effective. They supported this notion in this section

by agreeing that there was "a perception" of lack of cost effectiveness concerning AFIT's graduate education programs. Another perception problem that was agreed upon was that many may view civilian university programs as equivalent to AFIT's graduate education programs.

Pointedly, by a three to one margin, the respondents agreed that there was a lack of understanding and support of AFIT's graduate education programs throughout the Air Force.

There were also areas that were addressed as weaknesses yet the majority of respondents disagreed with them. One comment stated that there was too much emphasis on resident courses, which in turn, detracted from day-to-day changes in priorities. Overwhelmingly, this perceived weakness was rejected.

Additionally, comments were made to the effect that AFIT's graduate education programs required too many resources, especially manpower and dollars, to get the product, i.e., a successful master's or PhD graduate. This perception, too, was overwhelmingly rejected by the respondents--again leading to the conclusion that DOD senior policy and decision makers perceive AFIT as cost efficient.

Question 16. Consulting Strengths

"What are AFIT's strengths in terms of consulting?"

As a precursor to other comments, it should be noted that the respondents unanimously agreed with the fact that consulting is recognized as essential to quality teaching and, therefore, a source of institutional strength to AFIT's mission.

Most agreed that AFIT's consulting efforts were responsive, flexible, and relatively low cost. A few areas of strength that were pointed out were: total quality management, theory of constraints, organizational development, group dynamics, and team building.

Question 17. Consulting Weaknesses

"What are AFIT's weaknesses in terms of consulting?"

AFIT's greatest recognized weakness in consulting was that not too many people are aware of the fact that AFIT does consulting. The panel overwhelmingly agreed: "A greater awareness of AFIT throughout the Air Force would increase the demand for consulting."

The consulting programs were not very visible; few people were aware of them. However, it was generally agreed upon (impressions) that the School of Systems and Logistics provided "much consulting"--and the impression existed that the School of Engineering provided much less.

As in other question areas, the respondents agreed that AFIT is not properly resourced to provide consulting.

Question 18. Research Strengths

"What are AFIT's strengths in terms of research?"

AFIT's research strengths were recognized in both quantity and quality of research being done. Research was viewed as relevant, especially with an Air Force orientation; responsive, and flexible. It was also agreed that AFIT research was conducted at low cost.

AFIT's research focuses on Air Force and Department of Defense problems. "It not only provides a stimulating educational experience to the

students, it allows for professional growth of the faculty as well. Research and consulting by AFIT have saved the Air Force over \$30 million annually" (7:1).

Question 19. Research Weaknesses

"What are AFIT's weaknesses in terms of research?"

Major identified weaknesses of AFIT's research programs were actually traced to origins outside the organization. The most agreed upon comment was the idea that AFIT "could use better input from Air Force commands regarding topics for research." Unanimously agreed upon was the fact that external research in a quality graduate institution is paramount.

The majority of respondents agreed that AFIT needed more outside funding for its research efforts.

Also, the need existed to upgrade its laboratories. This problem was also recognized by the Office of Technology Assessment when a key research finding pointed out: "The complexity and cost of equipment for teaching engineering is high and rising dramatically, and many engineering schools are unable to keep up" (169:59). Graduate research programs are very sensitive to technological change and require constant, almost exponential funding. Once again, commitment, and with it the necessary resources, is addressed.

Internally-related weaknesses centered on a failure to improve feedback and post-research loops. Most agreed that some "hobby shopping" went on in regards to research topics. Importantly, the respondents agreed that there was "not much evidence in the refereed literature of AFIT faculty doing world-class research."

Question 20. Administrative Strengths

"What are AFIT's strengths in terms of Management/Administration (policies, procedures, and organization)?"

The support structure that manages AFIT received high marks for efforts to create a desired "Blue Suit" environment. Respondents agreed the support structure was focused on education; customer focus was good and there was a spirit of cooperation; and personnel were responsive to customer needs. Additionally, "AFIT personnel had a knowledge of DOD and military processes and a strong belief in AFIT's mission."

Again it was agreed that AFIT had quality people, putting forth an effort to meet requirements with limited resources. There was a good military/civilian mix with a great ability to cope with change—especially an ability to survive in spite of a large force structure/manpower drawdown.

Question 21. Administrative Weaknesses

"What are AFIT's weaknesses in terms of Management/Administration (policies, procedures, and organization)?"

One comment relayed the opinion that "AFIT should be cut drastically [with emphasis on drastically] as it is a dinosaur in its present configuration.' Overwhelmingly, the respondents disagreed with this perception. But, again, here is another area AFIT has had to constantly defend. As Turney discusses:

When hard times hit, this type of knee-jerk reaction is typical--i.e., reach for the knife to achieve cost reductions. This cost-cutting method does save money in the short run but over time manning strengths creep back up to their initial levels. When you slash overhead costs, you're cutting the result, not the cause. Consequently, you're more likely to damage the quality of products and services than to reduce costs permanently. The way to do that is to change the way you perform the work. (167:18-19)

Harari provides further support:

The key is to make the right cuts, not just big cuts. . . . The point is to apply precise surgical strikes to procedures, policies, and personnel that add least value to the critical mission of the firm. One last thing to keep in mind: The minute you start applying the cleaver to . . . quality and service enhancement, and training, you're dead. If anything, expenditures in these areas should go up. (93:9)

Most also agreed that AFIT needed to make more effective use of automation to provide specific solutions to the types of problems AFIT is currently encountering. Along the lines of automation, again, it was noted that AFIT's distance education capabilities were lagging—with further criticism for a lack of initiative to use technology to decentralize training and education.

Another weakness focused on faculty vacancies. This was viewed as especially critical in view of current and proposed increases in the PhD load. The key here, as Brimson states, "is to manage and reduce the work load—not just the work force—and to streamline the activities of the remaining work load" (34:2). As Drucker emphasizes, "As you add new tasks, you deemphasize and get rid of old ones. You can only do so many things" (62:5).

Quality business improvement initiatives should always be at the forefront of AFIT's "way of doing business." However, it must also be recognized by Air Force leadership that the Institute cannot continually be drawn down and expected to still maintain its current work load. Doing "more with less" must be replaced with doing "less with less" if the quality of AFIT products and services are to be maintained. If DOD and the Air Force expect to keep AFIT's doors open, i.e., a continued commitment to be competitive DOD-wide, there will have to be an increase in resourcing. This is the price that must be paid if AFIT is to

remain competitive in the education of its customers. This pertains not just to AFIT, but to all DOD education and training institutions.

Also, there was the perception that AFIT needed to streamline procedures for getting PCE courses up and running.

Along formal organization lines, it was agreed that Air University, the major command to which AFIT is attached, "ties AFIT's hands," i.e., precludes AFIT from acting independently, especially in the areas where it could and should act independently. By a two to one margin, the respondents agreed that AFIT should be broken away from AU and made an FOA (Forward Operating Agency).

Question 22. Other Strengths

"What are AFIT's strengths: other area (please define)?"

There were only two additional strength comments outside the previously discussed areas. The respondents agreed that AFIT's personnel were dedicated to the AFIT mission. They also agreed that theoretical engineering was a strength.

Question 23. Other Weaknesses

"What are AFIT's weaknesses: other area (please define)?"

There were only a limited number of responses regarding other area weaknesses for AFIT. Most notable was the fact that the AFIT commandant should be an Air Force general officer. Secondly, AFIT needs a flexible pay structure to maintain competitiveness with other educational institutions--something it currently does not have. Also listed as a weakness was practical engineering.

Question 24. Effectiveness and Efficiency

"What would you change to improve AFIT's effectiveness and efficiency?"

There were numerous comments and suggestions to improve AFIT--some are within AFIT's control; others, obviously not.

It was suggested that the Air Force (whomever that may be) make a decision on whether AFIT is to exist or not, i.e., to stop the yearly cost-benefit studies to determine the worth/need of AFIT to the Air Force. Unanimously, the respondents agreed on this course of action. Along those same lines, it was agreed that if the commitment is to be there, then resource it--all facets--properly. External to AFIT, the stakeholders must decide if the Air Force, through AFIT, will provide the graduate degrees and continuing education needed. Will Air Force organizations expend the resources necessary today to be capable of responding to the rapid changes in technology and management tomorrow?

The idea to fund AFIT with 3600 money (research and development) received an equal support/nonsupport split; half of the respondents, however, failed to respond to this comment. It will be necessary to refine the processes that define Air Force education needs--better delineating the connection between educational requirements and the resources necessary to provide it.

One suggestion was to abolish AFIT as it currently exists and only have courses that are Air Force unique taught at Wright-Patterson AFB. This respondent further suggested sending personnel to civilian institutions for graduate degrees that are needed and saving lots of resource dollars. This idea was, however, rejected by the vast majority of the respondents--fourteen to two. Almost all did agree, however, that AFIT must ensure it has a unique niché.

Moreover, they agreed AFIT must "continue efforts at image enhancement--especially within the Air Force."

Again the organizational command lines were commented on. Most respondents agreed that AU needs to provide less control and, to a slightly lesser extent, agreed AFIT should be made independent of AU. Despite the suggestion to make AFIT independent, the respondents were split as to making AFIT an FOA; even fewer agreed with the idea of placing AFIT under AFMC. (Earlier, Question 21 indicated respondents desired to make AFIT an FOA by a two to one margin. These respondents were commenting on the combined suggestion "organizationally--break it out of AU. Make it an SOA." In Question 24, respondents were commenting to "make it an SOA" and, separately, "make it independent of AU." While it appears there may be conflicting results, the differences are a result of how the comments were divided/grouped in these two questions.)

It was suggested that a SAF--level position (under secretary level) be created to provide strategic oversight/direction for AFIT in conjunction with other pertinent educational oversight agencies (e.g., AFIT Board of Visitors and AFIT's accrediting agencies). Once again, the respondents were split about equally between agreement/disagreement on this topic.

For internal stability, it was recommended that the AFIT commandant not only be a brigadier general [assumption by researchers] but to consider restoring that position to the major general level. The respondents agreed that the AFIT commandant position should be a general officer. The key element here is a general officer commandant, in a controlled tour of several years, that is capable of providing exceptional leadership in an educational environment.

The next five years appear to be some of the most turbulent years the Air Force will ever face. As Drucker puts it:

The most important task of an organization's leader is to anticipate crisis. . . . to make the organization capable of anticipating the storm, weathering it, and, in fact, being ahead of it. That is called innovation, constant renewal. You cannot prevent a major catastrophe, but you can build an organization that is battle-ready
(62:9)

It was suggested that efforts be made to ensure the stability of AFIT's senior management positions. The respondents also agreed, almost unanimously, on this point. Again, the discussion turns to long-term strategic planning. And, again, this implies commitment--where plans can be made for the future. Currently, AFIT exists on a day-to-day basis. The commandant has no idea if he'll receive a call telling him to shut AFIT down. This adversely impacts morale and how planning for the organization is accomplished. Without that long-term commitment, AFIT finds itself working on immediate symptoms--commonly called "brush fires." When one fire is out, on to the next crisis. This shortsightedness breaks people down and burns them out. This organizational lifestyle continues, looking for the quick fix to the symptoms, rather than deal with the chronic problems. Even long-range strategic planning will fail in this scenario if AFIT personnel are in constant turmoil, unsure of their futures.

From a customer-oriented perspective, it was suggested AFIT allow the MAJCOMs more input into the course curricula. This would allow these partners in education to "take a rigorous look at curricula and prune those no longer needed and focus resources on those that are." This relationship would also help ensure "AFIT graduates were efficiently and effectively being utilized in an AAD [advanced academic degree] billet." Respondents agreed that these actions would assist in improving AFIT's effectiveness and efficiency.

Again, comments were made about distance education. This appears to be one of the most important "foot stompers" highlighted in the survey results. It was unanimously agreed upon that AFIT should "push hard for best quality distance education" capability.

Research improvements were tied to ensuring closer relationships with the super labs (especially the Wright Lab) and to look into the possibility of making staff research a part of lab programs.

Question 25. Future Mission

"What factors in AFIT's external environment (events, budget, regulations, technological changes, etc.) will significantly affect the organization's ability to achieve its mission?"

One first-round comment stated AFIT shouldn't have much of a mission. This comment, however, was overwhelmingly rejected by the respondents. But this does lead to another comment that suggested "the Air Force determine, once and for all, if AFIT should have a mission." The implication being if it should, support it; if it should not, then close it. This also was unanimously agreed to.

If AFIT is to keep its doors open as a matter of policy then it still faces a challenge from DOD's dwindling resources. As one panel member put it--"the budget will continue to challenge AFIT's existence." Therefore, in light of a decreasing DOD, and specifically, Air Force budget, "production will become even more difficult to achieve." Additionally, continued competition by civilian institutions will play a major role. One respondent relayed, "I see more and more universities offering courses that have an orientation to a specific purpose vice generalized education." Although not by a wide margin, respondents agreed with that perception.

To meet the demands of severe budget constraints, it appears the Air Force is taking short-term approaches to cost reduction. Brimson provides a list of inevitable actions under such circumstances: Freeze hiring; freeze overtime and pay increases; freeze training; freeze overhead activities; freeze non-essential travel; offer early retirements; make universal reductions in the budgets of all departments; cut back R&D and investment; and, downsize (34:2,10). He adds "these approaches may ease short-term cash flow problems but, in the long run, hurt company performance and alienate customers" (34:2). Brimson continues by offering that rather than implement short-term fixes, organizations must:

1. Address the fundamental problems and eliminate nonproductive structured cost;
2. Design cost out of products, activities, and business processes; and
3. Greatly improve efficiencies in the long run. (34:2)

This brings it all back to square one. If the DOD and Air Force senior policy/decision makers have a "commitment to technologically advanced education," which they unanimously agreed upon, then they must make the effort to adequately fund AFIT. Regardless, however, in today's tough resourcing environment, it is dangerous to focus only on the bottom line. Such a near-sighted focus may lead to short-term successes--but also long-term failures. If senior policy/decision makers allow cost of education to be the sole factor in their decision making process, then they will have lost sight of the multiple factors that play in AFIT's long-term ability to produce quality programs that they themselves view as necessary to meet the operational commitments of their organizations.

AFIT must also recognize the need to change--empirical evidence of a better product/service at a lower cost than offered elsewhere will be required. Panel members agreed that the current environment is forcing new ways of doing business. They also agreed that AFIT has a better opportunity than anyone else in the Air Force to rapidly and effectively change its culture to continuously improve customer satisfaction. AFIT must recognize that change, while it can be a threat, is more likely opportunity--and personnel should look for innovation.

Other agreed upon significant areas of impact included the educational demand of the acquisition community; as alluded to above, a continued DOD emphasis on technology; continued downsizing; and timely replacement of faculty with highly qualified people.

Respondents also indicated, although not by a wide margin, that AU's goals/objectives would significantly affect AFIT's ability to achieve its mission. It should be noted that the panel members agreed, unanimously, that over control would also have significant impact.

AFIT staff and faculty were requested not to comment on questions 26-29 as the questions were not applicable to them.

Question 26. PCE Attendance Alternatives

"Within your area of responsibility, do personnel routinely obtain professional continuing education (PCE) courses from AFIT? If not, why--and where do they obtain the education?"

Ten responded "yes"; three "no;" four "N/A;" with three no responses.

This question attempted to determine if sources other than AFIT were being used extensively by the panel members for their PCE requirements. No

comments were provided from Questionnaire I for respondents in this second round to comment on. No additional second-round comments were made.

Question 27. Graduate Education Attendance Alternatives

"Would you prefer to send your personnel to AFIT (resident) to obtain graduate education? If not, why--and where would you prefer they go?"

This question was trying to determine major alternatives for graduate education that AFIT needs to be aware of. The majority of respondents preferred AFIT resident graduate education over other institutions. Most agreed that AFIT provides the unique education they desire and because the programs are focused on Air Force needs.

For PhD programs, however, it was an almost equal split preference for AFIT resident programs and civilian institutions. But most agreed that for DOD civilians trying to obtain graduate education, AFIT did not have the ability to meet the demand. Again, this reinforces the idea that AFIT must consider the entire DOD population as eligible for its products and services.

Interestingly, and of special note for AFIT, the respondents were split on a comment that referenced a preference for AFIT resident graduate education but, due to Air Force dollar/manpower cuts, now sought civilian institutions because of perceived reduction in AFIT quality.

The respondents were also divided over the need to have graduates from the "right" universities (MIT, Duke, Arizona State, etc.) to maintain the appearance within the R&D world of having a quality staff.

Question 28. Consulting Alternatives

"Do you obtain consulting services from AFIT? (In CY 91, the spectrum of consulting services ran from phone calls to formal investigations with written reports) If not, why--and where do you sponsor research?"

Eight responded "yes"; four "no;" five "N/A;" with three no responses.

This question attempted to determine the awareness and extent of AFIT consulting services. No comments were provided from Questionnaire I for respondents in this second round to comment on. No additional second-round comments were made.

Question 29. Research Alternatives

"Do you use AFIT for sponsored research? (theses, dissertations, or faculty projects, whether funded or unfunded)? If not, why--and where do you sponsor research?"

Nine responded "yes"; three "no;" five "N/A;" with three no responses.

This question was trying to determine major alternatives for research that AFIT needs to be aware of. No comments were provided from Questionnaire I for respondents in this second round to comment on. No additional second-round comments were made.

Summary

The responses provided by the panel members provided an excellent first step to assist AFIT in determining its critical success factors; and therefore, its strategic direction. AFIT should take special note of these responses as, again, they are from senior-level positions throughout DOD. For these individuals to take time out of their busy schedules to participate in it both lengthy

questionnaires should indicate to AFIT's leadership the concern and the need for a healthy AFIT.

Critical success factors will identify the strategic direction in terms of stakeholder needs. After the activities have been prioritized, then a reality check must be made based on resourcing. Customer's will draw the line on what they will finance under the proposed fee-for-service initiatives. Changes in activities will be based on user needs, reflecting AFIT's ability to meet customer needs and provide continuous improvement. Under unit cost resourcing, AFIT must draw the line to determine what it can provide--understanding that meeting customer needs will provide AFIT with an element of control previously unattainable.

VI. RECOMMENDATIONS

Chapter Overview

There are tremendous changes taking place within the Department of Defense--restructuring, budget cuts, manpower cuts--items that have occurred before but never to this extent, nor with the sudden impact. AFIT will soon be caught up in those dramatic changes and will feel the impact as it faces doing business less like a government entity and more like a civilian business. AFIT faces the formidable task of simultaneously improving quality and customer service while reducing costs. To succeed AFIT must organize itself as a business enterprise to perform at higher, more productive levels than ever before. When DOD organizations think education, research, or consulting, they must think AFIT--if AFIT is to survive in the newly defined, competitive unit costing environment.

Review

Following the Packard Commission's report, DOD information systems integration efforts through CIM were established to implement business process improvement. In past years, information systems that contained cost accounting type information could be found only in accounting departments. Not any more! New business approaches in DOD require the commander to take control of his unit's resource allocation procedures. The primary task will be to review the current business processes and determine if any should be reduced or deleted. If either occurs, the Institute must ensure that the activities were non-value added and not eliminated on a cost-only basis.

When AFIT receives its budget allocation from Air University, based on historical student and budget data, strict budgeting measures will, and must be, followed. The product and service output information will be extremely important because the type of output will determine the amount of reimbursement (through unit cost resourcing). AFIT costing procedures will also have to be open and defensible.

The research questions identified in Chapter I were an attempt to provide AFIT with the perceptions of its stakeholders and assist in defining its internal and external environments. More specifically, those questions looked to identify AFIT's mission, who its customers are and should be, what products/services AFIT provides and should provide in the near future, and what is required to provide those products/services.

Also, the research effort was directed at identifying AFIT strengths and weaknesses--both real and perceived. The researchers believed the Delphi technique to be the most appropriate method for gaining the widest spectrum of respected opinion from experts at the highest level that were able to address numerous feasible options, prioritize them, and place resources against them.

Chapter V reiterated those research questions and provided the responses from senior-level DOD leaders/managers. In the aggregate, these responses provided a very wide spectrum of interests for and concern about AFIT; specifically, they provide AFIT a wealth of data in which to ascertain a particular course of direction. Again, these responses are from some of the most senior policy/decision makers in DOD and cannot be ignored--their participation alone reflects their understanding of the role AFIT plays in educating the personnel that will be in charge of tomorrow's military establishment.

Recommendations

The AFIT Commandant faces a new challenge. Quality and productivity issues will demand more attention and a commitment to continuous, measurable improvement. AFIT's senior leaders must clearly define how they will conduct future business. Individuals, as opposed to Program Action Teams or ad hoc committees, must be given clear authority and responsibility.

First and foremost, AFIT/CC must recognize information as a significant resource and plan strategically for its use to gain a competitive advantage in AFIT's "new marketplace." Overnight, AFIT's current strategic plan has become obsolete. The new plan must focus even more on stakeholders and the customer-provider relationship. The strategic business concepts that DOD is turning to will require pulling away from the old methods of doing business and will require a brand new concept for cost-effective AFIT programs.

Qualified management has proven to be a real dilemma. Management quality has become a key to success; and information and its supporting technology have become essential for success (180:17). Also, information systems add value only to the extent that these systems and their products have direct access to and are controlled by management (180:17).

Most studies indicate that information systems that succeed were precisely those in which top management participated (184:43). Strassmann also emphasizes the role of management in information technology. He states, "Measuring managerial productivity is the key. . . . Improve management before you . . . automate" (160:xvii).

AFIT must use its information resource to gain competitive advantage. For the information resource to be of benefit, AFIT must select an information process- or activity-oriented methodology to trace costs to their source and

provide a dependable audit trail. And, to meet new DOD mandates, AFIT must have an open system architecture so it can establish an integrated information system that its shareholders can employ.

Such a system must: be simple to use, i.e., require minimal training for effective, efficient use; be easily updated and expanded; maintain data that is reliable, relevant, and easily accessible; follow new DOD guidelines for data standardization; reduce maintenance costs; and be tied to the overall strategic objectives of the organization. This list is not, and was not, intended to be all inclusive; however, it should provide some assistance in the detailed research by the AFIT/SC community and calls for unwavering support from the AFIT Commandant. It is imperative that every individual within AFIT understands their responsibilities as an information manager. Information will become the strategic weapon of choice for competitive advantage in the marketplace.

AFIT must also devise a strategic marketing plan that advertises AFIT's capabilities, products, and services. Procedures will be needed to track the types of services provided to customers and also determine specifically what costs have been incurred. Not only will there be a need to attract customers based on high quality but a need to determine if the allocated unit cost per output will cover costs. Again, it should be pointed out that the respondents agreed that AFIT needed to market itself better as many did not know what services AFIT offered.

The researchers recommend this document serve its intended purpose, i.e., a base foundation for AFIT to implement business process improvement. Suggest AFIT/CF be given overall responsibility for coordinating the many facets of redesign AFIT will be required to undertake. As Corbin points out, and what AFIT/CF must do, is to use "business process reengineering to negate virtually

all the premises on which previous organizational structures have been based" (41:41). This tasking may involve a complete overhaul of the way AFIT does business. Someone with extensive civilian educational background and working knowledge of AFIT must provide the vision that will govern AFIT's products and services; therefore, it is necessary to appoint a key senior manager for this task.

AFIT/CF must ensure each school continues to conduct formal and informal program reviews with its stakeholders. These reviews must be customer focused, catering to operational needs. Customers' requirements will not only drive the activities that AFIT must perform, but will provide reimbursement. Along these same lines, AFIT/CF must be responsible for ensuring both PCE and graduate education courses are established that will educate AFIT's customers to these new budgeting and accounting concepts.

For AFIT to realize the full potential of corporate information management, there must again be that single senior leader with vision of how technology and information can be combined to identify strengths, weaknesses, opportunities, and threats. This visionary must see the organization as a whole, not just a series of functional activities. Information usage must be shared across functional activities as a corporate resource, not a resource of segmented departmental activities.

A new DOD business perspective (activity based costing) requires information managers to make a commitment to corporate information management and establish business models to link their organizations business activities to the costs associated with them.

AFIT's Directorate of Resource Management will need to track AFIT's total budget and make recommendations for cost saving measures with product and service output in mind. Whereas schools had not previously been as

concerned about monitoring costs which they knew could be covered within the command's total budget, they now will find themselves forced to institute new ways of identifying and tracking costs. Feedback must be real-time in order to remain within the parameters established for an organization's budget. For the first time, AFIT staff and faculty will be required to update and report not only programmatic data for courses and students, research and consulting, but indicate revenues and costs within their programs.

AFIT will not be reimbursed for consulting, research, or educational record keeping on a cost reimbursement basis through DBOF.

AFIT/SC must be responsible for implementing organization-wide information systems that provide real-time reliable data to assist in decision making throughout AFIT. Information technology, computer systems, and software management tools and techniques can add value to business processes, but by themselves they do not deliver strategic gains (133:81). Brewin agrees by adding, "Businesses . . . gain strategic advantage by changing the way they work, not by automating old or inefficient methods. A key to this approach is to strip all processes down to basics, to unit costs, so managers can see what works and what doesn't. . . ." (33:3).

The researchers suggest that Information Engineering be the applied methodology for managing the life-cycle development process, ensuring that data is a central concept for systems development. Data should be corporate and easily accessed for manipulation as required by any user of its internal customer base. Therefore, the AFIT database must, despite its numerous users, be reliable, safeguarded, and capable of maintaining data integrity. The entire process should be developed along the guidelines provided from the Corporate Information Management initiative, e.g., open systems architecture, data

standardization, and safeguarding information. AFIT/SC must be responsible for meeting new, dynamic DOD-wide standardization requirements.

AFIT/RM must take full responsibility for every aspect of unit cost resourcing for AFIT's internal operations, i.e., to assist in putting an accurate price tag on every activity AFIT engages in. Air University, in order for AFIT/RM to meet its unit costing responsibilities, must provide detailed costing data for AFIT to budget for purchases costs and to justify reimbursement for services costs. Customers will be demanding this exact information in order to execute their budgets. AFIT and AU must become electronically linked to attain and maintain the capability necessary to handle course and cost data on a real-time basis.

AFIT/XP should be the overall coordinator for both AFIT's strategic plan and its subcomponents, the strategic marketing, and information plans. The concept of marketing AFIT is critical and will require an extensive market research to determine customer needs. The directors of research and consulting must be integral parts of the marketing strategy. According to the results of the survey, respondents overwhelmingly agreed with the comment "More (better) marketing/advertising of products and services. I don't know what all you do or can do." Whereas it is understood each school will develop its own strategic marketing plan, AFIT/XP must ensure these individual plans are congruent with AFIT's overall marketing strategy.

It is only through changes in the business process that significant gains are made. AFIT must continue its drive toward increased productivity and lower costs through its long distance education program.

The Training and Performance Data Center, Orlando FL, will track AFIT's programmatic data; whereas the Defense Manpower Data Center (DMDC) will

track AFIT's' total costs and total outputs. DMDC will determine the amount AFIT is reimbursed for its outputs. As of this time, only "students" have been considered outputs for schools. AFIT's sole reimbursement will come from cost-per-graduate data. By increasing productivity, AFIT will be able to do more with less. Do not assume, however, that more graduates mean more money.

AFIT/RR, in defining its activities, should keep its sights on the proposed fee-for-service program and be prepared to place a dollar figure on each of its activities. As an example, specific reimbursement for a forwarded transcript would be charged directly to the customer. Other possible reimbursements would come from maintaining Air National Guard and Air Force Reserve officer education records and record requests on their personnel.

The Directorate of the Registrar and Admissions will have to schedule courses with cost information in mind. For example, a course with only five students may no longer be economically feasible. AFIT/RR will need to notify customers of course cancellations--timeliness of notification would mean the difference between the customer being reimbursed by AFIT or not for TDY travel to a canceled course. Timely notification works both ways and the RR shop must help ensure all possible seats in AFIT classrooms are filled for each course offering.

AFIT/IM responsibilities have been relegated to the art of managing the mail. The progressively important aspects of the Defense Information Management program dictate AFIT/IM accept greater responsibilities for the management of AFIT's information resources. Efforts should be expended to reinstate the AFIT/IM position to an officer and the enlisted personnel screened for the technical and managerial background necessary to assist in automating the select processes that AFIT retains to conduct its business.

Process Model

The survey responses provided a baseline for establishing a rudimentary process model which details the AFIT "To-be" activities (Figure 6-1). To fully implement business process improvement, activity modeling of AFIT's functional activities must be performed.

The process should first identify value and non-value added activities. These models assist in taking uncertainty out of the decision making process. Activity based costing facilitates the business improvement process by linking activities and costs. An AFIT "As-is" process model must be developed to then further implement Functional Economic Analysis which tracks costs and identifies cost "avoiders."

Process models must not only be used in the IM field to identify and record activities, but must be used by line personnel who are closest to the activity, understand its details, and can initiate improvements at the lowest level. The AFIT "To-be" process model needs to be compared and contrasted to an "As-is" process model.

Summary

The objective of this research was to identify the strategic-level requirements for an integrated information system in order to facilitate decision making at the business process level. This would enable AFIT to develop a system that would provide staff, faculty, and customers with insight into the cost and value of AFIT products or services.

The responses from Chapter V and the recommendations from this chapter are key sources of information to assist AFIT in identifying strategic-level critical success factors. As mentioned throughout this study, information is

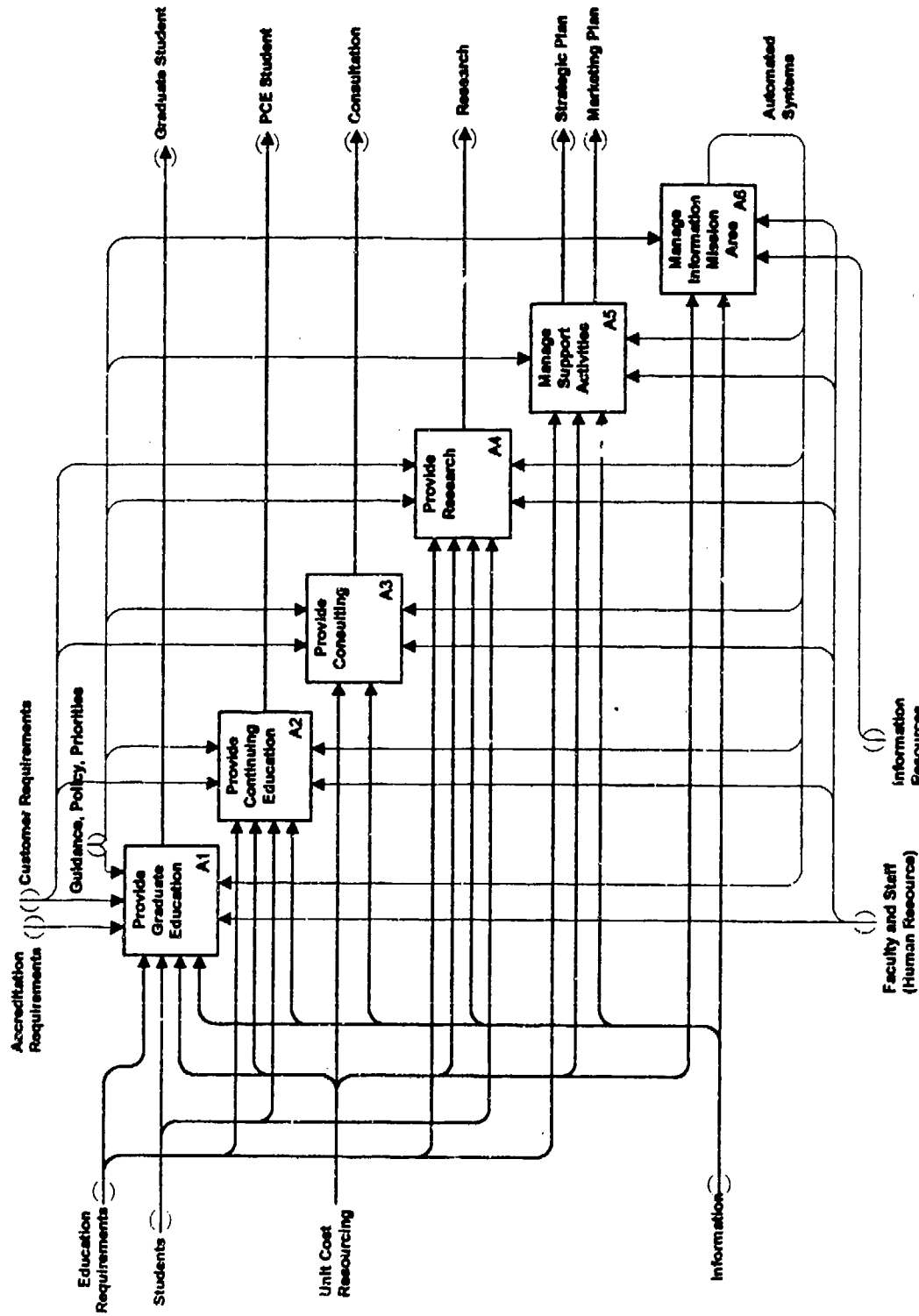


Figure 6-1

AFIT "To-Be" MODELING DIAGRAM

a strategic resource. That resource is useless without an integrated information system that is supported by a strategic information systems plan. Information that is readily accessed, reliable, and relevant will prove to be the essential component that provides AFIT the insight into cost reductions and quality improvements—the competitive advantage.

Appendix A

GLOSSARY

Activity: A named process, function, or task that occurs over time and has recognizable results. Activities use up resources to produce products and services. Activities combine to form business processes. (43:A-5)

Activity Based Costing (ABC): A method of measuring the cost and performance of activities, products, and customers. In product costing applications, for example, ABC allows costs to be apportioned to products by the actual activities and resources consumed in producing, marketing, selling, delivering, and servicing the product. (167:24)

Activity Model: A graphic representation of a business process that exhibits the activities that make up the business process to any desired level of detail. An activity model reveals the interactions between activities in terms of inputs and outputs while showing the controls placed on each activity and the types of resources assigned to each activity. (43:A-5)

Architecture: See Information Systems Architecture.

Benchmark: An activity that is best practice and by which a similar activity will be judged. Benchmarks are used to help identify opportunities for improving the performance of comparable activities. The source of a benchmark may be internal (such as another department in the same company) or external (such as a competitor). (167:382)

BSP: See Business Systems Planning.

Business Case: A structured proposal for a Business Process Improvement Program that functions as a decision package for enterprise leadership. It includes an analysis of business process needs or problems, proposed solutions, assumptions and constraints, alternatives, life cycle costs, benefit/cost analysis, and investment risk analysis. Within DOD, a business case is a Functional Economic Analysis (FEA). (43:A-7)

Business Policies: Policies are the guiding principles and operating fundamentals that determine the direction the organization shall take. Policy is announced in memoranda, regulations and directives. Policies

frame the business methods and performance measures to be employed by the organization. (56:iii)

Business Process: A collection of activities that work together to produce a defined set of products and services. All business processes in an enterprise exist to fulfill the mission of the enterprise. Business processes must be related in some way to mission objective. (43:A-7)

Business Process Redesign (BPR): BPR is a methodology for transforming the business processes of an enterprise to achieve breakthroughs in the quality, responsiveness, flexibility and cost to compete more effectively and efficiently in a chosen market. (78:91)

Business Process Reengineering: The improvement of business methods as the systems supporting those methods are improved. (89:40)

Business Rules: Specific English sentences that describe and specify the constraints the environment imposes on the data relationships (43:A-8). Business rules are developed from two forms of knowledge: basic and expert. Basic knowledge is based on known relations such as time and cost. Expert knowledge is derived from experience. (34:53)

Business Systems Planning (BSP): BSP was the first systems development methodology to emphasize data as a corporate resource and to recognize the need to link information systems planning to strategic planning. BSP provides a structured top-down design and bottom-up implementation methodology for organizations to deal with information flow within an organization. It displays the information/subsystem relationships and the processes supported by each subsystem (63:55).

Capital Budgeting: The making of long-term planning decisions for investments and their financing. (34:204)

CASE: See Computer-Aided Software Engineering.

Change Agent: A person who introduces and implements innovative tools and techniques. (116:264)

CIM: See Corporate Information Management.

CIM Integration Architecture: The reference model that guides all information systems implementation activities. It provides a strategic framework for making information systems related decisions that impact, or may impact, the DOD information infrastructure. The architecture supports a layered

approach to defining information systems implementation activities, which ensures that all such efforts proceed from mission requirements, organizational objectives, and business process needs to workable systems that are compatible with the current geographic and technological infrastructure that together provide a platform for all systems operations. (43:A-9)

Computer-Aided Software Engineering (CASE): A computer tool used to build and update models of entire organizations and their strategic plans and to design and document systems development from planning to implementation of complete systems. (82:17)

Continuous Improvement: The relentless and ongoing search for ways to improve business performance. (167:382)

Conventional Cost System: Any of the older, traditional cost systems that use direct material and labor consumed as the primary means of apportioning overhead. This proved adequate when the overhead cost of indirect activities was a small percentage compared to direct labor consumed in actually making products. But today, automation has reduced direct labor substantially, leaving indirect activities as a far more significant cost factor. For this and other reasons, using direct labor as a primary apportioning device can cause significant costing distortions and poor strategic decisions. (167:25)

Corporate Information Management (CIM): An initiative to reduce non-value added work and costs. The concept focuses on maintaining or improving the quality of a product or service while minimizing total expenses for conducting that particular business function. (10:1-2)

Cost: Resources sacrificed or foregone to achieve a specific objective. (34:204)

Cost Driver: A factor that causes a change in the performance of an activity and, in doing so, affects the resources required by the activity. For example, the quality of parts received by that activity is a determining factor in the effort required by that activity. An activity may have multiple cost drivers associated with it. (167:383)

Critical Success Factors: The few key areas of activity in which favorable results are absolutely necessary for a particular manager to reach his goals (149:17). Those factors that engage management's attention and insure that the information systems meet the most critical business needs (107:20).

Data: Data are language, mathematical, and other symbolic surrogates which are generally agreed upon to represent people, objects, events, and concepts. Simply stated, data are raw facts. (35:4)

Data Entity: A person, place, or thing about which information is stored and managed. Data models are comprised of entities and their interrelationships. (116:267)

Data Model: A graphical representation of an organization's information and data assets expressed in terms of entities, relationships, and interrelationships. Relationships are also called business rules because they enable or constrain business actions (43:A-11). Data models are used to specify databases requirements (116:265). A data model includes both a data entity list and a data map. According to Finkelstein, "a data entity represents some 'thing' that is to be stored for later reference . . . for example CUSTOMER, ORDER, SUPPLIER, and PRODUCT are data entities" (72:34). A data map graphically illustrates the business strategy established to manage data entities and their associations with other entities (72:37).

Data Normalization: A data modeling process used to simplify random groupings of data into data entities. (116:265)

DBOF: See Defense Business Operations Fund.

Defense Business Operations Fund: A DOD revolving fund established in FY 92; includes all existing stock and industrial funds for all military departments. Conceptually, all direct, indirect, and general and administrative costs incurred shall be collected and identified to the product or service benefiting from the costs. (154:Atch 1,1; 156:11)

Delphi Technique: A process of deliberation, involving a group of experts, that is steered, through feedback, by a control group. The Delphi technique attempts to improve the panel or committee approach to problem solving, forecasting, etc., by subjecting the views of individual experts to each other's criticisms in ways that avoid face-to-face confrontation and provide anonymity of opinions and of arguments advanced in defense of these opinions. Each successive iteration is intended to uncover a consensus, which, in turn, is applied to solve problems, forecast, etc. (145:333)

Direct Costs: Direct costs are those costs clearly identified to a product or output and are totally related to the output, such as hands-on labor or material used in a product. First line supervision over a function in sole

support of a specific output is considered a direct cost. Similarly, second line supervision may also be considered a direct cost if solely in support of a specific output. Secondline supervision and activities above second line that do not provide direct benefits to a specific output are considered indirect costs. Costs related to Headquarters, regional offices, or support activities are not considered direct costs. (155:7)

Enterprise Model (EM): A description of the entity types, functions, and processes that define an enterprise and the interrelationships (127:431). A composite data model that represents all modeled data within an organization (116:266).

Entity: A person, place, or thing about which information is stored and managed. Data models are comprised of entities and their interrelationships (116:267).

Fee-for-service: Conceptually, fee-for-service has the customer reimbursing the provider for products or services rendered. This differs from unit cost resourcing, in that, the reimbursement comes directly from the customer's organization (86). "Fee-for-service makes it possible to establish a measure of actual computer center productivity gains and a measure of competitive excellence for software efforts" (162:9,

Functional Economic Analysis (FEA). A methodology for analyzing and evaluating alternative information system investments and management practices. Within DOD, FEA is a Business Case. (43:A-7)

Functional Layer: The functional layer of the CIM Integration Architecture contains the specific processes that are derived from mission needs. All business processes exist to serve mission needs or they are entirely unnecessary and should be discontinued. (43:A-12)

General and Administrative (G&A) Expenses: General and administrative expenses are essentially overhead. These costs cannot be reasonably associated with any particular outputs and are allocated over all of the outputs. G&A costs generally include functions such as local comptroller, installation security, . . . legal services, fire protection, . . . refuse collection, snow removal and similar types of base support functions. (155:7)

IDEF Modeling Techniques: Techniques that were derived from the Integrate Computer Aided Manufacturing (ICAM) program sponsored by the US Air Force. The acronym IDEF (pronounced eye-deaf) was formed from the term ICAM Definition Languages. The widely used techniques were

designed to capture the processes and structure of information in an organization. (43:A-13)

IE: See Information Engineering.

Indirect Costs: Indirect costs are those mission costs which benefit two or more outputs but not all outputs. Costs which benefit all outputs are general and administrative expenses. (155:7)

Industrial Funds: Industrial funds are revolving funds established to manage the acquisition and distribution of services. (49:6)

Information: Information is data placed into a meaningful context for its recipient (35:20). The meaning people assign to data that increases their knowledge with regard to an item of interest. Information usually is derived from the assembly, analysis, or summarization of data. (54:2-1)

Information Analysis: See Information Requirements Analysis.

Information Engineering (IE): A data-driven design discipline that encompasses business, data, process, and enterprise modeling practices (116:268). IE is a strategic information systems development methodology which supports the entire life-cycle of information as a valued resource (121:449). IE is a systematic, top-down, planning methodology which is data oriented and objectives driven. Through interviews and questionnaires, IE identifies and models data required to run an organization. IE does not automate manual information systems or business routines but models the organization according to a new strategic plan. (72:233-234)

Information Management (IM): IM is the management of information as a resource. Information becomes a valuable resource like financial and human resources (147:17). Processes to create and use information as a critical corporate resource in an effective and efficient mission and business operation. The structuring of mission and business activities to produce and consume information and control use of data within business processes, data repositories, information systems, and computing and communications infrastructures. (53:15)

Information Requirements Analysis: Information analysis is a methodology which incorporates top management strategic direction to identify the data required for effective organizational control. The purpose of such an analysis is to consolidate the information requirements from each functional area, to avoid redundancy of data if possible, and identify what

data is required from each functional area to perform the decision-making process in a more efficient and effective manner. (184:13)

Information Resource Management (IRM): The planning, budgeting, organizing, directing, training, promoting, controlling, and management activities associated with the burden, collection, creation, use and dissemination of information by agencies, and includes the actual management of information, as well as the resources (hardware, software, and human) used to manipulate, store and disseminate the information, such as automated data processing, telecommunications and related equipment. (54:2, 2-1)

IRM ensures that an organization's use of information technology is consistent with its strategic direction and business plans (147:17). IRM does not necessarily mean computerize. IRM is a management function which develops and implements policies, programs, and guidelines, to plan, manage, and control information and information resources. (184:82)

Information Systems (IS): ISs are key methods and mechanisms used to streamline business functions, improve managerial decision making, create new products and businesses, and enhance relationships with internal or external organizations (147:17). An IS is an assemblage or collection of people, machines, ideas, and objectives that gather and process data in a manner that will meet the formal information requirements of an organization (35:10).

Information Systems Architecture: The composite of specific components, and the way in which they interact, that form a computer system (128:610). Represents the user's view of an organization. It specifies the demands for data, and it defines the numerous uses of data that support the business processes, which are defined external to the computer systems (43:A-13). A corporate-wide system for information acquisition, conservation, and management. . . which integrates and standardizes technology, practice, and planning on a corporate-wide basis (57:30).

Information Systems Planning Methodology: A methodical approach to information systems planning, analysis, and design (139:1).

Information Technology: The hardware and software used in connection with government information, regardless of the technology involved, whether computers, telecommunications, micrographics, or others. (54:2-1)

Integrated CASE (ICASE): ICASE supports methodologies that incorporate information engineering principles, which prescribe that specifications for a company's plans are also the basis for specifications for its information planning (82:18).

Management Information Systems (MIS): An organizer's method of providing past, present, and prospective information relating to internal operations and external intelligence. It supports the planning, controlling, and operational functions of an organization by providing information in the proper time frame to assist decision makers. (34:207)

Model: A model is a graphical representation of complex, real-world phenomena; it assists in understanding the current environment and is the mechanism professionals employ to improve business processes (43:2-4,A-15).

Open Systems Architecture: A computer system technical architecture based exclusively on components that are highly modular, can be installed without requiring significant investment of technical expertise or programming on the part of the user, and can be modified without requiring changes to the application systems that make use of the system. (129:50-51)

Overhead Costs: See Indirect Costs and General and Administrative Expenses.

Proactive Planning: Taking the initiative in advocating the use of information systems for competitive advantage. It also must flow from a base of carefully developed computer systems and planning files. Instead of a waiting preparedness, however, it is a direct advocacy of possibilities for information systems developments that will impact the firm's business position. In addition to being aware of some of the strategic possibilities, and of watching for opportunities to develop systems, it includes selling the ideas of the systems to senior management. (107:18)

Process Model: A process model documents business methods by graphically describing the tasks performed and their sequence. They are used to describe present methods and are essential to continuously evolving improved methods. (56:iv) Also, see activity model.

Reactive Planning: Being prepared to be readily responsive to initiatives from management. This does not mean taking a wait-and-see attitude. It means developing computer systems and planning files so that planning information, such as applications descriptions, equipment and communications inventories, organization charts, and understanding of

corporate activities, and the routine development of business and information services projections. It means being aware of some of the strategic possibilities of information systems and watching for opportunities that may be presented to propose their development. (107:18)

Redundancy: The multiple, repeated implementation of a function in an application, often implemented uniquely as discreet repetitive pieces of code for each occurrence of the function in the system. It is a common occurrence for systems constructed or maintained without the use of structured analysis and design techniques; it results in higher maintenance costs and testing requirements beyond what is necessary for the application's function. (131:72)

Reengineering: Reengineering involves the accumulation of specifications for a software program that already exists; the modification of these specifications; and the subsequent use of the new specifications to recreate the software. (82:18)

Reimbursement/Reimbursement Accounts: Sums received by the Federal Government as a repayment for commodities sold or services furnished either to the public or to another Government account that are authorized by law to be credited directly to specific appropriation and fund accounts. These amounts are deducted from the total obligations incurred (and outlays) in determining net obligations (and outlays) for such accounts. (173:65)

Reusability: The multiple use of a single implementation of a function in an application (131:72).

Revolving Funds: These funds are authorized by law to carry out a cycle of intragovernmental business-type operations. They are similar to public enterprise fund accounts except they are credited with offsetting collections primarily from other Federal agencies and accounts. Some examples are working capital fund, stock fund, industrial fund, and supply fund. (173:36)

Stakeholder: Those groups without whose support the organization would cease to exist. Any group or individual who can affect or is affected by the achievement of an organization's purpose. (77:31,53)

Stock Funds: Stock funds are revolving funds established to manage the acquisition and distribution of goods. (49:6)

Strategic Information Systems: Those computer systems that implement business strategies. They are those systems where information services resources are applied to strategic business opportunities in such a way that the computer systems have an impact on the organizations products and business operations. Strategic information systems are systems that are developed in response to corporate business initiative. (107:29)

Strategic Planning: The process of deciding on objectives of the organization, of changes in those objectives, on the resources used to attain those objectives, and on the policies that are used to govern the acquisition, use, and disposition of those resources (107:33).

Systems Architecture: See Information Systems Architecture.

Unit Cost Resourcing (UCR): Conceptually, funding is allocated by determining a function's total cost per unit of output, projecting users' demands for the output, providing users the required funding, and then charging users for the output they consume. (156:10)

Zero-Base Budgeting: A process emphasizing management's responsibility to plan, budget, and evaluate. Zero-base budgeting provides for analysis of alternative methods of operation and various levels of effort. It places new programs on an equal footing with existing programs by requiring that program priorities be ranked, thereby providing a systematic basis for allocating resources. (173:83)

Appendix B

PACKARD COMMISSION MEMBERSHIP

Chairman:

Packard, David. Chairman, Hewlett-Packard and a former Deputy Secretary of Defense

Members:

Arbuckle, Ernest. Dean emeritus of Stanford University's Graduate School of Business (now deceased)

Barrow, General Robert H., USMC (Ret). Former Commandant of the Marine Corps

Brady, Nicholas F. Former Republican senator from New Jersey

Cabot, Louis Wellington. Former Chairman, Federal Reserve Bank of Boston

Carlucci, Frank C. A former Deputy Secretary of Defense

Clark, William P. Former Deputy Secretary of State, National Security Affairs Advisor, and Interior Secretary

Gorman, General Paul F., USA (Ret). Former Commander, US SOUTHCOM

Hills, Carla Anderson. Former Secretary of Housing and Urban Development

Holloway, Admiral James, USN (Ret). A former Chief of Naval Operations

Perry, William J. A former Pentagon executive

Pilliard, Charles J., Jr. A former Chief Executive, Goodyear Tire and Rubber Co

Scowcroft, General Brent. National Security Advisor for President Ford

Stein, Herbert. Former Chairman of the Council of Economic Advisors

Woolsey, R. James. A former National Security Council Analyst, Under Secretary of the Navy, and advisor to US Arms Talks delegations

Source: Patton, Bernard W. The Packard Commission: Implementation of Acquisition Improvements, Executive Research Project. Fort McNair, Washington: Industrial College of the Armed Forces, May 1987 (AD-B116 434).

Appendix C

AFIT KEY STAKEHOLDER LIST

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ODC (MS) DMI
Rm 1A658
Washington DC 20301-1100

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Commander
Air Training Command
Randolph AFB TX 78150-5001

Maj Gen William P. Hallin
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Air Force Logistics Command
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Lt Gen Billy J. Boles
DCS/Personnel
HQ United States Air Force
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Lt Gen Trevor Hammond
DCS/Logistics
HQ USAF/LG
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Commander
Rome Laboratory
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Maj Gen Charles R. Henry
Commander, DCMC
Defense Logistics Agency
Cameron Station
Alexandria VA 22304-6100

Lt Gen Charles Boyd
Commander
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Lt Gen Thomas R. Ferguson
Commander
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General John M. Loh
Commander
Air Combat Command
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Maj Gen Richard F. Gillis
Commander
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Robins AFB GA 31098-5990

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Dr. J. S. Przemieniecki
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and Scientific Advisor
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Deputy Assistant Secretary,
Acquisition, Management and Policy
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DCS/Technology
HQ Air Force Systems Command
Andrews AFB Washington DC 20334

Honorable Donald B. Rice
Secretary of the Air Force
Washington DC 20330

Mr. Paul A. Strassmann
Director of Defense Information
OSD (C3I) Rm 3E240
Washington DC 20301-3040

Mr. Gary Vest
Deputy Assistant Secretary,
Environment, Safety, and
Occupational Health
Washington DC 20330-1000

Dr. Billy E. Welch
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Armstrong Laboratory
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Colonel Paul T. Welch
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Colonel David C. Whitlock
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General Ronald W. Yates
Commander
Air Force Systems Command
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Appendix D

PRESURVEY NOTIFICATION LETTER

AFIT/LSC (513-255-2061)

10 April 1992

Air Force Institute of Technology (AFIT) Questionnaire

Honorable Donald B. Rice
Secretary of the Air Force
Washington DC 20330

Dear Secretary Rice

As Secretary of the Air Force, your help is needed in a research project that will assist in gathering initial data to help AFIT implement two DOD strategic initiatives: the Unit Cost-Per-Output and Corporate Information Management programs.

In a few days you will receive our questionnaire. It will take approximately twenty minutes to fill out. Your answers will be of the greatest importance to the success of this survey. Replies will be confidential. All responses will be assimilated into a summary document and forwarded for your further review and comment.

This survey will be mailed to only thirty key AFIT stakeholders; therefore, your individual reply is vital. I would appreciate your cooperation.

Thank you for your help.

Respectfully

LARRY W. EMMELHAINZ
Lt Col, USAF
Director, Research and Consulting

Appendix E

FIRST-ROUND QUESTIONNAIRE COVER LETTER

AFIT/LSC

14 Apr 92

Air Force Institute of Technology (AFIT) Questionnaire

Honorable Donald B. Rice
Secretary of the Air Force
Washington DC 20330

Dear Secretary Rice

Recently DOD mandated a Unit Cost-Per-Output Program to enhance the visibility of costs and contribute to better resource management. AFIT needs your help in identifying and documenting data required to implement this program and to also initiate efforts to implement the Corporate Information Management Program. Please take the time, approximately twenty minutes, to complete the attached questions and return your comments in the enclosed envelope by 30 April 1992.

Attachment 1 surveys a panel of thirty key AFIT stakeholders in an effort to provide a very important initial step toward implementation of these programs. The improved business-oriented concepts that DOD is pursuing will require AFIT to be extremely competitive (especially in terms of costs) in future educational programs. Critical success factors must be properly and completely identified in order to be responsive to the needs of all AFIT customers. The data we gather will become part of an AFIT research project. Your individual response will be combined with others and will not be attributed to you personally. In using a modified Delphi technique, we would like you to participate in both this initial mailing and also to comment on responses in a later, second mailing.

Due to your association with AFIT, we value your input. Your participation in our survey is vital. I cannot over emphasize the importance of your participation; however, it is completely voluntary. Your responses will directly assist in determining the future of ongoing educational programs at AFIT. This questionnaire is a vital first step in defining individual units' future educational

outlays. I thank you for finding time in your busy schedule to assist us in gathering this important information.

Should you have questions regarding this survey, please contact Maj Gordon Wishon, DSN 785-8000. Again, thank you for your assistance.

Respectfully

LARRY W. EMMELHAINZ
Lt Col, USAF
Director, Research and Consulting

2 Atch
1. AFIT Questionnaire
2. Return Envelope

(In trying to maintain the level of correspondence that senior DOD officials and general officers receive, this letter was originally one page. This reproduction is formatted in accordance with AFIT/LS thesis guidelines.)

Appendix F

FIRST-ROUND QUESTIONNAIRE

AFIT Stakeholder Questionnaire

(USAF SCN 92-12, Expires: 1 Oct 92)

1. In an effort to become more efficient and effective, DOD is encouraging, and in some cases directing, improved business practices. Are you aware of these recent initiatives?

Yes _____ No _____

2. DOD recently mandated a Unit Cost-Per-Output Program that will require DOD organizations to reimburse AFIT for educational programs and services beginning in FY 93. Are you aware of this program?

Yes _____ No _____

3. Another DOD strategic initiative is the Corporate Information Management (CIM) Program, a business-oriented management tool for effectively managing DOD's information resources. Are you aware of this program?

Yes _____ No _____

4. *The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?*

5. In your current area of responsibility, what types of products or services does AFIT now provide?
6. What additional products or services should AFIT provide?
7. What products or services would you prefer to eliminate or reduce in scope?
8. Looking ahead 3-5 years, what current or future AFIT products or services will generate the greatest demand by DOD?

9. What would be necessary to effectively develop and deliver products or services suggested in the previous question?

10. To the best of your knowledge, who are AFIT's customers?

11. Do you expect the customers to be the same in the future?

Yes _____

No _____ (Who do you think they should be?)

12. What are AFIT's strengths and weaknesses in terms of:

a. Professional Continuing Education Programs?

Strengths:

Weaknesses:

b. Graduate Education Programs?

Strengths:

Weaknesses:

12. What are AFIT's strengths and weaknesses in terms of:

c. Consulting?

Strengths:

Weaknesses:

d. Research?

Strengths:

Weaknesses:

12. What are AFIT's strengths and weaknesses in terms of:

e. Management/Administration (Policies, procedures, and organization)?

Strengths:

Weaknesses:

f. Other area (please define)? _____

Strengths:

Weaknesses:

13. What would you change to improve AFIT's effectiveness and efficiency?

14. What factors in AFIT's external environment (events, budget, regulations, technological changes, etc.) will significantly affect the organization's ability to achieve its mission?

AFIT Faculty/Staff **STOP HERE!**

15. Within your area of responsibility, do personnel routinely obtain professional continuing education (PCE) courses from AFIT?

Yes _____ N/A _____

No _____ (If not, why--and where do they obtain the education?)

16. Would you prefer to send your personnel to AFIT (resident) to obtain graduate education?

Yes _____ N/A _____

No _____ (If not, why--and where would you prefer they go?)

17. Do you obtain consulting services from AFIT? (In CY 91, the spectrum of consulting services ran from phone calls to formal investigations with written reports)

Yes _____ N/A _____

No _____ (If not, why--and where do you obtain the services?)

18. Do you use AFIT for sponsored research? (theses, dissertations, or faculty projects, whether funded or unfunded)?

Yes _____ N/A _____

No _____ (If not, why--and where do you sponsor research?)

Appendix G

FOLLOW-UP LETTER

AFIT/LSC

6 May 92

Air Force Institute of Technology (AFIT) Questionnaire

Honorable Donald B. Rice
Secretary of the Air Force
Washington DC 20330

Dear Secretary Rice

Recently I mailed you a questionnaire asking for your participation in an important research survey undertaken by two of our graduate students.

If you have already returned the questionnaire, please consider this note a "Thank you" for your valuable assistance.

If you have not had a chance to do so as of yet, may I ask you to return the completed form now? Because it has been sent to only thirty-three key AFIT stakeholders, it is extremely important that your response also be included in the study. As my initial letter indicated, there will also be a "second-round" mailing for you to participate in. That mailing, to be sent out 15 May, will ask panel members to comment on others' responses. Your inputs are valued; your anonymity is assured.

If by chance you did not receive the questionnaire a copy is attached. If you have any questions or need further assistance, please contact Major Gordon Wishon, DSN 785-8000.

Respectfully

LARRY W. EMMELHAINZ
Lt Col, USAF
Director, Research and Consulting

2 Atch
1. AFIT Questionnaire
2. Return Envelope

Appendix H

PAMPHLET I

AFIT Questionnaire

**PAMPHLET I:
VERBATIM FIRST-ROUND RESPONSES**

(USAF SCN 92-12, Expires: 1 Oct 92)

[The original Pamphlet I included twenty responses. This update includes four additional responses which arrived after the original Pamphlet I was printed. Pamphlet II, therefore, did not include comments from the additional four respondents. The four additional responses have been recorded here and noted as such in the text.]

VERBATIM FIRST-ROUND RESPONSES

1. In an effort to become more efficient and effective, DOD is encouraging, and in some cases directing, improved business practices. Are you aware of these recent initiatives?

Responses: Yes 19 No 1

Additional Responses: Yes 4 No

2. DOD recently mandated a Unit Cost-Per-Output Program that will require DOD organizations to reimburse AFIT for educational programs and services beginning in FY 93. Are you aware of this program?

Responses: Yes 11 No 9

Additional Responses: Yes 1 No 3

Comments:

1. No. Not an accurate statement. [Statement should read: "DOD recently mandated a Cost Per Output Program. Unit cost resourcing will make funding allocations to AFIT based on the average cost per graduate beginning in FY 93. Are you aware of this program?"]
2. I checked "No" because I was not aware it was a "done deal."
3. Yes, in general terms.

3. Another DOD strategic initiative is the Corporate Information Management (CIM) Program, a business-oriented management tool for effectively managing DOD's information resources. Are you aware of this program?

Responses: Yes 16 No 4

Additional Responses: Yes 4 No

Comments:

1. Yes, but not in detail.
2. No. I know something about it, but very little detail.

4. ***The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?***
1. No change to above.
 2. Concur in the present mission.
 3. The same.
 4. The stated mission is satisfactory.
 5. [Blank] (one response)
 6. I do not believe the changing DOD environment implies any change to the basic AFIT mission. I believe, however, that the mission statement should formally acknowledge the requirements to include Air Force (DOD?) civilians as customers. (I would observe that as the Air Force becomes ever more dependent upon technology for its superiority, the mission of AFIT becomes more urgent.)
 7. Customer-focused graduate and professional education. When customer pays, the focus has to be clearly on customer requirements.
 8. That mission is still valid. AFIT should differ from PME, civilian schools, and other military schools in (at least) two respects: specialized education/training on unique AF topics and broad graduate education which prepares officers to work in many disciplines and to evaluate/synthesize divers technologies.
 9. To provide advanced degree programs in only those areas that are unique to the Air Force and cannot be obtained through a civilian institution. Research should be limited to Air Force/DOD programs - nothing more.
 10. a) To develop, deliver, and evaluate training and undergraduate and graduate education in technical, management, and (services) topics to Air Force officers, senior enlisted, and civilian personnel in response to valid (and validated) requirements using a variety of delivery modes, and by means of a qualified faculty who stay current in their areas of specialization;

b) To provide consulting services to AF agencies as manpower permits; and

c) To conduct research (applied research in schools such as SOCES [School of Civil Engineering and Services] in areas related to the schools' mission.

11. Probably the same, but we need to look hard at the ROI and make sure we can't get elsewhere at a more competitive price.
12. To educate people in the narrow disciplines where the AF has both stated requirements & provided funding to support.
13. Since change has become the central theme of the DOD, the mission of AFIT should be to provide DOD/USAF managers and leaders with the thoughtware tools to continuously improve the combat capability of forces within an environment of ever constrained budgets.
14. To be competitive in the DOD educational community requiring proactive strategies in the new concept of business orientation.
15. Despite the changes in the DOD environment, I do not see AFIT's mission changing, however, I do see adjustments in relative size and scope commensurate with Air Force needs for technical education. In fact, one can make the argument that many of the traditional AFIT-acquired skills can be obtained elsewhere. We need to focus on military-unique education: civil engineering, logistics, and acquisition professional development.
16. Educate, train, assist and research.
17. Customer-focused, competitive (dollars and quality) advanced education and short courses. The shorter and more general the mission statement, the better.
18. Current statement sounds reasonable, but could be more specific. It seems unbounded.
19. AFIT should continue with the same general objectives/mission. However, we need to focus the studies even further to ensure specific AF needs are addressed.
20. This is a good mission statement. However! AFIT must always try to reduce the costs of its programs while making it more convenient for its customers to obtain that education. Working more closely with the organizations from which AFIT's customers come should be a priority.

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

21. Recommend continuing the present mission of supporting national defense, emphasizing quality for our graduate, professional education, consulting and research programs.
22. AFIT = AIR FORCE . . . not National Defense. (I'm aware of other Service's use of AFIT.)
I believe mission should focus on:
 - Air Force needs
 - Job related education
 - Tailored education to be responsive to changing AF needs
23. 1-Continuing education (i.e., short courses) vice graduate school
2-Consulting (i.e., independent teams)
3-Case Studying/lessons learned
4-Research
24. AFIT's mission should not change appreciably. AFIT should work to be more tightly coupled to the AFMC (and other commands) "user" community, AFIT should take advantage of its uniqueness and structure its curriculum to teach in areas not readily available at other institutions.

5. In your current area of responsibility, what types of products or services does AFIT now provide that you are aware of?

1. Graduate education in engineering, science, logistics. PCE [professional continuing education]; research, mostly customer sponsored; consultation; workshops, symposia, etc.; and publications.
2. Graduate education and PCE; research; consulting. AF educational records repository.
3. Multitude of professional education and consulting services. AFMC will be AFIT's largest customer by far.
4. Research, consultation, graduate education, professional continuing education and training.
5. Graduate students
6. I am directly involved in the PCE program and am well aware of the graduate degree programs and of research and consulting.
7. Support to professional societies. Help determine education requirements. Clearing house for available education in certain specialty areas. Develop courses and seminars; teaching courses in residence; teaching courses in the field; conducting seminars in residence and field. Consulting; research. Provide inputs to studies, conferences and workshops as a participant or by making a presentation
8. - MS and PhD graduates for the AF laboratories
- SYS 100, 200, 400 courses for professional development for scientists and engineers
- "Continuing education" short courses for scientists and engineers
9. Teaching; research (in-house); research (in AF labs by students); and consultation
10. Residence CE courses; graduate degrees; tele-teach; on-site courses; and consulting.
11. Grad Ed and PCE.
12. Formal advanced degree programs--technical orientation. Logistics continuing education. Acquisition continuing education. Limited TQM/TOC [Theory of Constraints] education.

13. Short/Long courses and Graduate Programs.
14. Graduate education with unique Air Force flavor. Professional continuing education courses, consulting services, and skills the have Air Force only application.
15. Graduate education (mostly military, some civilian); research; and consultation to AF labs.
16. [My unit] essentially benefits or is a user of all AFIT services.
17. - Graduate training in technical areas of interest to the AF
- Graduate research in support of AF needs
- Short courses
18. Logistics studies - graduate level and a series of short courses designed for senior logisticians.
19. - Highly relevant technological graduate education
- "On demand" continuing education
- Relevant research in areas of primary interest to Air Force laboratories
20. - Research
- Consulting
- Education

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

21. - Graduate Degrees
- Research
- Special Courses
- Consulting
22. AFIT provides us with quality graduates in various areas of expertise such as operations research, cost analysis, logistics management, engineering, communications and computer information systems. We should retain these products.
23. Short courses and Research
24. - In-house education for engineering, logistics, civil engineering
- Runs civilian institution program
- Many continuing professional education programs

6. What additional products or services should AFIT provide?

1. Blank (five responses)
2. I get lots of bright young Captains with cosmic technical degrees--what I need are more (some) senior civilians and Lt Col/Cols with formal advanced education in managing change.
3. Strategic planning for education and training. Education management (course evaluation and matching student needs with available courses).
4. Need courses that bridge gap between the pure technical type and the pure management type, i.e., someone that can effectively manage people in a technical environment. Live satellite education; correspondence courses. More (better) marketing/advertising of products and services. I don't know what all you do or can do!
5. My only quarrel over the years has been with content. I still think the School of Engineering should recognize that graduates will move through a wide range of assignments and trade some narrow specialization for greater breadth of coverage. (I lobbied unsuccessfully for this during my years on the faculty)
6. It should focus on the graduate student and selective professional education programs.
7. Continue to provide TQM facilitating service to AFMC. It's significantly helped us with our command integration.
8. NOTHING!
9. You should and do provide curriculum support services.
10. I feel fairly comfortable that [AFIT] now provides what should be provided but not always to the extent that is needed to fully satisfy the requirements. For example, not enough offerings of courses, and [AFIT] needs to do more distance education (video, teleconference, and taking courses to the field).
11. Increase SYS 100, 200, and 400 throughput during the next 2-3 years to reduce backlog created by new APDP [Acquisition Professional Development Program] requirements. Offer SYS 100, 200, 400 at major AFMC bases.
12. More seminars/workshops and periodicals such as newsletters.

13. During these times of fiscal reductions AFIT should develop as many transportable methods as possible of delivering all of its courses (i.e., video, CB [computer based training (assumed)], satellite offerings, etc.).
14. Support of acquisition professional development program (APDP) requirements. Environmental sciences/engineering.
15. - Expanded PhD capability to meet AF laboratory (and other) needs
- Improved distance education services to meet continuing education needs at lower costs to consumers
16. Increased educational capability.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

17. - Include the equivalent of DSMC for all management grads (in-house)
- If possible, for engineering grads
18. - More case studies with lessons learned
- More independent analysis of current issues and future planning
- More creative problem solving
- More functional & technical symposiums & conferences
19. More special courses in AF specific technical areas.
More emphasis on PhD level research. (I realize that AFIT has already begun to place more emphasis on PhDs.)
20. In the area of short courses, the planned AFIT Distance Learning Initiative should provide excellent training for all Air Force officers and civilians requiring specific professional expertise. This initiative will not only provide training, but will also save TDY funds. Recommend AFIT offer one-week courses in operations research, additional acquisition courses, and an environmental-exchange program with the Corps of Engineers.

7. What products or services would you prefer to eliminate or reduce in scope?

1. N/A (one response)
2. None (four responses)
3. [Blank] (two responses)
4. Only suggestion is to ensure all PCE offerings address valid needs, not just the desire to pump up the statistics of bodies in lecture halls.
5. I think AFIT could put together more effective cooperative efforts with AF laboratories to share research activities of the faculty and thesis/dissertation research. Might not have to reduce as much as you think. Get products first available from other sources.
6. Training.
7. Any degree program that cannot be obtained from a civilian institution.
8. Training where a particular course may contain an unreasonable amount of training.
9. If I had to reduce any - would probably drop the research and set up collaborative efforts to get most of the benefits.
10. If AFIT isn't the leader, recognized expert, center of excellence, etc., for a particular program either attain that status or get rid of the program.
11. A lot of the logistics continuing education courses were good but have been OBE'd by the numerous major changes, DMRDs, two-level maintenance, stock funding, etc. The scope could be reduced by shortening course development.
12. Redundancy in courses presented in other DOD environments.
13. As mentioned above [Question 6], with downsizing, particularly in TDY budgets, in-residence offerings should be reduced, offset by an increase in mobile offerings.
14. Nuclear engineering.

15. General knowledge short courses. Not by choice but based on a mandated prioritized drawdown. Concentrate on focused specific subjects.
16. - I would not recommend elimination of any existing services.
- If a reduction in scope were mandated, I would prioritize services as:
 (1) graduate education;
 (2) research;
 (3) continuing education—in that order.
Obviously, these services are essential and would have to be provided by other means if not by AFIT.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

17. We should retain the present AFIT mission and increase the Distance Learning Program to save money. Also increase course offerings through a cooperative effort between AFIT and the Defense Systems Management College at Ft Belvoir VA.
18. Eliminate civilian institution masters in all but engineering, and management unless dictated by a specific job assignment (e.g., political science for Asst. Air Attaché).
19. Graduate programs—i.e. keep or maintain the same ratio of slots for graduate degrees, but send most or all selectees to civilian institutions.
20. None

8. Looking ahead 3-5 years, what current or future AFIT products or services will generate the greatest demand by DOD?

1. Information sciences and engineering; test beds and other experimental facilities supporting CIM; Paul Strassmann is dead serious about getting CIM (per his definition) under control through standards, better education, etc.
2. Integrated engineering courses; those that emphasize the relationship between design, manufacturing, operational costs SPC [Software Productivity Consortium (assumed)] and like methods for engineering and management.
3. I would expect to see a growing demand for short-term acquisition and logistics professional education. Emphasis must be on distant learning technique. TDY dollars won't be there.
4. There are so many demands, and its impossible to prioritize them because they are so closely linked. I see a huge demand in such areas as distance education (satellites), environmental engineering, information management, APDP, civilian education, financial management, technology management, etc., etc., etc.
5. PCE for the acquisition workforce and engineering PhDs.
6. Only grads of unique to the AF/DOD programs.
7. PCE.
8. Courses and graduate education programs that are relevant to the Air Force mission, such as the environmental program--both Grad Ed and PCE. I believe that the relevance question will take on more and more importance, especially if the customer has to pay.
9. PhD graduates. SYS 100, 200, 400 courses for professional development.
10. Specialized course work directed toward rapid solution of AF issues.
11. Acquisition.
12. Managing Change.
13. Strategic planning.
Education and training management courses.

14. New courses in accepting, dealing with, and using new business strategies. A DOD base commanders course on how to be a landlord for DOD.
15. The offering of acquisition courses due to the implementation of the acquisition professional development program. Additionally, offering of financial management courses should be expanded, emphasizing Industrial Funds, Stock Funds, and the Defense Business Operating Fund.
16. Environmental Engineering. Parallel processing mathematical algorithms.
17. Technical training for officers to make them more knowledgeable about technical aspects of AF systems.
18. Need help in courses aimed at management and understanding of new financial management rules, i.e., stock fund, DLRS, DMRD 904-908, etc.
19. - Graduate technical education
- Distance delivery of continuing education
- Professional acquisition courses within Defense Acquisition University structure
20. Education.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

21. "Distance Learning" courses - Both regular graduate courses and special courses tailored for a particular organization.
22. Continuing education - i.e. short courses, especially as acquisition and logistics personnel try to learn more about the other in the new AFMC & the new integrated weapon system management (IWSM) process.
23. - Artificial Intelligence - In-house masters
- Ops Research - In-house masters
- In-house Engineering PhD
24. Over the next 3-5 years, the Distance Learning Program will be called upon to provide AFIT professional training, while the graduate programs will provide critical skills necessary for the Commands to effectively and efficiently function. Recommend adding more advanced degrees in the areas of Logistics and Engineering requiring command specific research/thesis.

9. What would be necessary to effectively develop and deliver products or services suggested in the previous question?

1. [Blank] (two responses)
2. AF needs to do a better job of defining education needs--tough in the middle of the current implosion. AFIT needs to take a rigorous look at curricula to prune those no longer needed and focus resources on those that are.
3. Might have to use help of AFSC's product centers and logistics centers. Create interdependent programs. Would challenge accepted view of university as self-contained provider of educational services.
4. Distance learning; circuit rider approach; more trained facilitators/associate professors at customer locations.
5. Adequate resources.
6. AFIT is doing fine. Increased emphasis should be placed on technologically-based course delivery; on-sites, i.e., mobile training; and lower unit cost, e.g., some large classes.
7. Faculty experienced in the relevant areas. Equipment such as satellite TV (send and receive) and other state-of-the-art items such as computers/computer labs.
8. Adequate faculty and resources.
9. Rapid curriculum development. Rapid movement of experts into AFIT.
10. More dedicated faculty.
11. The single biggest constraint is the difficulty of course development in its traditional paradigm. Using "current" methods, it is possible that a new course is outdated by its prototype class.
12. Adequate professional resources; information; and MIS [Management Information Systems].
13. Information on Defense Business Operations Fund and associated regulations, etc. Policy on General and Administrative Reimbursement Program.

14. [AFIT] must live within current or even more constrained funding. Therefore, a stringent review of current and future requirements is imperative. Each customer must justify their needs, else eliminate things on a reverse-priority basis.
15. Make AFIT an SOA (like the Academy) with direct lines (command and resources) to a SAF-level undersecretary position or to the Chief of Staff.
16. State of the art computers (massively parallel). Environmental engineering department--faculty and staff.
17. Case studies on practical usage scenarios.
18.
 - Expanded PhD capability--increased faculty
 - Distance learning capabilities--course development and delivery techniques
 - improved coupling to AF laboratories for high quality research and consultation
19. Less external distraction.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

20. Continue the Distance Learning initiative - Satellite Delivery Systems. Also, recommend expanding the present AFIT programs to produce more graduates, improve the interface between AFIT and MAJCOMs and create a graduate liaison program (program will require recent graduates to serve in a one-year AFIT liaison additional duty position).
21. Resetting priorities . . . No additional resources.
22.
 1. Immediate involvement of AFIT & AFMC
 2. More funding for this near-term increase in education requirements
 3. Partnership with all of the players--i.e. internal AF (academic, operational and support communities), and external AF (other services and industry)
23. Considerable equipment and special training for faculty in how to teach through television/video link-ups. AFIT should move strongly into the interactive distance learning area.

10. To the best of your knowledge, who are AFIT's customers?

1. DOD military and civilian; allied officers.
2. Almost entirely AFSC/AFLC and civil engineers following the traditional relationships.
3. The leaders and managers within the DOD who turn dollars into combat capability.
4. The people who pass through your doors, first—second, the organizations that send them.
5. Mid- to senior-level civilian and military managers (managers not leaders).
6. Predominantly AFMC. Integration of AFSC/AFLC requires AFIT to seriously rethink customer base and relationships.
7. The Air Force (Secretary, Chief, MAJCOMs, students), DOD, other services, other nations, accrediting bodies.
8. The primary user of AFIT's graduate education and PCE courses is AFSC and AFLC. In the future the needs of AFMC will dictate AFIT's role and ultimately its existence.
9. Functional managers/acquisition managers.
10.
 - The AF labs
 - AF Material Command
 - The research community
 - Logistics/Systems engineering
11.

- AFIT's students	- SAF/AQ
- OUSD(A)	- ?? [actual input]
12.
 - Air Staff functional leaders
 - Secretary of the Air Forces-level offices with specific interests such as environment
 - MAJCOM functional areas
 - Squadron commanders and supervisors within squadrons
 - Students
 - Air Force FOAs, such as, the Air Force Center for Environmental Excellence

13. The organizations who employ AFIT students following course completion or graduation
14. - Air Force
- Nation
15. - AF people and organizations
- Other DOD
16. Functional managers, sponsors, Air Staff, MAJCOMs, students, and AU
17. - AF labs
- Major Commands
- Students
18. - Active duty USAF
- Some other services
- Fed employees
19. - AFSC + AFLC = AFMC
- It is a fact, that the primary customer is as above. I believe, though, that AFIT's customer should be the Air Force at large. To maintain our technologically-based superior force, we need graduate technical officers throughout the service.
20. - Air Staff
- MAJCOMs
- Operating Agencies
- Foreign governments
- DOD staffers
- Other services

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

21. Obviously, all of the AF, but particularly Materiel Command which will have the strongest concentration of advanced degree holders.
22. Air Force management--all levels
23. - AFMC . . . followed by other MAJCOMs
- How could it be otherwise . . . AFIT = Air Force Institute of Technology. AFMC is the AF's only technical command.
- If AFIT becomes too focused on USAF we put AFIT at risk

11. Do you expect the customers to be the same in the future?

Responses: Yes 17 [14 responses with no comments]
No 3 (Who do you think they should be?)

Comments:

1. Yes. The primary user of AFIT's graduate education and PCE courses is AFSC and AFLC. In the future the needs of AFMC will dictate AFIT's role and ultimately its existence.
2. Yes. More emphasis on junior through middle structure. Some careful senior courses.
3. Yes. I doubt that we will see much expansion beyond AFMC. However, the Space Command may lead the way to expand the customer base.
4. No. More other DOD.
5. No. Organizationally the same; however, the customer pool will be much different. With force drawdown, our smaller work force will be required to be more highly educated than the workforce of today. In order to handle the aspects of future jobs that allow productivity through technology, i.e., tomorrow's captain will be handling the jobs of what two or three captains are handling today. Additionally, the "operational" pull to keep these people on the job will be stronger than the foresight to send them for advanced/continuing education. We end up with short-term operational efficiency and, unfortunately, long-term strategic deficiency.
6. No. AFIT should become a Center of Excellence in CIM, simulation/modeling, decision systems, etc., to service MAJCOMs and joint staffs with the expertise needed for the new era of system acquisition and force management.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

Responses: Yes 4

Comments: None

12. What are AFIT's strengths in terms of Professional Continuing Education Programs?

1. [Blank] (four responses)
2. Tailored programs to Air Force specialized needs.
3. Customer satisfaction.
4. Good for some tailored programs.
5.
 - Faculty
 - Administrative structure
 - Command support within AFIT
 - Facilities
6.
 - Responsive
 - Flexible
 - Relevant courses since [AFIT] can tailor to specific job areas
7. Rapid course development, therefore, rapid education for the field.
8. Course development responsive to AF needs
9.
 - AF orientation
 - Quality personnel
10. Meet immediate AF requirements.
11. Depth of expertise in the fundamentals and underlying principles of the traditional disciplines.
12.
 - Ties with functional areas
 - Professional staff
13. Basically unfamiliar with specifics on AFIT.
14.
 - Quality of courses
 - Unique Air Force flavor
 - Quick development of courses
 - Ability to change curriculum on short notice
15. Competence, functional knowledge, and credibility

- 16. - Responsiveness
- Relevance
- Quality
- Cost effectiveness

17. Faculty currency.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

18. Good well-rounded courses.

19. AFIT has provided and continues to provide excellent specified professional continuing education programs for our officer and civilians. In this era of contraction, AFIT continues to get the job done.

- 20. 1-Variety
- 2-Breadth and depth
- 3-Presentation

21. Knowledge of area from AF perspective.

13. What are AFIT's weaknesses in terms of Professional Continuing Education Programs?

1. [Blank] (four responses)
2.
 - Lack of \$ resources and manpower
 - Maintain currency in short-course subject material
3. Award of "credit" for PCE courses.
4. Too much \$, too much overhead and resources to get the product.
5. Location (of 21,000 GS-1102s [contract and procurement], only 339 are in the Dayton-Springfield standard metropolitan statistical area, according to DMDC). Air travel to and from Dayton is expensive, now that it is not a USAir hub.
6. Insufficient resources.
7.
 - Not enough resources to do all that's needed.
 - AU bureaucracy making [AFIT] less flexible and responsive
 - Unfair quota allocation process
8. Not enough throughput.
9. Centralized location.
10. More requirements than funds.
11. Speed of adapting to new leadership/management disciplines and incorporating them in curriculum.
12. Basically unfamiliar with specifics on AFIT.
13.
 - Providing enough quotas
 - Too much emphasis on residence courses, which, in turn, detracts from day-to-day changes in priorities.
14.
 - Lack of "distance" delivery--high quality at lower cost
 - Bureaucratic approval process for course initiation (and attendant delay)
15. Requirements without appropriate resourcing.

16. I honestly have no clue what PCE AFIT currently offers. It might be suggestive that an AF Superlab Commander never thinks of AFIT as a source of PCE for his people.
17. Didn't answer these questions. Too far from programs to offer good answers.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

18. Not enough contact with the "field" outside the Dayton area. Courses not easy enough to get to the field.
19. 1-Not enough HQ USAF, MAJCOM HQs and field expert guest lecturers
2-Not enough realistic problem solving in some courses
3-Lack of currency in some courses
20. AFIT has limited resources in the areas of engineering and operations research--recommend establishing new resources in these areas. Also recommend a review of course lengths versus course study materials of all professional continuing education courses.
21. Throughput.

14. What are AFIT's strengths in terms of Graduate Education Programs?

1. [Blank] (three responses)
2. The graduates coming to this lab are well prepared.
3. Again, Air Force-focused, student-oriented programs. Strong partnership and common bond with the student.
4. Program quality.
5. Able to grant degrees in unique areas.
6. Ties with functional areas. Professional staff.
7. Responsive. Flexible--to a lesser extent than PCE programs. Relevant.
8. Quality
9. AF orientation. Quality personnel.
10. Depth of scholarship.
11. The depth and breadth of technical programs that simultaneously fill AFSC, and too a lesser degree AFLC, scientific and engineering needs for leading-edge education.
12.
 - Quality of education
 - Unique Air Force perspective added
 - Ability to meet Air Force needs
 - CDERS [Command Derived Educational Requirements System] Program
13. The MSc program--very thorough.
14. Involvement of graduate research with AF needs.
15. Same. [competence, functional knowledge, and credibility]
16.
 - Responsiveness to AF needs
 - "Blue Suit" university environment
 - Coupling to AF laboratories for "real world" thesis work
 - Mission-oriented faculty--total dedication
 - Cost effectiveness (admittedly contentious)

17. Blue Suit. Unique. Solving Blue Suit problems.
18. More focused student body on AF application of their education.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

19. Tough in-house programs.
20. As in the professional continuing education area, AFIT has done and continues to do a good job.
21. (Not familiar enough to comment constructively)
22. Rigorous programs in most areas.
Requirement for thesis for all technical MS degrees.
Responsiveness to AF unique requirements.

15. What are AFIT's weaknesses in terms of Graduate Education Programs?

1. [Blank] (six responses)
2. None.
3. Inability to hire appropriate level expertise due to budget constraints. If grad ed program is to be worthwhile, its faculty must be competitive.
4. See question 6. [My only quarrel over the years has been with content--I still think the School of Engineering should recognize that graduates will move through a wide range of assignments and trade some narrow specialization for greater breadth of coverage. (I lobbied unsuccessfully for this during my years on the faculty)]
5. Outsiders view that AFIT = civilian institutions so cut AFIT grad programs.
6. Inadequate resources to maintain civilian faculty numbers and quality.
7. Too much \$, too much overhead and resources to get the product.
8. Faculty perception in shaping curriculum may not be on target with actual needs.
9. - Professional recognition
- Research equipment/facilities
10. Insufficient breadth of disciplines in social sciences and humanities.
11. Virtual absence of graduate programs in the areas of managing change and directing culture change for continuous improvement.
12. - Providing enough quotas
- Too much emphasis on residence courses, which, in turn, detract from day-to-day changes in priorities.
13. Opportunities for AF civilians.
14. Too many stay out of the operational field for too long. Loss of operational orientation.
15. - Lack of understanding and support throughout Air Force
- Perceived lack of cost effectiveness (competitiveness)

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

16. Graduate theses should be structured to meet Air Force needs. There appears to be a need for more specified engineering, computer software and operations research (Strategic and Tactical Science) programs. AFIT, working closely with HQ USAF, should scrutinize our career fields needing graduate level expertise to determine the need to increase or decrease graduate programs. Also recommend a hands-on approach for graduate students completing theses--similar to the Naval Postgraduate School (program allows students to receive hands-on/over-the-shoulder training in their respective area specialty).
17. Too much emphasis on MS degrees - "Master's Degree Mill"
18. (Not familiar with to comment constructively)
19. Civilian institution degrees that aren't relevant to the work of the Air Force.

16. What are AFIT's strengths in terms of consulting?

1. [Blank] (seven responses)
2. [Other comments] I do not have enough contact with the customer community to provide informed comments. From what I have learned at AFIT meetings, I have the impression that the School of S&L [Systems and Logistics] provides much consulting for which it receives high customer marks. I have the impression that the School of Eng provides much less.
3. None.
4. - Availability
- Responsiveness
5. AFIT has demonstrated some expertise in group dynamics and team building. In addition, the work AFIT has done in Theory of Constraints, while not formal consulting, has been most beneficial.
6. TQ facilitating has been outstanding.
7. Strong staff.
8. Quality and expertise of persons available at AFIT.
9. - Providing consultation from operational point as well as academic
- Relative low cost
- Specific research focus, when Air Force takes the time to define real needs
10. The fact that consulting and research are recognized as essential to quality teaching and, therefore, to AFIT's mission is a source of institutional strength.
11. - Responsive
- Flexible
12. Organizational development.
13. - AF orientation
- Quality people
- Relative availability
14. Lots of expertise.

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

- 15. Generally, very willing.
- 16. Unknown, since AFIT does not publish the results of their consulting programs.
- 17.
 - Bright well prepared faculty
 - Up on latest body of knowledge
- 18.
 - 1. Expertise
 - 2. Independence
 - 3. Feedback (available from access to cross sections of students with various backgrounds)

17. What are AFIT's weaknesses in terms of consulting?

1. [Blank] (nine responses)
2. Beats me. Never talk to 'em.
3. The consulting skills and availability of AFIT to do specific consulting tasks are not sufficiently advertised throughout this (AFMC) command.
4. Insufficient resources.
5. AFIT is not resourced to provide consulting.
6. Putting too much academic emphasis on results; consulting must be here and now.
7. Didn't know they did it!
8.
 - Not enough faculty to satisfy all requirements
 - I put it secondary to teaching
 - Faculty members are (some not all) junior and some lack in-depth experience in the field. Highly educated but have not faced the real world problems.
9. Not very visible.
10. Not well known in some circles.
11. Need more operational orientation.
12. A greater awareness of AFIT throughout the Air Force would increase the demand for consultation.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

13.
 1. Time not available for lengthy or extended consulting
 2. Learning curve in new areas
14. Lack of familiarity with the real-world technology and management problems in today's program management business.

15. No published results - recommend AFIT establish a continuing marketing program to explain what is available and also the results of their consulting programs.
16. Again, too little contact and knowledge of AF world outside Dayton area. Need better coupling to other labs, bases.

18. What are AFIT's strengths in terms of research?

1. [Blank] (seven responses)
2. N/A
3. AFIT does a good job on the projects we sponsor.
4. The strengths of the AFIT research program are its energy and enthusiasm, recently coupled, thanks to General McDonald, to its focus.
5. Research is conducted by personnel that understand needs of the AF/DOD--therefore, can identify significant/insignificant findings in that vein.
6. - AF relevance of research
- Quantity and quality of research done
7. I'm sure there are many, but I'm not aware of them.
8. - Excellent research opportunity on variety of areas
- Low cost
9. - Responsive
- Flexible
- Relevant
10. Good research in chosen areas.
11. Quality.
12. - AF experience/orientation
- Know the environment
- Relate to the need
13. - High quality
- Relevance to AF "real world" problems
14. - Focused
- Responsive
- Related to Air Force issues

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

15. Lots of capability. Many opportunities for research projects because of large number of students. Strong willingness to tailor projects to AF needs.
16. Unknown, since AFIT does not publish the results of their research.
17. Proximity to AF Labs
18. Wealth of talent, writing, material, etc.

19. What are AFIT's weaknesses in terms of research?

1. [Blank] (nine responses)
2. N/A (one response)
3. No comment.
4. Don't see much evidence in the refereed literature of AFIT faculty doing world-class research.
5. - The weaknesses from our perspective are in the feedback and post-research loops.

- Major research findings are sometimes washed away or badly mauled in the thesis review process. If they do survive, they often dry up and blow away from lack of user follow-up.
6. External recognition of the necessity for this research in a quality graduate institution.
7. Exquisite solutions vs. what can be done incrementally.
8. - \$ shortfall
- Some "hobby shopping"
9. - Out of the mainstream of AF research
- Laboratories
10. Need more outside funding.
11. Need more operational orientation.
12. - Need broadened capability for classified research for increased relevance
- Could use better input from AF commands regarding topics for research

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

13. No published results--recommend AFIT establish a continuing marketing program to explain what is available and also the results of their consulting programs.
14. Lack of enough financial resources

15. Not tightly enough coupled to AF interests.
16. Too few faculty capable of R&D research supervision at PhD level. Again, poor coupling of individual faculty with research outside Dayton area.

20. What are AFIT's strengths in terms of Management/Administration (Policies, procedures, and organization)?

1. [Blank] (eight responses)
2. No opinion.
3. No comment (two responses)
4. Customer focus is good.
5. - Belief in AFIT's mission
- Spirit of cooperation
6. Ability to survive in spite of large force structure/manpower drawdown.
7. Responsive to customer needs in the mid- and long-term sense.
8. - Academic orientation (e.g., faculty governance)
- Quality people
- Good civilian/military mix
- Relevance
- Knowledge of DOD and military processes
9. - Focused (on education)
- Individual schools can respond quickly to their customers: therefore, less bureaucratic
10. Great ability to cope with change.
11. Efforts to meet requirements with limited resources.
12. - High "tooth-to-tail" ratio (faculty to support)
- Responsive to customer demands
- Creation of good "Blue Suit" environment
13. Customer responsiveness.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

14. Well organized, well administered

15. AFIT has excellently managed and administered the training careers of our Air Force officers and civilians. The organizational structure has established policies and procedures congruent to supporting the training/education needs of the Air Force officers and civilians.
16. Well organized and responsive.
17. Not familiar enough to comment constructively.

21. What are AFIT's weaknesses in terms of Management/Administration (Policies, procedures, and organization)?

1. [Blank] (eight responses)
2. No opinion (one response)
3. No comment (one response)
4. No clue.
5. It [AFIT] should be cut drastically--it is a dinosaur in its present configuration.
6. Slow to respond to rapidly changing requirements. APDP is case in point.
7.
 - Lack of continuity in senior positions
 - Not responsive enough to the schools
8. Need more effective use of automation, specific solutions to today.
9.
 - AU ties [AFIT's] hands
 - Test organization may remove synergism between PCE and Grad Ed
10.
 - Lack of innovation
 - 100% solution may not always be the best solution
 - Lack of initiative to get training decentralized via VTCs [video teleconferencing centers], distance learning, etc.
11. Organizationally--break it out of AU. Make it an SOA.
12. Inability to act independently.
13.
 - Pockets of inadequate support personnel to faculty
 - Earlier notification and preparation of students needed
 - Faculty vacancies--more critical in view of increased PhD load
 - Need streamlined procedures for new continuing ed courses
 - Distance learning capabilities lagging

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

14. We need to establish a graduate liaison program to help pave the way for future AFIT students and provide Air Force management with quick reference resource.
15. Too rigid about many academic prerequisites. Not enough flexibility in admissions policy. Many outstanding candidates excluded from desired fields because of rigid standards for prerequisites and because of rigid programs and schedules.
16. Not familiar enough to comment constructively.
17. [Blank Response]

22. What are AFIT's strengths: Other area (please define)? _____?

1. [Blank] (18 responses)
2. Theoretical engineering.
3. Mission orientation--dedication.

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

4. [Blank] (4 responses)

23. What are AFIT's weaknesses: Other area (please define)? _____?

1. [Blank] (18 responses)
2. Practical engineering.
3.
 - Commandant should be Brigadier General for image enhancement with academic community and within Air Force
 - Need a flexible pay structure to maintain competitiveness with other educational institutions

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

4. [Blank] (4 responses)

24. What would you change to improve AFIT's effectiveness and efficiency?

1. [Blank] (five responses)
2. Nothing.
3.
 - 1st, AF make decision on whether AFIT will exist or not--i.e., stop the every year drill of "Why AFIT?" it wastes time, money, and is demoralizing
 - 2nd, if the commitment is to be there, resource it (all facets) properly
 - 3rd, make it a SOA
 - 4th, create SAF-level position (under secretary level) to provide strategic oversight/direction in conjunction with other pertinent educational oversight agencies and hold regular meetings
 - 5th, make commandant a general officer
4. I would abolish AFIT as it is today and only have courses that are totally unique taught at Wright Pat; go to civilian institutions for grad degrees we need and save lots of \$ of resources.
5. Make it independent from AU. Let it really respond to real AF needs.
6. Make research by the graduate student more convenient. Wherever possible, do the research at the job rather than at the school. Push hard for best quality distance education you [AFIT] can create.
7. AFIT needs a more specific, customer-coordinated goal; and then needs to measure program decisions and the allocation of resources on the throughput inventory and operating expense of achieving that goal.
8.
 - Provide funding to fully man faculty authorizations
 - Aggressively pursue distance learning capabilities
 - Continue efforts at image enhancement--especially within AF
9. Roll faculty members through AFMC assignments to keep them in touch with customer needs.

10. - Stability of senior management
 - Internal resource allocation process
 - The connection between demands and resources
11. AF needs to do a better job of defining education needs--tough in the middle of current implosion. AFIT needs to take a rigorous look at curricula to prune those no longer needed and focus resources on those that are.
12. Allowing the MAJCOMs to have more input into the course curriculum and insuring AFIT graduates were efficiently being utilized on an AAD [advanced academic degree] billet, soon after graduating.
13. - Quota distribution for PCE should not be reduced if [AFIT is] successful in capturing supplemental funding
 - AU needs to provide less control
14. - A closer relationship with AF labs, especially the labs at Wright-Patterson.
 - Put AFIT under the new AFMC, to improve customer-supplier relationships, and increase support of AFIT. Fund AFIT with 3600 money.
 - Restore AFIT Commandant to Major General level
 - Become a full partner in the Ohio Aerospace Institute
15. - Really work to conduct as much training (not education) remotely as possible to do in a cost-effective manner
 - Re-look at the issue of research by faculty. How can [AFIT] tie in better to the labs and maybe make the staff research a part of the lab program.
 - Insure that AFIT has a unique niché
16. A General Officer Commandant

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

17. Expand graduate degree capability in operations research, engineering, computer information systems, logistics management and cost analysis. Publicize and market the AFIT consulting and research programs.

18. Work on coupling it closer to AF needs. Every graduate goes to work 3-4 years in his specialty. CDERS program . . . 100% for all thesis programs.
19. Better coupling to customer. Individual faculty need to attend reviews as laboratories (Spring Reviews, etc.) and at AFOSR. We have never seen anyone from AFIT at these reviews. This is where faculty could find out just what our "mainstream" programs are in all the technical areas. AFIT needs better coupling to AFOSR.
20. 1-Greater communication with customers, policy makers, and field experts to better address needs and improve currency of material

2-Greater participation by policy makers and field experts in course/material building and presentations

3-More direct involvement in AF issues and problem solving

25. What factors in AFIT's external environment (events, budget, regulations, technological changes, etc.) will significantly affect the organization's ability to achieve its mission?

1. [Blank] (three responses)
2. - Extent of commitment of AF leadership to technologically advanced education
- Decreasing overall AF budget
3. All of the above! [events, budget, regulations, technological changes, etc.]
4. Realistically, as the AF shrinks, and civilian universities get more desperate, AFIT will have a tough time surviving. Survival will depend mostly on providing uniqueness--a service not available elsewhere. [AFIT] can always jiggle the figures to make costs look competitive.
5. BUDGET! It is essential to fund it!
6. Must have a strong user--so likely to be AFMC. Better be sure you keep AFMC a happy customer.
7. Like the rest of the AF, budget will force new thinking--but AFIT has a better opportunity than anyone else in the AF to rapidly and effectively change its culture to continuously improve customer satisfaction. The changes that are occurring external to AFIT should be viewed as the fire to motivate internal change.
8. Budget is not external; need better understanding of AFIT cost requirements.
9. - Budget--will continue to challenge AFIT's existence
- Since AFIT's major customer is AFMC, perhaps a solution is to roll AFIT under AFMC
10. AF "downsizing"; DOD's dwindling resources; and educational demand of the AQ "world"
11. It really shouldn't have much of a mission.
12. The current and projected fiscal reductions will directly impact AFIT and its mission. Adaptation to fee-for-service is an imperative. In other words, AFIT's true contribution is a function of how well we judge its value-added function in the immediate future. Otherwise, AFIT is an extravagance.

13. - Over control
 - Funding for necessary equipment
 - Timely replacement of faculty with highly qualified people
14. AF needs to determine, once and for all, if AFIT should have a mission. If yes, no problem. If no, case closed.
15. Tightening/downturn of acquisition programs. Slight increases in R&D budget.
16. - A tight budget will make production difficult
 - Continued DOD emphasis on technology will sustain the importance of S&E [science and engineering] education in the AF
17. Dollars and manpower ceilings may drive AFIT out of business. Continued competition by the academic community will also play a major role. I see more and more universities offering courses that have an orientation to a specific purpose vice generalized education.
18. AU's goals and objectives.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

19. 1-Budget--i.e. budget pressures will question need for duplication of AFIT missions versus what's available elsewhere, e.g. graduate school
 2-Video teleconferencing--i.e. new opportunities to reach more people at other locations or get off site lecturers at low cost
 3-Smaller, high quality AF requires more emphasis on continuing education
20. All of the listed items. Reduction in the number of AF AAD positions and slots for graduate education will, obviously, have a great effect of AFIT. (see comments under question 27: [AFIT provides an excellent graduate education. Some of our strongest, most capable researchers have AFIT degrees. But - AFIT should not be the only source of graduate education for the military. Just as AFIT would not consider having all its faculty from the same institution, we do not want every one of our blue-suit physicists, EEs, Aeros, etc., taught at the same institution. Regardless of budget, policies, usage, etc., we need to keep a reasonable number of CI slots available for regular program education - not just for USAFA and AFIT instructor pipeline slots. If I had to choose between having AFIT and

having to have all of my officers educated there, and not having AFIT and having education available from a variety of schools, I would choose to not have AFIT.])

21. - Lack of support from senior AF leadership . . . Budget will immediately follow
- Right now, AFIT doesn't have a sponsor
22. Development and improvement of the Distance Learning Initiative will aid immeasurably in improving AFIT's ability to provide professional continuing education (PCE). Budget reductions and the planned cost per unit (places burden of cost on each MAJCOM) will reduce AFIT student loads drastically.

AFIT Faculty/Staff were requested not to respond to questions 26-29

26. Within your area of responsibility, do personnel routinely obtain professional continuing education (PCE) courses from AFIT?

Responses: Yes or N/A 18

No 2 (If not, why--and where do they obtain the education?)

Comments:

1. Yes. But also send many to DSMC [Defense Systems Management College] because of my backlog of acquisition requirements.
2. No. Better offerings available elsewhere. The one exception might be program/lab management.
3. No. Navy Postgraduate School and non-government sponsored learning centers.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

Responses: Yes 2

No 2 (If not, why--and where do they obtain the education?)

Comments:

4. Yes. [My organization] receives approximately 750 professional continuing education quotas annually. However, present quota allocations are inadequate. We need to increase training availability in this area to better meet mission requirements. (Example: [My organization's] operation research annual training requirement is 30; however, we only receive three to four funded quotas).
5. Yes.
6. Routinely, no, although we do use AFIT for a few courses. We have had a mixed experience scheduling AFIT courses locally. Some have been easily scheduled and well received, others have been difficult to obtain.
7. No. There are only 6 military working directly for [my organization]. Our PCE comes before or after this assignment.

27. Would you prefer to send your personnel to AFIT (resident) to obtain graduate education?

Responses: Yes or N/A 12 No 2 (If not, why--and where would you prefer they go?)

Yes and No 3 Neither Yes or No (but with response) 3

Comments:

1. Yes. But only to obtain skills that meet my expected needs which, by definition, are in transition.
2. Yes. Provided degree is focused on AF needs.
3. No. Private institutions more attuned to business management.

Marked Both Yes and No with Comments:

4. If its the best source for what they need and value. Locally if that's the best. Locally offered courses would receive much better "field" civilian participation.
5. Yes, Master's. No, PhDs; in most cases, PhD programs should be driven by very specific matches between student and principal faculty member
6. Yes, because in some areas AFIT does have a unique niche. No, because AFIT is not necessarily viewed by the academic snobs as equivalent to MIT, Duke, Arizona State, etc. In the R&D world the advisors to OSD and the AF place considerable stock in where the degree is obtained. If we don't have staff from the "right" universities, we don't have a quality staff. An illogical argument, but one we have to deal with.

Neither Yes or No, but with comments:

7. Want to send people where we get the best value--good education, reasonable price, least time away from career.
8. Depends on technical field. Right now, AFIT doesn't have the ability to meet the demand of more than a few civilian personnel in graduate education.
9. In the past, I preferred to. But quite frankly, I'm requesting more and more civilian institutions because, due to AF dollar/manpower cuts, I see AFIT quality slipping.

Additional Responses Received After Printing Pamphlets I and II.
These Responses Not Included In Second-Round Comments

Responses: Yes or N/A 1 No 1 (If not, why--and where would you prefer they go?)

Yes and No 1 Neither Yes or No (but with response) 1

Comments:

10. [No.] AFIT provides an excellent graduate education. Some of our strongest, most capable researchers have AFIT degrees. But - AFIT should not be the only source of graduate education for the military. Just as AFIT would not consider having all its faculty from the same institution, we do not want every one of our blue-suit physicists, EEs, Aeros, etc., taught at the same institution. Regardless of budget, policies, usage, etc., we need to keep a reasonable number of CI slots available for regular program education - not just for USAFA and AFIT instructor pipeline slots. If I had to choose between having AFIT and having to have all of my officers educated there, and not having AFIT and having education available from a variety of schools, I would choose to not have AFIT.

Neither Yes or No, but with comments:

11. AFIT should continue to provide the majority of graduate education in support of Air Force Advanced Academic Degree requirements. However, we recommend AFIT continue to send a few of our brightest officers to civilian institutions.

28. Do you obtain consulting services from AFIT? (In CY 91, the spectrum of consulting services ran from phone calls to formal investigations with written reports)

Responses: Yes, N/A, or Blank 16

No 4 (If not, why--and where do you obtain the services?)

Comments:

1. Yes, occasional.
2. Yes, limited.
3. No, I'm not aware of any. We do consulting. When we get it, its usually from a blue-ribbon panel of national experts.
4. No, contractors are responsive and quick.
5. Didn't know AFIT provided consulting services. Usually contract out.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

Responses: Yes, N/A, or Blank 2

No 2 (If not, why--and where do you obtain the services?)

Comments:

6. Yes, on a limited basis. AFIT needs to market this area and explain what is available and what was previously accomplished.
7. No. Very little, except for sponsored research.
8. No. But some Secretariat and Air Staff organizations do. We should do more.

29. Do you use AFIT for sponsored research? (theses, dissertations, or faculty projects, whether funded or unfunded)?

Responses: Yes, N/A, or Blank 18

No 2 (If not, why--and where do you sponsor your research?)

Comments:

1. N/A, no sponsored research.
2. No, we don't.
3. No, but would like to. Our office has several projects that would lend themselves to AFIT.

Additional Responses Received After Printing Pamphlets I and II. These Responses Not Included In Second-Round Comments

Responses: Yes, N/A, or Blank 3

No 1 (If not, why--and where do you sponsor your research?)

Comments:

4. Yes. We have been very actively trying to increase our coupling to AFIT in this area as well as others.
5. Yes, on a limited basis. Recommend AFIT send representatives to meet with MAJCOM representatives during AFIT/[my organization] Day to discuss needs of the command.
6. No. But some Secretariat and Air Staff organizations do. We should do more.

Appendix I

SECOND-ROUND QUESTIONNAIRE COVER LETTER

AFIT/LSC

22 May 1992

Air Force Institute of Technology (AFIT) "Second-Round" Questionnaire

Honorable Donald B. Rice
Secretary of the Air Force
Washington DC 20330

Dear Secretary Rice

As you may recall, approximately six weeks ago you were asked to participate in an AFIT survey which is part of ongoing student thesis research. That survey was designed to assist AFIT in identifying and documenting data required to implement the DOD-mandated Unit Cost Resourcing and Corporate Information Management programs. My initial letter advised you that we would also appreciate your participating in a second mailing of that same survey by providing your comments to the responses we received. Please take the time, approximately 60 minutes, to review the attached responses and questions and return your comments (Atch 2) in the enclosed envelope by 12 June 1992.

We are using a modified Delphi technique to collect and assess responses that will be used as a baseline in determining critical success factors. As you may know, the Delphi technique uses two or more rounds to query a limited number of experts for their opinions on the same set of questions. Each round allows written "discussion" of the recorded responses by all respondents. As a panel member, your comments about the initial responses are important in that they will assist AFIT to focus on the subject matter in a systematic manner, producing a more comprehensive device than would the input from a single expert source. Your comments will not be attributed to you personally.

Our initial mailing went to only 33 key AFIT stakeholders; we received 20 responses. Your participation is vital to the success of our survey and I cannot over emphasize the importance of your participation; however, it is completely voluntary. If you were unable to participate in the "first-round" questionnaire, please feel free to comment in this "second-round." Your input is highly valued.

Should you have questions regarding this questionnaire or the Delphi technique, please contact Major Gordon Wishon, DSN 785-8000. Thank you for finding time in your busy schedule to assist us in gathering this important information.

Respectfully

LARRY W. EMMELHAINZ
Lt Col, USAF
Director, Research and Consulting

3 Atch

1. AFIT Questionnaire
(Pamphlet I: Verbatim First-Round Responses)
2. AFIT Questionnaire
(Pamphlet II: Second-Round Response Request)
3. Return Envelope

(In trying to maintain the level of correspondence that senior DOD officials and general officers receive, this letter was originally one page. This reproduction is formatted in accordance with AFIT/LS thesis guidelines.)

Appendix J

PAMPHLET II

AFIT Questionnaire

**PAMPHLET II:
SECOND-ROUND RESPONSE REQUEST**

(USAF SCN 92-12. Expires: 1 Oct 92)

PLEASE RETURN THIS PAMPHLET IN THE PROVIDED ENVELOPE BY:

12 JUNE 1992

SECOND-ROUND RESPONSES

1. In an effort to become more efficient and effective, DOD is encouraging, and in some cases directing, improved business practices. Are you aware of these recent initiatives?

Yes 12 No 3 (no response) 5

COMMENTS: (If you were not a first-round participant please check the appropriate response above and use this block for further comments if necessary)

1. The "awareness" is quite general. I have no knowledge of the details.
2. Apparently I was the only one not aware of the new emphasis on business practices. This may be explained by the fact that I have been in DOD since July 1991 and am not directly involved in business issues.

2. DOD recently mandated a Unit Cost-Per-Output Program that will require DOD organizations to reimburse AFIT for educational programs and services beginning in FY 93. Are you aware of this program?

Yes 9 No 4 (no response) 7

COMMENTS: (If you were not a first-round participant please check the appropriate response above and use this block for further comments if necessary)

1. Actually, I believe the question is incorrectly stated [Correct assessment]. My understanding is that unit-cost funding will begin in FY 93. However, I believe the question of central vs. customer funding remains to be decided."
2. Not sure this is a good idea. May make the overall program too short term in outlook.

3. Another DOD strategic initiative is the Corporate Information Management (CIM) Program, a business-oriented management tool for effectively managing DOD's information resources. Are you aware of this program?

Yes 11 No 2 (no response) 7

COMMENTS: (If you were not a first-round participant please check the appropriate response above and use this block for further comments if necessary)

1. Apparently a lot to be done. I understand that some organizations still handle enormous accounts of paper.

4 *The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?*

		S T R O N G R E E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E E	N R O F S P O N S E
A	As the Air Force becomes ever more dependent upon technology for its superiority, the mission of AFIT becomes more urgent.	7	11	1	0	1
B	<u>Customer-focused</u> graduate and professional education. When customer pays, the focus has to be clearly on customer requirements. Work closely with the organizations from which AFIT's customers come. Focus the studies even further to ensure specific AF needs are addressed.	10	8	1	0	1
C	Research should be limited to Air Force/DOD programs - <u>nothing</u> more.	3	4	8	4	1
D	Provide advanced degree programs in <u>only</u> those areas that are unique to the Air Force and cannot be obtained through a civilian institution. We need to look hard at the ROI and make sure we can't get elsewhere at a more competitive price.	2	5	10	2	1
E	In fact, one can make the argument that many of the traditional AFIT-acquired skills can be obtained elsewhere.	0	12	6	0	2
F	Focus on military-unique education: civil engineering, logistics, and acquisition professional development.	5	9	2	4	0
G	Educate, train, assist and research.	5	9	4	0	2
H	Provide proactive strategies in the new concept of business orientation.	2	12	3	0	3
I	Should be to provide DOD/USAF managers and leaders with the thoughtware tools to continuously improve the combat capability of forces within an environment of ever constrained budgets.	6	12	1	0	1

4 *The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?*

		S T R O A N G R L E Y E	A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y E	N R O E S P O N S E
J	Conduct research (applied research in schools such as SOCES [School of Civil Engineering and Services]) in areas related to the schools' mission.	5	12	1	0	2
K	Provide consulting services to AF agencies as manpower permits	3	15	1	0	1
L	Educate people in the narrow disciplines where the AF has both stated requirements and funding to support.	4	9	5	1	1
M	Develop, deliver, and evaluate training and undergraduate and graduate education in technical topics,	8	10	0	1	1
N	management topics, and	6	11	1	0	2
O	services topics	4	13	0	0	3
P	to Air Force officers,	7	12	0	0	1
Q	senior enlisted, and	2	7	8	0	3
R	civilian personnel, (mission statement should formally acknowledge the requirement to include AF (DOD?) civilians as customers	7	8	4	0	1
S	in response to valid (and validated) requirements	7	11	0	1	1
T	using a variety of delivery modes, and	12	6	0	0	2

4 The mission of AFIT is to support national defense through quality graduate and professional education, consulting, and research programs. Given the changing DOD environment, to the best of your knowledge, what should be the mission of AFIT?

		S		D	S D	N R
		T		I	T I	O E
		R		S	R S	S
	O A	A	A	O A	P	
	N G	G	G	N G	O	
	G R	R	R	G R	N	
	L E	E	E	L E	S	
	Y E	E	E	Y E	E	
U	by means of a qualified faculty who stay current in their areas of specialization	14	5	0	0	1
V	[Be] Competitive (dollars and quality)	13	4	2	0	1

COMMENTS:

4. Purpose should be to train a cadre of officers who are technically qualified to build the AF of the future, which will be an increasingly high technology organization. AFIT has the position to do this with a unique emphasis on AF interests.

4. Bottom line: focus on your primary customers and be competitive.

4. Does AFIT need to be in the "undergraduate education" business? I think not. The key is to have validated requirements-and that is not the responsibility of AFIT. They respond to the AF requirements.

4(C). I believe the research should show some relevance to Air Force Programs [Agree].

4(D). A similar program may be obtained through CI; however, I don't believe that should be the only criteria. The AFIT program will probably be tailored better to meet specific Air Force requirements [Disagree].

4(D and E). While AFIT does produce degrees that civilian institutions also produce, it is AFIT's ability to tailor to specific, current Air Force needs that is important. People are the key. It is people with today's experience and unique insight into tomorrow's environment that count--these, by definition, are Air Force people [Agree, Agree].

4(R). I don't believe you need to specify: Civilians in mission statement as that should be understood. I believe mission statement needs to be aimed at the Air Force mission vice DOD [Disagree].

4(T). Especially Distance Learning modes [Strongly Agree].

4(V). Being competitive is important but it's hard to put a \$ value on education and I fear that putting \$ in mission statement could result in a valuable program being killed because it's not viewed as competitive for some reason [Disagree].

5 In your current area of responsibility, what types of products or services does AFIT now provide that you are aware of?

		I M P O R T A N T V E R Y	I M P O R T A N T	I M P O R T A N T L E S S	U N I M P O R T A N T	N O R E S P O N S E
A	GRADUATE EDUCATION.	6	3	0	0	11
B	Graduate training in technical areas of interest to AF. Highly relevant technological graduate education.	15	3	1	0	1
C	Graduate education in engineering	11	5	3	0	1
D	science,	10	5	4	0	1
E	logistics	9	7	2	0	2
F	MS and PhD graduates for the AF laboratories	8	8	3	0	1
G	Graduate education (mostly military,	10	7	2	0	1
H	some civilian)	3	10	4	1	2
I	Graduate education with unique Air Force flavor.	11	7	0	1	1
J	PROFESSIONAL CONTINUING EDUCATION (PCE) courses; short courses. "On demand" continuing education.	11	7	0	0	2
K	PCE for Acquisition.	12	6	0	0	2
L	SYS 100, 200, 400 courses for professional development for scientists and engineers.	7	11	0	0	2
M	PCE for scientists and engineers.	6	12	0	0	2
N	Logistics continuing education.	8	10	0	0	2

5 In your current area of responsibility, what types of products or services does AFIT now provide that you are aware of?

		I M P O R T A N T V E R Y	I M P O R T A N T	I M P O R T A N T S L I G H T L Y	U N I M P O R T A N T	N R O E S P O N S E
O	PCE designed for senior logisticians.	10	8	0	0	2
P	Limited TQM/TOC [Theory of Constraints] education.	5	9	4	0	2
Q	PCE courses and skills that have Air Force only application.	7	9	3	0	2
R	CONSULTING	3	9	3	0	5
S	Consulting services that have Air Force only application.	2	13	3	0	2
T	Consultation to AF labs	3	9	7	0	1
U	RESEARCH	4	7	0	0	9
V	Relevant research in areas of primary interest to AF laboratories.	8	8	3	0	1
W	Research, mostly customer sponsored.	5	10	3	1	1
X	Research (in-house)	5	10	3	1	1
Y	Research (in AF labs by students)	7	9	2	0	2
Z	Publications	8	8	3	0	1
A A	Workshops, symposia, etc.	4	8	6	0	2
B B	Provide inputs to studies, conferences and workshops as a participant or by making a presentation.	4	12	3	0	1

5 In your current area of responsibility, what types of products or services does AFIT now provide that you are aware of?

		I M P O R T A N T	I M P O R T A N T	I M P O R T A N T	U N I M P O R T A N T	N E E D S P O N S E
CC	Support to professional societies.	2	10	7	0	1
DD	Help [customers] determine education requirements.	7	10	1	1	1
EE	Clearing house for available education in certain specialty areas.	4	10	4	1	1
FF	Teaching courses in residence.	11	6	1	0	2
GG	Teaching courses in the field.	9	6	2	0	3
HH	Develop courses and seminars.	8	11	0	0	1
II	AF educational records repository.	2	3	12	1	2

COMMENTS:

5. Grad Ed, PCE, Consulting, Research.

5. Mainly courses for advanced degrees. which is very important to train young officers to lead AF technical activities. Slightly aware of PCE courses.

5. Focus on unique Air Force requirements for products and services is the key.

5. Education and Lab-sponsored research

5(B). "Graduate training" is a curious term. Perhaps it should say "graduate education"? [Very Important]

5(P). We should expand TQM/TOC theories. not limit them. [Very Important]

5(X). Not sure what this is? But answered [Unimportant] assuming there was no Air Force requirement.

5(GG). Teaching courses in the field is important but not as important as meeting our requirements to teach scheduled residence courses. In a time of diminishing resources. I'd reduce my effort at teaching courses in the field before I would cancel an in-residence course [Important].

6 What additional products or services should AFIT provide?

		S T R O A N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
A	<u>NOTHING!</u>	1	0	9	3	7
B	Need courses that bridge gap between the pure technical type and the pure management type, i.e., someone that can effectively manage people in a technical environment.	8	8	2	0	2
C	Increased educational capability.	0	14	4	0	2
D	Strategic planning for education and training. Education management (course evaluation and matching student needs with available courses).	0	14	4	0	2
E	Live satellite education.	11	7	0	0	2
F	Improved distance education services to meet continuing education needs at lower costs to consumers.	13	5	0	0	2
G	Correspondence courses.	3	7	4	4	2
H	More (better) marketing/advertising of products and services. I don't know what all you do or can do.	6	11	1	0	2
I	My only quarrel over the years has been with <u>content</u> .	1	3	12	1	3
J	The School of Engineering should recognize that graduates will move through a wide range of assignments and trade some narrow specialization for greater breadth of coverage.	2	9	3	2	4
K	Expanded PhD capability to meet AF laboratory (and other) needs.	6	6	4	1	3

6 What additional products or services should AFIT provide?

		S T R O A N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
L	It should focus on the graduate student and selective professional education programs.	7	5	6	0	2
M	Continue to provide TQM facilitating service.	3	12	1	1	3
N	Need more (some) senior civilians with formal advanced education in <u>managing change</u> .	2	7	6	1	4
O	I feel fairly comfortable that AFIT now provides what should be provided but not always to the extent that is needed to fully satisfy the requirements. For example, not enough offerings of courses, and AFIT needs to do more distance education (video, teleconference, and taking courses to the field).	5	12	0	1	2
P	Increase SYS 100, 200, and 400 throughput during the next 2-3 years to reduce backlog created by new APDP requirements.	7	9	0	1	3
Q	Offer SYS 100, 200, 400 at major AFMC bases.	8	8	0	0	4
R	More seminars and workshops.	1	10	3	1	5
S	More periodicals or newsletters.	2	5	8	1	4
T	During these times of fiscal reductions AFIT should develop as many transportable methods as possible of delivering all of its courses (i.e., video, CBT, satellite offerings, etc.).	11	7	0	0	2
U	Support of acquisition professional development program (APDP) requirements.	9	6	1	0	4

6 What additional products or services should AFIT provide?

		S T R O N G R E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E Y E	N R O E S P O N S E
V	Support of environmental sciences/engineering requirements.	6	10	0	0	4
W	Provide curriculum support services.	2	10	4	0	4

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 6(1); If from Pamphlet II use, e.g., 6(A)).

6. Distance courses are very helpful, but face-to-face professor-student relations are very important for professional development.

6. Distance learning, on site with customer are two key capabilities. Need to shift to meet critical customer requirements such as APDP training--Flexible response through distance learning is critical.

6(B). DE already has some of these in its PCE courses and the GEEM Program could be said to fit this description [Agree Strongly].

6(G). Could be a place for correspondence courses in certain areas, but I'm concerned how productive correspondence courses are from an education standpoint [Disagree].

6(N). What is "formal advanced education in "managing change""? Where is this available? [Disagree]

6(P,Q). I don't have a good enough feel for this to provide an answer I could stand behind [Agree, Agree].

6(Q). SYS 400 is no longer required for APDP certification [Agree Strongly].

6(T). AFIT should develop as many transportable methods as possible for delivering all? NO, not all of its courses [Agree].

6(W). Not sure what this means [Agree].

7 What products or services would you prefer to eliminate or reduce in scope?

		S T R O N G L Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E E	N R O E S P O N S E
A	I would not recommend elimination of any existing services.	2	4	10	1	3
B	If a reduction in scope were mandated, I would prioritize services as: (1) graduate education; (2) research; (3) continuing education--in that order. Obviously, these services are essential and would have to be provided by other means if not by AFIT.	6	6	4	3	1
C	Ensure all PCE offerings address valid needs, not just the desire to pump up the statistics of bodies in lecture halls.	11	6	0	0	3
D	AFIT could put together more effective cooperative efforts with AF laboratories to share research activities of the faculty and thesis/dissertation research.	7	9	0	0	4
E	Training. Course/programs that may contain an unreasonable amount of training.	0	10	6	0	4
F	Any degree program that cannot be obtained from a civilian institution.	1	1	7	6	5
G	Drop the research and set up collaborative efforts to get most of the benefits.	1	3	6	8	2
H	If AFIT isn't the leader, recognized expert, center of excellence, etc., for a particular program either attain that status or get rid of the program.	3	10	5	0	2

7 What products or services would you prefer to eliminate or reduce in scope?

		S T R O A N G R L E Y E	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y E	N R O E S P O N S E
I	A lot of the logistics continuing education courses were good but have been OBE'd by the numerous major changes, DMRDs, two-level maintenance, stock funding, etc. The scope could be reduced by shortening course development.	1	7	6	0	6
J	Redundancy in courses presented in other DOD environments.	2	11	3	0	4
K	With downsizing, particularly in TDY budgets, in-residence offerings should be reduced, offset by an increase in mobile offerings.	2	13	3	0	2
L	General knowledge short courses. Not by choice but based on a mandated prioritized drawdown. Concentrate on focused specific subjects.	2	13	1	0	4
M	Nuclear engineering.	3	8	3	1	5

COMMENTS:

7. Resources are headed South: prioritization is a must. I do believe there is some belt tightening that can be accomplished in the PCE area to reorganize reality of today's requirements.
7. - AFIT should teach degree programs NOT available at civilian institutions
 - In resident course offerings are beneficial--less distractions. academic environment
 - Short courses should be subject area specific NOT of a general basis
7. Drop first those activities that do not contribute to advanced degree programs.
- 7(B). AFIT's offering of PCE courses is of primary importance to AFMC. Indeed, PCE courses are the cornerstone of Air Force Acquisition and Professional Development Program [Disagree].

COMMENTS CONTINUED:

- 7(B). I don't agree with the order. Some PCE might very well be a higher priority than much of the graduate education and research. I won't sign up to all graduate education and research being more important than PCE [Strongly Disagree].
- 7(D). Sounds reasonable but my experience with this area has been limited so the confidence in my answer [Agree] is low.
- 7(E). May be difficult to define "unreasonable" [Agree].
- 7(F). Surely you mean can! [Agree] [Original comment stated "cannot"]
- 7(F). If we can get technical degree at civilian institution - eliminate at AFIT [Strongly Agree].
- 7(F). Eliminate/reduce any degree program that cannot be obtained from a civilian institution [Disagree]:
- We should retain Air Force unique programs.
 - Review duplicate programs offered by AFIT and civilian institutions and offer programs through the most cost effective medium.
- 7(I). The logistical changes should be incorporated rather than deleting courses. Our Logisticians need courses that match the changes in the Air Force revision [Agree].
- 7(I). ? [response: none]
- 7(I). Low level of confidence in answer [Disagree] but don't see the connection.
- 7(J). Would certainly want to look at this carefully to be sure the other course would meet the Air Force requirements [Agree].
- 7(K). is more than one question? Refers to PCE? Grad Ed? [Agree]
- 7(K). With downsizing, particularly in TDY budgets. PCE in-residence offerings should be reduced, offset by an increase in mobile offerings.
- 7(K). I believe we can provide the best education in-residence but the reality of budget cuts may dictate that we "go mobile" with the course or don't offer it at all. Going to the field could take more faculty [Agree].

8 Looking ahead 3-5 years, what current or future AFIT products or services will generate the greatest demand by DOD?

		S T R O N G R L E Y E	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y E	N R O F S P O N S E
A	Information sciences and engineering; test beds and other experimental facilities supporting CIM.	4	11	2	0	3
B	Integrated engineering courses; those that emphasize the relationship between design, manufacturing, and operational costs.	8	8	0	0	4
C	SPC [Software Productivity Consortium (assumed)] and like methods for engineering and management.	4	9	2	0	5
D	Technical training for officers to make them more knowledgeable about technical aspects of AF systems.	3	12	1	0	4
E	PCE for the acquisition workforce and engineering PhDs. SYS 100, 200, 400 courses for professional development. Acquisition.	4	12	1	0	3
F	Professional acquisition courses within Defense Acquisition University structure.	6	9	2	0	3
G	Growing demand for short-term acquisition professional education.	10	5	1	0	4
H	Growing demand for short-term logistics professional education.	6	9	0	0	5
I	Emphasis <u>must</u> be on distant learning techniques. TDY dollars won't be there.	10	8	0	0	2
J	There are so many demands, and its impossible to prioritize them because they are so closely linked. I see a huge demand in such areas as distance education (satellites),	5	11	2	0	2

8 Looking ahead 3-5 years, what current or future AFIT products or services will generate the greatest demand by DOD?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
K	environmental engineering,	8	9	1	0	3
L	information management,	6	10	2	0	2
M	civilian education,	1	11	4	1	3
N	financial management, and	3	10	3	1	3
O	technology management.	9	9	0	0	2
P	Only grads of unique to the AF/DOD programs. Short courses and graduate education programs that are relevant to the Air Force mission, such as the environmental program--both Grad Ed and PCE. The relevance question will take on more and more importance, especially if the customer has to pay.	5	11	2	0	2
Q	PCE.	7	8	3	0	2
R	PhD graduates.	2	12	3	1	2
S	Specialized course work directed toward <u>rapid</u> solution of AF issues.	3	7	6	1	3
T	Offering of financial management courses should be expanded, emphasizing Industrial Funds, Stock Funds, and the Defense Business Operating Fund.	3	9	5	0	3
U	New courses in accepting, dealing with, and using new business strategies. A DOD base commanders course on how to be a landlord for DOD.	0	8	8	1	3
V	Strategic planning.	2	10	3	0	5

8 Looking ahead 3-5 years, what current or future AFIT products or services will generate the greatest demand by DOD?

		S T R O N G R L E Y	A A G R E E	D I S A G R E E	S D I S O N G R L E Y	N R O S P O N S E
W	Education and training management courses.	0	9	4	2	5
X	Managing Change.	2	10	4	1	3
Y	Parallel processing mathematical algorithms.	3	9	2	1	5

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 8(I); If from Pamphlet II use, e.g., 8(A)).

8. If customers pay, may force AFIT to short-term courses, rather than advanced degrees which pay off over the long term.

8. Focus on unique AF/DOD requirements: positioned to respond to rapidly changing requirements.

8(C). No opinion [response: none].

8(D). Technical education for officers to make them more knowledgeable about technical aspects of AF systems [Strongly Agree].

8(J). I believe the demand for distance education will be there but disagree that the demands can't be prioritized at least within broad categories [Disagree].

8(Q). WOW! [response: none].

8(U). AFIT should not be in the "Base Commander" business [Strongly Disagree].

8(Z). No opinion [response: none].

9 What would be necessary to effectively develop and deliver products or services suggested in the previous question?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
A	Adequate faculty and resources.	11	6	0	0	3
B	Expanded PhD capability--increased faculty.	9	5	2	1	3
C	Rapid movement of experts <u>into</u> AFIT. Faculty experienced in the <u>relevant</u> areas.	8	9	0	0	3
D	More dedicated faculty.	3	5	5	1	6
E	AF needs to do a better job of defining education needs--tough in the middle of the current implosion.	8	8	0	0	4
F	AFIT needs to take a rigorous look at curricula to prune those no longer needed and focus resources on those that are.	8	10	0	0	2
G	Might have to use help of AFSC's product centers and logistics centers. Create interdependent programs.	6	5	4	0	5
H	Would challenge accepted view of university as self-contained provider of educational services.	5	4	6	0	5
I	The single biggest constraint is the difficulty of course development in its traditional paradigm. Using "current" methods, it is possible that a new course is outdated by its prototype class. Rapid curriculum development.	5	11	1	0	3
J	AFIT must live within current or even more constrained funding. Therefore, a stringent review of current and future requirements is imperative. Each customer must justify their needs, else eliminate things on a reverse-priority basis.	6	9	0	0	5

9 What would be necessary to effectively develop and deliver products or services suggested in the previous question?

		S T R O N G R E L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
K	Improved coupling to AF laboratories for high quality research and consultation.	9	7	1	0	3
L	State-of-the-art-computers (massively parallel).	5	9	0	0	6
M	Environmental engineering department--faculty and staff.	3	13	0	0	4
N	Adequate professional resources; information; and MIS [Management Information Systems]	3	12	0	0	5
O	Equipment such as satellite TV (send and receive) and other state-of-the-art items such as computers/computer labs. Increased emphasis should be placed on technologically-based course delivery. Distance learning; course development and delivery techniques.	10	7	1	0	2
P	Increased emphasis should be placed on on-sites, i.e., mobile training; circuit rider approach; and more trained facilitators/associate professors at customer locations.	6	10	2	0	2
Q	AFIT is doing fine.	1	10	4	2	3
R	Increased emphasis should be placed on lower unit cost, e.g., some large classes.	4	7	3	0	6
S	Information on Defense Business Operations Fund and associated regulations, etc. Policy on General and Administrative Reimbursement Program.	2	10	3	0	5
T	Case studies on practical usage scenarios.	4	9	2	0	5

9 What would be necessary to effectively develop and deliver products or services suggested in the previous question?

		S T R O N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
U	Make AFIT an SOA (like the Academy) with direct lines (command and resources) to a SAF-level undersecretary position or to the Chief of Staff.	5	4	4	2	5
V	Less external distraction.	4	10	2	0	4

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 9(1); If from Pamphlet II use, e.g., 9(A)).

9. Distance learning should be enhanced to increase accessibility of courses.

9. Be aware some of these questions require a biased/slanted answer as phrased.

9. AFIT is not going to grow; must take what we have, reorient and get better ROI.

9(D). There is no lack of dedication now [Disagree].

9(F). This needs to be done but the customer has to be the prime player in determining requirements. AFIT is a provider of Education [Agree].

9(H, L, N, R, S, U, and V). Blank = no opinion.

9(M). This exists today in EN & DE [Strongly Agree].

9(O and P). Might have different answers for PCE and Grad Ed [Agree, Agree].

9(P). This may take more faculty than doing same number of courses in residence [Strongly Agree].

9(R). Depends on subject and availability of large classrooms [Agree].

9(U). AFIT should remain a part of AU for now, but Air Force leadership must ensure adequate funding. Study feasibility of placing under AFMC as primary user of graduates [Disagree].

9(V). Not sure what you mean here [Disagree].

10 Who should be AFIT's customers? [This question is changed to assist in identifying AFIT's primary customers]

		P R I M A R Y	S E C O N D A R Y	T E R T I A R Y	N R O F S P O N S E
A	Predominantly AFMC. Integration of AFSC/AFLC requires AFIT to seriously rethink customer base and relationships. In the future, the needs of AFMC will dictate AFIT's role and ultimately its existence.	10	5	1	4
B	Secretary of the Air Force.	4	5	8	3
C	Chief of Staff of the Air Force.	4	8	6	2
D	MAJCOMs. MAJCOM functional areas.	12	6	1	1
E	Students.	12	3	1	4
F	DOD (includes other services)	5	14	1	0
G	Foreign governments/allied nations.	0	6	13	1
H	Accrediting bodies.	4	4	9	3
I	AF labs.	11	5	3	1
J	The research community.	7	6	5	2
K	Logistics/Systems engineering.	7	9	2	2
L	OUSDA(A); SAF/AQ; and acquisition managers.	6	12	0	2
M	Federal employees.	4	7	6	3
N	Mid- to senior-level civilian and military <u>managers</u> (managers <u>not</u> leaders).	3	6	7	4
O	Nation.	2	5	9	4

10 Who should be AFIT's customers? [This question is changed to assist in identifying AFIT's primary customers]

		P R I M A R Y	S E C O N D A R Y	T E R T I A R Y	N R O E S P O N S E
P	Air Staff functional leaders and Air Staff functional managers.	7	9	2	2
Q	Squadron commanders and supervisors within squadrons.	6	6	6	2
R	Air Force FOAs, such as, the Air Force Center for Environmental Excellence.	4	11	3	2

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 10(1); If from Pamphlet II use, e.g., 10(A)).

10(A). AFMC is a primary customer but I disagree with this statement that AFIT's customer is predominantly AFMC [Primary]. * Need definition of Primary, Secondary, and Tertiary.

10(H). ? [response: none].

10(N). PCE courses are by nature geared toward low to mid managers--not senior folks--they need the "specialty training" early in their careers [Tertiary].

11 Do you expect the customers to be the same in the future?

Yes _____

No _____ (Who do you think they should be?)

		S T R O N G G R E E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E E	N R O E S P O N S E
A	Yes. The primary user of AFIT's graduate education and PCE courses is AFSC and AFLC. In the future the needs of AFMC will dictate AFIT's role and ultimately its existence.	7	7	2	1	3
B	Yes. More emphasis on junior through middle structure.	3	11	1	0	5
C	Yes. Some careful senior courses.	3	9	3	0	5
D	Yes. I doubt that we will see much expansion beyond AFMC. However, the Space Command may lead the way to expand the customer base.	2	7	6	3	2
E	No. More other DOD.	3	6	7	0	4
F	No. Organizationally the same; however, the customer pool will be much different. With force drawdown, our smaller work force will be required to be more highly educated than the workforce of today. In order to handle the aspects of future jobs that allow productivity through technology, i.e., tomorrow's captain will be handling the jobs of what two or three captains are handling today. Additionally, the "operational" pull to keep these people on the job will be stronger than the foresight to send them for advanced/continuing education. We end up with short-term operational efficiency and, unfortunately, long-term strategic deficiency.	4	7	4	0	5

11 Do you expect the customers to be the same in the future?

Yes _____

No _____ (Who do you think they should be?)

G	No. AFIT <u>should</u> become a Center of Excellence in CIM, simulation/modeling, decision systems, etc., to service MAJCOMs and joint staffs with the expertise needed for the new era of system acquisition and force management.	S		D	S D	N R
		T		I	T I	O F
		R		S	R S	S
		O A	A	A	O A	P
		N G	G	G	N G	O
		G R	R	R	G R	N
		L E	E	E	L E	S
		Y E	E	E	Y E	F
		1	9	4	2	4

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 11(1); If from Pamphlet II use, e.g., 11(A)).

11. Issue--is AFIT an educational or a training function?

11. If customers are not the same, there will be a strong change in course topics. This may happen, but AFIT may then become short-term oriented.

11(A). AFMC is going to be the primary driver. An AFIT/AFMC lash up would appear to be a win-win for the future [Strongly Agree].

11(A). AFIT exists to support all MAJCOMs not only AFSC and AFLC [Strongly Disagree].

11(B). I believe the emphasis on junior through middle structures is about right [Disagree].

11(B and C). Meaning is not clear [responses: none].

12 What are AFIT's strengths in terms of Professional Continuing Education Programs?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
A	Cost effectiveness.	3	7	3	1	6
B	Customer satisfaction.	4	13	0	0	3
C	Quality of courses.	5	11	0	0	4
D	Ties with functional areas.	5	10	2	0	3
E	Tailored programs to meet specialized needs.	7	7	2	0	4
F	Unique Air Force flavor (AF orientation).	9	8	0	0	3
G	Relevant courses since [AFIT] can tailor to specific job areas.	6	8	2	0	4
H	Ability to change curriculum on short notice. Responsiveness.	7	4	2	3	4
I	Meet immediate AF requirements (Course development flexible, responsive to AF needs).	7	5	2	2	4
J	Faculty (Professional staff. Quality personnel.)	6	7	2	0	5
K	Faculty currency, credibility.	4	9	1	1	5
L	Depth of expertise in the fundamentals and underlying principles of the traditional disciplines. Competence and functional knowledge.	3	9	2	0	6
M	Administrative structure.	0	9	5	0	6
N	Command support within AFIT	2	8	3	1	6
O	Facilities.	2	10	2	3	3

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 12(1); If from Pamphlet II use, e.g., 12(A)).

12(E) is important; not sure AFIT is positioned for rapid reaction to changing customer requirements [Agree].

12(J, K, and L). Both agree and disagree [responses: none].

12(O). I would change my answer to "Agree" once the new DE building is completed [Strongly Disagree].

13 What are AFIT's weaknesses in terms of Professional Continuing Education Programs?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
A	Award of "credit" for PCE courses.	3	6	5	1	5
B	Centralized location.	3	6	4	2	5
C	Location (of 21,000 GS-1102s [contract and procurement], only 339 are in the Dayton-Springfield standard metropolitan statistical area, according to DMDC). Air travel to and from Dayton is expensive, now that it is not a USAir hub.	1	8	4	1	6
D	Too much emphasis on residence courses, which, in turn, detracts from day-to-day changes in priorities.	1	6	7	1	5
E	Lack of "distance" delivery--high quality at lower cost.	4	9	2	0	5
F	Too many dollars to get the product.	0	8	6	0	6
G	Too many [other] resources/overhead to get the product.	0	7	6	0	7
H	More requirements than funds (insufficient resources to do all that is needed).	5	9	1	0	5
I	Lack of manpower.	5	8	0	0	7
J	Speed of adapting to new leadership/management disciplines and incorporating them in curriculum.	3	6	5	0	6
K	Bureaucratic approval process for course initiation (and attendant delay).	5	7	3	0	5

13 What are AFIT's weaknesses in terms of Professional Continuing Education Programs?

		S T R O N G L E Y	A A G R E E	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
L	Maintain currency in short-course subject material.	1	8	5	1	5	
M	Not enough throughput ([not] providing enough quotas).	6	6	3	0	5	
N	Unfair quota allocation process.	1	4	7	2	6	
O	AU bureaucracy making [AFIT] less flexible and responsive.	5	8	1	1	5	
P	No clue what PCE AFIT currently offers.	1	1	4	5	9	

COMMENTS:

13(J, K, and L). AFIT has been very responsive in providing new courses and changing curriculum, but MAJCOMs and functional managers must provide input to keep courses current [Disagree, Disagree, Disagree].

13(M). AU does not allocate enough quotas to the schools [Agree].

13(N). AFIT's quota allocation is based on requirements established by MAJCOMs. It is MAJCOM responsibility to ensure requirements are clear and recorded in the personnel data system [Disagree].

13(N). Unfair in the way AU allocates quotas to AFIT schools, not the way the schools allocate quotas to customers (MAJCOMs) [Agree].

14 What are AFIT's strengths in terms of Graduate Education Programs?

		S T R O N G R E E Y	A A G R E E	D I S A G E E	S D T I S O A N G R E E Y	N R O E S P O N S E
A	"Blue Suit" university environment.	4	9	2	0	5
B	Cost effectiveness (admittedly contentious).	1	9	3	1	6
C	The graduates coming to this lab are well prepared.	4	7	1	0	8
D	Air Force-focused, student-oriented programs. Unique Air Force perspective added.	7	9	0	0	4
E	Involvement of graduate research with AF needs.	5	9	2	0	4
F	Ability to meet Air Force needs; to grant degrees in unique areas.	5	10	0	0	5
G	Responsive.	3	8	3	0	6
H	Flexible--to a lesser extent than PCE programs.	1	10	3	0	6
I	Relevant.	5	9	2	0	4
J	Ties with functional areas	6	8	1	0	5
K	Strong partnership and common bond with the student.	5	10	2	0	3
L	Program quality. Credibility.	3	11	2	0	4
M	Professional staff. Quality personnel. Competence. Mission-oriented faculty--total dedication.	3	11	1	0	5
N	Depth of scholarship. Functional knowledge.	2	12	0	0	6

14 What are AFIT's strengths in terms of Graduate Education Programs?

		S T R O A N G R L E Y	A A G R E E	D I S A G R E E	S D T I S O A N G R L E Y	N R O E S P O N S E
O	The MSc program--very thorough.	6	7	0	0	7
P	Coupling to AF laboratories for "real world" thesis work.	7	8	0	0	5
Q	CDERS [Command Derived Educational Requirements System] Program.	2	6	5	0	7
R	Solving Blue Suit problems.	4	9	2	0	5
S	The depth and breadth of technical programs that simultaneously fill AFSC, and too a lesser degree AFLC, scientific and engineering needs for leading-edge education.	5	9	2	0	4

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 14(1); If from Pamphlet II use, e.g., 14(A)).

14(A). Both a strength and a weakness [response: none].

14(C and O). Don't understand/not qualified to respond [responses: none].

15 What are AFIT's weaknesses in terms of Graduate Education Programs?

		S T R O N G R E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
A	Lack of understanding and support throughout Air Force.	5	7	4	0	4
B	<u>Content</u> --the School of Engineering should recognize that graduates will move through a wide range of assignments and trade some narrow specialization for greater breadth of coverage.	1	7	6	1	5
C	Faculty perception in shaping curriculum may not be on target with actual needs.	1	9	5	0	5
D	Insufficient breadth of disciplines in social sciences and humanities.	0	3	10	2	5
E	Virtual absence of graduate programs in the areas of managing change and directing culture change for continuous improvement.	0	4	8	2	6
F	Too many dollars to get the product.	0	2	11	2	5
G	Too much overhead [manpower] to get the product.	0	2	11	2	5
H	Too many [other] resources to get the product.	0	2	11	2	5
I	<u>Perceived</u> lack of cost effectiveness (competitiveness).	3	10	4	0	3
J	Inadequate resources to maintain civilian faculty numbers and quality. Inability to hire appropriate level expertise due to budget constraints. If Grad Ed program is to be worthwhile, its faculty must be competitive.	5	10	1	0	4

15 What are AFIT's weaknesses in terms of Graduate Education Programs?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
K	Research equipment/facilities.	2	7	5	1	5
L	View that AFIT = civilian institutions so cut AFIT grad programs.	6	6	4	1	3
M	Opportunities for AF civilians.	3	6	7	1	3
N	Too much emphasis on residence courses, which, in turn, detract from day-to-day changes in priorities.	1	0	11	3	5
O	Professional recognition.	2	9	5	0	4
P	[Not] providing enough quotas.	1	10	4	1	4
Q	Too many [faculty] stay out of the operational field for too long. Loss of operational orientation.	2	3	10	1	4

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 15(1); If from Pamphlet II use, e.g., 15(A)).

15(F, G, H, I). Cannot make adequate judgment without cost figures. There is a perception that AFIT is expensive [F: Disagree, G: Disagree, H: Disagree, I: Agree].

15(J). Same problem with PCE faculty [Agree].

15(Q). This may be true in some cases with the civilian faculty [Agree].

16 What are AFIT's strengths in terms of consulting?

		S T R O N G R E S P O N S I V E	A A G R E E	D I S A G R E E	S D T I R S O A N G R E E	N R O E S P O N S E
A	Quality and expertise of persons available at AFIT.	2	13	0	0	5
B	Availability. <u>Relative</u> availability.	1	11	2	0	6
C	Providing consultation from operational point as well as academic.	3	12	0	0	5
D	AFIT has demonstrated some expertise in group dynamics and team building.	4	10	0	0	6
E	The fact that consulting and research are recognized as essential to quality teaching and, therefore, to AFIT's mission is a source of institutional strength.	3	12	0	0	5
F	Organizational development.	0	10	2	0	8
G	AF orientation.	3	12	0	0	5
H	The work AFIT has done in Theory of Constraints, while not formal consulting, has been most beneficial.	2	6	2	0	10
I	TQ facilitating has been <u>outstanding</u> .	4	8	1	0	7
J	Specific research focus, when Air Force takes the time to define real needs.	3	11	0	0	6
K	Responsive.	3	10	0	0	7
L	Flexible.	3	10	0	0	7
M	Relative low cost.	4	9	1	0	6

COMMENTS:

Comments: None.

17 What are AFIT's weaknesses in terms of consulting?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
A	AFIT is not resourced to provide consulting.	3	10	1	0	6
B	Not enough faculty to satisfy all requirements.	2	10	1	0	7
C	Insufficient resources.	2	10	1	0	7
D	A greater awareness of AFIT throughout the Air Force would increase the demand for consultation.	8	5	1	0	6
E	Impression that the School of S&L [Systems and Logistics] provides much consulting for which it receives high customer marks.	1	10	2	0	7
F	Impression that the School of Eng. provides much less consulting.	1	9	3	0	7
G	The consulting skills and availability of AFIT to do specific consulting tasks are not sufficiently advertised throughout [my] command.	7	5	1	0	7
H	Not very visible. Not well known in some circles.	7	7	0	0	6
I	Faculty members are (some not all) junior and some lack in-depth experience in the field. Highly educated but have not faced the real world problems.	1	6	6	0	7
J	Putting too much academic emphasis on results; consulting must be here and now.	0	8	4	0	8
K	Need more operational orientation.	1	4	7	0	8

COMMENTS:

17(J). Not sure AFIT puts too much academic emphasis on results but agree consulting must be here and now [Agree].

18 What are AFIT's strengths in terms of research?

		S T R O N G R E S T R U C T U R E S O N L Y	A A G R E E E	D I S A G R E E E	S D T I R S O A N G R E L E Y E	N R O E S P O N S E
A	High Quality. Quality.	2	12	2	0	4
B	AF experience/orientation.	5	12	0	0	3
C	Relevant. Research is conducted by personnel that understand needs of AF/DOD--therefore, can identify significant/insignificant findings in that vein. Know the environment. Relate to the need. Relevance to AF real-world problems.	5	11	0	0	4
D	Responsive.	2	14	0	0	4
E	Flexible.	1	13	1	0	5
F	AFIT does a good job on the projects we sponsor.	3	10	0	0	7
G	The strengths of the AFIT research program are its energy and enthusiasm, <u>recently</u> coupled, thanks to General McDonald, to its focus. Focused.	2	9	1	1	7
H	Good research in chosen areas.	1	15	0	0	4
I	Quantity of research done.	1	15	0	0	4
J	Excellent research opportunity on variety of areas.	1	15	0	0	4
K	Low cost	3	11	2	0	4

COMMENTS:

18. Quality. AF-relevant.

18(F). Have not sponsored any projects [response: none].

19 What are AFIT's weaknesses in terms of research?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O F S P O N S E
A	Don't see much evidence in the refereed literature of AFIT faculty doing world-class research.	3	7	6	0	4
B	The weaknesses from our perspective are in the feedback and post-research loops.	1	10	2	0	7
C	<u>Major</u> research findings are sometimes washed away or badly mauled in the thesis review process. If they do survive, they often dry up and blow away from lack of user follow-up.	3	3	8	0	6
D	Laboratories.	2	8	3	1	6
E	Need more outside funding.	2	12	2	0	4
F	External recognition of the necessity for this research in a quality graduate institution.	3	13	0	0	4
G	Out of the mainstream of AF research.	0	4	12	0	4
H	Need more operational orientation. Tie more to real needs--not just research for the sake of doing research.	3	5	8	0	4
I	Need broadened capability for <u>classified</u> research for increased relevance.	3	7	3	1	6
J	Exquisite solutions vs. what can be done incrementally.	0	6	7	0	7
K	Some "hobby shopping".	1	9	4	1	5
L	Could use better input from AF commands regarding topics for research.	12	5	0	0	3

COMMENTS:

19(A). AFIT needs to market/advertise their research programs/projects [Agree].

19(B). Don't know enough to answer this but guessed [Agree].

19(J). ? [response: none]

20 What are AFIT's strengths in terms of Management/Administration (Policies, procedures, and organization)?

		S T R O N G R E Y	A A G R E E	D I S A G R E E	S D T I O A N G R E Y	N R O S P O N S E
A	Customer focus is good.	3	11	2	1	3
B	Spirit of cooperation.	3	13	0	0	4
C	Responsive to customer needs in the mid- and long-term sense. Responsive to customer demands.	2	10	3	1	4
D	High "tooth-to-tail" ratio (faculty to support).	0	10	6	0	4
E	Belief in AFIT's mission.	5	10	0	1	4
F	Creation of good "Blue Suit" environment.	7	10	0	0	3
G	Efforts to meet requirements with limited resources.	4	10	2	0	4
H	Ability to survive in spite of large force structure/manpower drawdown.	3	10	1	0	6
I	Quality people.	6	9	0	0	5
J	Good civilian/military mix.	2	11	3	0	4
K	Knowledge of DOD and military processes.	3	12	2	0	3
L	Focused (on education).	1	15	0	0	4

20 What are AFIT's strengths in terms of Management/Administration (Policies, procedures, and organization)?

		S T R O N G R L E Y	A A G R E E	D I S A G R E E	S D I T I O N S O N S E	N R O E S P O N S E
M	Academic orientation (e.g., faculty governance).	2	11	2	0	5
N	Great ability to cope with change.	2	10	2	2	4
O	Individual schools can respond quickly to <u>their</u> customers: therefore, less bureaucratic.	2	9	4	0	5

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 20(1); If from Pamphlet II use, e.g., 20(A)).

20(O). AU involvement is changing (reversing) this capability [Strongly Agree].

21 What are AFIT's weaknesses in terms of Management/Administration (Policies, procedures, and organization)?

		S T R O N G R E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E Y	N R O E S P O N S E
A	[AFIT] should be cut <u>drastically</u> --it is a dinosaur in its present configuration.	0	1	8	6	5
B	Organizationally--break it out of AU. Make it an SOA.	5	5	3	2	5
C	Inability to act independently.	3	7	5	1	4
D	AU ties [AFIT's] hands.	6	6	2	0	6
E	Lack of initiative to get training decentralized via VTCs [video teleconferencing centers], distance learning, etc.	3	8	4	0	5
F	Distance learning capabilities lagging.	5	7	2	1	5
G	Need more effective use of automation, specific solutions to today.	2	11	1	0	6
H	Lack of continuity in senior positions.	3	2	8	1	6
I	Not responsive enough to the schools.	0	4	7	1	8
J	Lack of innovation.	0	4	8	1	7
K	Slow to respond to rapidly changing requirements. APDP is case in point.	1	5	6	2	6
L	Pockets of inadequate support personnel to faculty.	2	8	4	0	6
M	Earlier notification and preparation of students needed.	2	9	4	0	5

21 What are AFIT's weaknesses in terms of Management/Administration (Policies, procedures, and organization)?

		S T R O N G R E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E Y	N R O E S P O N S E
N	Faculty vacancies--more critical in view of increased PhD load.	3	10	2	0	5
O	Need streamlined procedures for new continuing ed courses.	3	9	2	0	6
P	Test organization <u>may</u> remove synergism between PCE and Grad Ed. [A current AFIT test reorganization divides all PCE from schools into one area and all Grad Ed from schools into one area as opposed to each school administering its own PCE and Grad Ed programs].	3	6	1	1	9

COMMENTS: (Please refer to the area you are commenting on. If from Pamphlet I use, e.g., 21(1); If from Pamphlet II use, e.g., 21(A)).

21(A). We need AFIT [Disagree]!

21(B). Organizational consolidation is almost inevitable [Strongly Disagree].

21(E). Realize this is working but needs more emphasis [Agree].

21(H, I, J and K). Have been very responsive to customer needs. Increased the throughput for SYS 200 from about 350 per year to over 3000 in less than a year, working with AFMC [H, I, J and K: Disagrees].

21(K). I have found AFIT to be responsive to APDP needs. At issue is the AF's ability to validate real needs from perceived needs. Once true requirements are known, I'm confident AFIT will give 100% to meet them [Strongly Disagree].

22 What are AFIT's strengths: Other area (please define)? _____

		S T R O A N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
A	Mission orientation--dedication.	7	10	0	0	3
B	Theoretical engineering.	1	11	2	0	6

COMMENTS:

Comments: None

23 What are AFIT's weaknesses: Other area (please define)? _____

		S T R O A N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
A	Commandant should be Brigadier General for image enhancement with academic community and within Air Force.	8	8	1	0	3
B	Need a flexible pay structure to maintain competitiveness with other educational institutions.	9	6	1	0	4
C	Practical engineering.	2	9	5	0	4

COMMENTS:

23(A and B). Not sure I answered correctly. You do need a BG; Do need a flexible pay structure [A and B: Agree].

24 What would you change to improve AFIT's effectiveness and efficiency?

		S T R O N G R E L E Y	A A G G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
A	Nothing.	0	0	9	4	7
B	AF make decision on whether AFIT will exist or not- -i.e. stop the every year drill of "Why AFIT?" It wastes time, money, and is demoralizing.	11	5	0	0	4
C	I would abolish AFIT as it is today and only have courses that are totally unique taught at Wright-Pat; go to civilian institutions for grad degrees we need and save lots of \$ of resources.	1	1	5	9	4
D	AF needs to do a better job of defining education needs.	9	7	0	0	4
E	If the commitment is to be there, resource it (all facets) properly. Provide funding to fully man faculty authorizations.	7	9	0	0	4
F	Fund AFIT with 3600 money.	0	4	3	3	10
G	Internal resource allocation process.	1	9	1	0	9
H	The connection between demands and resources.	2	12	0	0	6
I	Quota distribution for PCE should not be reduced if [AFIT is] successful in capturing supplemental funding.	6	7	0	0	7
J	Make it a SOA.	3	6	6	2	3
K	Put AFIT under the new AFMC, to improve customer-supplier relationships, and increase support of AFIT.	3	1	7	4	5

24 What would you change to improve AFIT's effectiveness and efficiency?

		S T R O N G R L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R L E Y	N R O E S P O N S E
L	Make it independent from AU. Let it really respond to real AF needs.	3	8	5	0	4
M	AU needs to provide less control.	2	12	1	0	5
N	Create SAF-level position (under secretary level) to provide strategic oversight/direction in conjunction with other pertinent educational oversight agencies and hold regular meetings.	3	5	3	4	5
O	Allowing the MAJCOMs to have more input into the course curriculum and insuring AFIT graduates were efficiently being utilized on an AAD [advanced academic degree] billet, soon after graduating.	6	8	1	1	4
P	AFIT needs to take a rigorous look at curricula to prune those no longer needed and focus resources on those that are.	6	10	0	0	4
Q	Become a full partner in the Ohio Aerospace Institute.	1	8	4	0	7
R	Insure that AFIT has a <u>unique</u> niche.	6	9	1	0	4
S	Make commandant a general officer. Restore AFIT Commandant to Major General level. A General Officer Commandant.	6	7	1	2	4
T	AFIT needs a more specific, customer-coordinated goal; and then needs to measure program decisions and the allocation of resources on the throughput inventory and operating expense of achieving that goal.	3	9	3	0	5

24 What would you change to improve AFIT's effectiveness and efficiency?

		S T R O N G R E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E Y	N R O E S P O N S E
U	Push hard for best quality distance education you can create. Aggressively pursue distance learning capabilities.	6	10	0	0	4
V	Really work to conduct as much training (not education) remotely as possible to do in a cost-effective manner.	5	7	1	2	5
W	Re-look at the issue of research by faculty. How can [AFIT] tie in better to the labs and maybe make the staff research a <u>part</u> of the lab program.	6	10	0	0	4
X	A closer relationship with AF labs, especially the labs at Wright-Patterson.	5	11	1	0	3
Y	Make research by the graduate student more convenient. Wherever possible, do the research at the job rather than at the school.	3	7	5	1	4
Z	[Ensure] stability of senior management positions.	5	10	1	0	4
A A	Continue efforts at image enhancement--especially within AF.	9	7	1	0	3
B B	Roll faculty members through AFMC assignments to keep them in touch with customer needs.	5	4	5	0	6

COMMENTS:

24(C). At PhD level - we need to use civilian institutions unless area is so AF specific that we must teach the material [Agree].

24(K). Put AFIT under AFMC, were most of its customers are.

25 What factors in AFIT's external environment (events, budget, regulations, technological changes, etc.) will significantly affect the organization's ability to achieve its mission?

		S T R O N G L E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
A	It really shouldn't have much of a mission.	0	0	6	12	2
B	AF needs to determine, once and for all, if AFIT <u>should</u> have a mission. If yes, no problem. If no, case closed.	7	11	0	0	2
C	Extent of commitment of AF leadership to technologically advanced education.	7	11	0	0	2
D	DOD's dwindling resources. <u>Budget</u> --will continue to challenge AFIT's existence.	8	11	0	0	1
E	Budget is <u>not</u> external; need better understanding of AFIT cost requirements.	3	7	2	1	7
F	A tight budget will make production difficult. BUDGET! It is essential to fund it! Decreasing overall AF budget.	4	12	0	0	4
G	Funding for necessary equipment.	3	14	0	0	3
H	Adaptation to fee-for-service is an imperative. In other words, AFIT's true contribution is a function of how well we judge its value-added function in the immediate future. Otherwise, AFIT is an extravagance.	3	5	5	4	3
I	Dollars and manpower ceilings may drive AFIT out of business. Continued competition by the academic community will also play a major role. I see more and more universities offering courses that have an orientation to a specific purpose vice generalized education.	4	7	7	0	2

25 What factors in AFIT's external environment (events, budget, regulations, technological changes, etc.) will significantly affect the organization's ability to achieve its mission?

		S T R O N G R E V	A A G R E E	D I S A G R E E	S D I R S O N G R E Y	N R O S P O N S E
J	Realistically, as the AF shrinks, and civilian universities get more desperate, AFIT will have a tough time surviving. Survival will depend mostly on providing <u>uniqueness</u> --a service not available elsewhere. [AFIT] can always jigger the figures to make costs look competitive.	5	7	6	0	2
K	Like the rest of the AF, budget will force new thinking--but AFIT has a better opportunity than anyone else in the AF to rapidly and effectively change its culture to continuously improve customer satisfaction. The changes that are occurring external to AFIT should be viewed as the fire to motivate internal change.	8	5	4	0	3
M	Must have a strong user--so likely to be AFMC. Better be sure you keep AFMC a happy customer.	5	11	1	0	3
N	Since AFIT's major customer is AFMC, perhaps a solution is to roll AFIT under AFMC.	3	2	6	5	4
O	AU's goals and objectives.	1	8	5	0	6
P	Over control.	0	14	1	0	5
Q	Continued DOD emphasis on technology will sustain the importance of S&E [science and engineering] education in the AF.	6	8	4	0	2
R	Slight increases in R&D budget.	1	7	7	0	5
S	Educational demand of the AQ "world".	2	12	2	0	4
T	Tightening/downturn of acquisition programs.	2	8	3	0	7

25 What factors in AFIT's external environment (events, budget, regulations, technological changes, etc.) will significantly affect the organization's ability to achieve its mission?

		S T R O N G R E Y	A A G R E E	D I S A G R E E	S D T I R S O A N G R E L E Y	N R O E S P O N S E
U	AF "downsizing."	3	14	1	0	2
V	Timely replacement of faculty with highly qualified people.	6	7	3	0	4

COMMENTS:

25(K). I don't think AFIT has the capability to change rapidly by itself without a great deal of support from AU to let it happen and provide needed resources [Disagree].

25(N). Consider this, but only on merit [Agree].

26. Within your area of responsibility, do personnel routinely obtain professional continuing education (PCE) courses from AFIT?

Yes 10 N/A 4 [Blank] 3

No 3 (If not, why--and where do they obtain the education?)

COMMENTS: (If you were not a first-round participant please check the appropriate response above and use this block for further comments if necessary)

Comments: None.

27 Would you prefer to send your personnel to AFIT (resident) to obtain graduate education?

		S T R O N G R L E Y	A A G R E E	D I S A G R E E	S D I S R S O A N G R L E Y	N R O E S P O N S E
A	Yes. Masters.	5	7	2	0	6
B	Yes. Provided degree is focused on AF needs.	5	10	1	0	4
C	No. PhDs; in most cases, PhD programs should be driven by very specific matches between student and principal faculty member.	1	5	7	1	6
D	No. Private institutions more attuned to business management.	1	3	7	1	8
E	Right now, AFIT doesn't have the ability to meet the demand of more than a few civilian personnel in graduate education.	2	9	3	0	6
F	Yes. Because in some areas AFIT does have a unique niche.	2	13	0	0	5
G	No. Because AFIT is not necessarily viewed by the academic snobs as equivalent to MIT, Duke, Arizona State, etc. In the R&D world the advisors to OSD and the AF place considerable stock in <u>where</u> the degree is obtained. If we don't have staff from the "right" universities, we don't have a quality staff. An illogical argument, but one we have to deal with.	1	8	6	0	5
H	In the past, I preferred to. But quite frankly, I'm requesting more and more civilian institutions because, due to AF dollar/manpower cuts, I see AFIT quality slipping.	2	5	7	0	6

Comments:

27(C). The requirement is on quality. If AFIT can produce, then I'll send my people [Disagree].

27(H). Private institutions are not attuned to Air Force needs [Disagree].

28. Do you obtain consulting services from AFIT? (In CY 91, the spectrum of consulting services ran from phone calls to formal investigations with written reports)

Yes 8 N/A 5 [Blank] 3

No 4 (If not, why--and where do they obtain the education?)

COMMENTS: (If you were not a first-round participant please check the appropriate response above and use this block for further comments if necessary)

No, no reason, just haven't.

29. Do you use AFIT for sponsored research? (theses, dissertations, or faculty projects, whether funded or unfunded)?

Yes 9 N/A 5 [Blank] 3

No 3 (If not, why--and where do they obtain the education?)

COMMENTS: (If you were not a first-round participant please check the appropriate response above and use this block for further comments if necessary)

Comments: None

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Kettell Vita

Captain Kevin D. Kettell entered the Air Force in 1980 and trained to be an Arabic translator at the Defense Language Institute, Monterey CA. He received a Presidential nomination to the United States Air Force Academy in 1981, where he graduated in 1985 with a Bachelor of Science in International Affairs. His first duty assignment was to Hurlburt Field FL, where he was the Director of the Middle East Orientation Course at the Special Operations School. In 1988, he was posted to 9AF HQ, Shaw AFB SC.

As a Southwest Asia Operations Officer within the Directorate of Tactical Exercise Operations and Plans, Capt Kettell planned joint and combined military training exercises in the Middle East, researched information requirements, and worked as budget officer for JCS overseas exercises.

Capt Kettell served as Arabic translator and aide to the deputy commander of CENTAF during Desert Shield just prior to entering the Air Force Institute of Technology's Graduate Information Resource Management Program in May 1991.

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Ziegler Vita

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He was selected as admin/exec officer for the DCS Operations, 12th FTW, Randolph AFB TX in January 1983. In January 1986, he was assigned to ACSC/XP, Maxwell AFB AL. Approximately one year later, he was assigned to HQ AU/XP as the AFIT liaison officer.

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13. ABSTRACT (Maximum 200 words) DOD has been undergoing changes toward a competitive "business-type" environment as a result of the Packard Commission and the Goldwater-Nichols Act. As a result of the Goldwater-Nichols Act, two programs directly affect the Air Force Institute of Technology (AFIT): Defense Management Report Decision 971, better known as the Defense Business Operations Fund (DBOF); and, the Corporate Information Management (CIM) initiative. DBOF requires that organizations provide unit cost per output figures as the basis for organizational funding. Unit cost resourcing changes the way federal managers manage and allocate resources, and promotes quality management and continuous improvement principles. Defense Information Management recognizes information as a resource to be managed. CIM initiatives use information as the basis to improve the way organizations operate. This research effort purports to identify strategic-level requirements that will allow the establishment of an integrated information system which will provide AFIT insight into the cost and value of their products and services.				
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