



**GOVERNANCE STRUCTURE TRANSFORMATION
DURING ERP IMPLEMENTATIONS**

THESIS

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AFIT/GLM/ENS/08-12

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Abstract

The United States Air Force (USAF) has a number of initiatives underway to better support tomorrow's Warfighter. As part of the Expeditionary Logistics for the 21st Century (eLog21) campaign, one of the most critical initiatives is the Expeditionary Combat Support System (ECSS). ECSS is the world's largest enterprise resource planning (ERP) implementation and will completely transform USAF logistics operations. The benefits of an ERP include centrally-managed and integrated information sharing, while the many challenges include training future state operations and employing change management. An effective governance structure is essential in order for the USAF to realize the full benefits of ECSS and minimize the challenges of ERP implementation. Governance is the means by which decisions are made and how decision-makers are held accountable for those decisions. This case study research examines the changes that five organizations made to their governance structure during a large transformation effort, such as an ERP implementation. Specifically, this research examines the main trigger points, or causes of these governance structure changes. The implications of these trigger points and changes to the governance structure are explored within the context of the current ECSS implementation.

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For my parents...all four of them

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Table of Contents

	Page
Abstract.....	iv
Dedication.....	v
Acknowledgments.....	vi
List of Figures	x
List of Tables	xi
 I. Introduction	 1
Overview.....	1
Problem Statement	3
Research Design.....	4
Research Questions.....	5
Investigative Questions.....	5
Methodology	5
Summary	6
 II. Literature Review.....	 8
Overview.....	8
Enterprise Resource Planning (ERP)	8
Transformation.....	12
DLA Transformation	13
DOD Transformation	14
Governance	15
The Importance of Governance.....	16
Expeditionary Combat Support System (ECSS).....	17
ECSS Governance.....	21
DOD Case Study Example.....	25
Logistics Modernization Program (LMP).....	26
Business Systems Modernization (BSM)	27
Conclusion	28

	Page
III. Methodology	30
Overview.....	30
Research Questions	30
Investigative Questions.....	31
Research Design.....	32
Units of Analysis.....	33
Case Study Selection.....	34
Data Analysis	38
Validity and Reliability.....	39
Conclusion	40
IV. Analysis and Results	42
Overview.....	42
Governance Structure Specifics	43
Senior Leadership Influence, Communication and Acceptance of Governance ...	45
Senior Leader Communication	47
Employee Buy-In	48
Changes Made to the Governance Structure.....	50
Classifications of Change	54
Harmonization.....	54
Synchronization	54
Trigger Points.....	56
Research Specific Trigger Points.....	57
Theoretical Decision Support Matrix.....	65
Decision Support Matrix Criterion	66
Using the Decision Support Matrix	69
Scale for Matrix Criterion.....	70
Scale for each Trigger Point Total	71
Example #1	72
Example #2	74
Conclusion	77
V. Conclusion	79
Overview.....	79
Trigger Points Application to ECSS	80
Classifications of Change	83
Additional Lessons Learned	84

	Page
Assumptions/Limitations of Research	87
Future Research	88
Appendix A. Investigative Questions	90
Bibliography	92
Vita	94

List of Figures

	Page
Figure 1. ECSS Governance Structure	21
Figure 2. ECSS Issue Resolution	22
Figure 3. Unit of Analysis	33

List of Tables

	Page
Table 1. ECSS Modules and Descriptions	19
Table 2. Selected Commercial and DOD Case Studies	36
Table 3. Sources for Governance Structures.....	45
Table 4. Case Study Changes and Classifications	53
Table 5. Trigger Points and Governance Structure Changes	65
Table 6. Theoretical Decision Support Matrix.....	69
Table 7. Theoretical Decision Support Matrix for Example #1.....	73
Table 8. Theoretical Decision Support Matrix for Example #2.....	75

GOVERNANCE STRUCTURE TRANSFORMATION DURING ERP IMPLEMENTATIONS

I. Introduction

Overview

The United States Air Force (USAF) has a number of initiatives underway to better support tomorrow's Warfighter. As part of the Expeditionary Logistics for the 21st Century (eLog21) campaign, one of the most critical initiatives is the Expeditionary Combat Support System (ECSS). Using a commercial off-the-shelf (COTS) Enterprise Resource Planning (ERP) foundation, ECSS will completely transform Air Force logistics operations currently using approximately 250 disparate legacy logistics information systems. Once ECSS is fully implemented, end-users will be able to capture real-time, centrally managed data and share integrated information across the enterprise.

ERP has become the integration solution of choice and the foundation for most commercial business processes. Using COTS applications, ERP implementations have evolved to provide increased complexity and improved reliability. As a result, the benefits of implementing an ERP are widely documented as well as the multitude of challenges and risks that continue to plague ERPs. A few of the benefits of implementing an ERP include reduction of on-hand inventory levels, elimination of outdated legacy systems and improved decision making capability based on enhanced and centrally managed asset visibility. Likewise, some of the risks associated with ERP

implementation often include the need for system reprogramming or modification, failure to achieve employee buy-in and unfulfilled expectations throughout the organization. However, in order to achieve the maximum benefits and minimize the risks and negative impacts to the organization, an effective governance structure is needed to steer the processes of designing and implementing the program.

Studies have shown that the lack of a governance structure or senior leadership involvement during an ERP implementation is one of the leading causes for failure during ERP development (Moon, 2007). An effective governance structure allows the leaders of the organization to hedge off any issues -- that without resolution -- would negatively impact the design and implementation of the program in terms of cost, schedule and performance. The governance structure enables an organization's leaders to navigate the complex waters during an ERP implementation. Most importantly, an effective governance structure facilitates senior leader decision making and issue resolution on the types of transformational activities deemed to improve the organization's current business processes.

Transformation initiatives can take on many different forms. ERP implementation is a type of transformation within the organization. Transformation is a commitment to enterprise-wide improvement that typically involves the development of new business processes, the re-structuring of personnel across the organization or the refinement of current operating policies. Regardless of the type of transformation effort or ERP implementation, both can be equally disruptive to members of the organization and

current business processes. To help minimize the degree of resulting chaos from the transformation or ERP implementation, a commitment to issue resolution and change management is needed from the governance structure.

Problem Statement

The Air Force is in a state of rapid transformation. According to General T. Michael Mosley, Chief of Staff of the Air Force, “Tomorrow’s Air Force must be and will be more agile, more compact and more lethal than ever ensuring global air, space and cyberspace dominance for the United States as we enter the 21st Century” (Moseley, 2006). One of the most significant transformation initiatives to provide agile and integrated logistics support to the Warfighter is the development of the Expeditionary Combat Support System (ECSS). ECSS will dramatically transform the way the Air Force performs current logistics operations by leveraging commercial best practices and proven benefits of an ERP application. If correctly implemented, the enhanced capabilities and benefits from ECSS may prove to be astounding. However, if ECSS is poorly implemented, the resulting challenges to Air Force logistics may prove to be equally astounding.

In order to achieve the anticipated improvements to logistics capability and the forecasted cost saving benefits post-ECSS implementation, Air Force decision makers need the proper tools to successfully implement ECSS within the allotted schedule and financial constraints. By acknowledging that the lack of governance or senior management guidance can be a leading factor in failed transformation initiatives, the Air Force does not have sufficient resources to allow ECSS to fail. To prevent the Air Force from failure

or enduring a number of damaging setbacks, an effective governance structure may prove to be the leading mechanism to successfully manage and implement ECSS.

Research Design

This research questions were answered by conducting interviews with selected case study examples from various commercial and DOD organizations. From these case studies, the research sought to identify the causes and changes made to the governance structures during a transformation, specifically during an ERP implementation. Each case study organization conveyed the importance of having a stalwart governance structure. In each of the case study examples, having a strong and effective governance structure was essential to their organization's transformation or ERP implementation success.

Additionally, this research discussed four primary trigger points. A "trigger point" is the term used to describe a specific cause or reason that drove members of the governance structure to make a change to the existing governance structure. Each of the trigger points discussed in this research was observed from at least one of the case studies and subsequently influenced a change or modification to that organization's governance structure. Most importantly, this research presented and discussed how the use of a decision support matrix is a value-added analytical tool that can be used during any transformation effort. The decision-support matrix assists members of the governance structure by calculating weighted responses to specific criteria within the matrix. Lastly, the research showed how the trigger points and the decision support matrix have direct application to decision making processes within ECSS.

Research Questions

To guide the direction of the study in a sound and logical manner, three research questions were proposed.

1. What specific changes were made to the governance structure during the transformation effort?
2. What was the precise trigger point or cause for the change made to the governance structure?
3. How can these changes and trigger points be applied to the ECSS governance structure?

Investigative Questions

The ten investigative questions found in Appendix A provide the framework for the study and collectively answer the three overall research questions. The investigative questions were each designed to gain a clear understanding of the governance structures employed during the different case study transformation activities. Furthermore, the investigative questions led each interview session and were the primary mode of identifying the trigger points influencing the changes made to each governance structure.

Methodology

A qualitative research methodology was used, specifically an explanatory case study to explore commercial and DOD ERP implementations. In general, qualitative case studies are the preferred strategy when “how”, “why” and “what” type of questions are being

posed and when the researcher has little control over the events (Yin, 1994). Data was collected primarily through the use of systematic interviews with subject matter experts (SME) such as Chief Information Officers (CIO) and ERP implementation project leaders. Each SME had personal knowledge and direct insight concerning their respective organization's ERP implementation or transformation effort. The case study examples selected for this research included the following organizations and programs:

- Defense Logistics Agency (DLA) Business Systems Modernization (BSM)
- National Cash Register (NCR)
- MeadWestvaco
- Advanced Planning & Scheduling (APS) Pathfinder
- Defense Enterprise Accounting & Management System (DEAMS)

Summary

ECSS is one of many eLog21 transformation initiatives being developed for future implementation across the Air Force. In light of the Air Force's need for rapid transformation, this study supports the requirement for an effective governance structure during the development and implementation of ECSS. By identifying specific trigger points and examples of changes made to other commercial and DOD governance structures, members of the ECSS governance structure will be better prepared to successfully overcome implementation challenges associated with ECSS. This first chapter provided a basic outline for the motivation and purpose of the study. The second chapter reviews the literature by exploring the evolution of ERP, different types of

transformation, the significance of ECSS to the Air Force and the importance of governance and having a governance structure to successfully implement ECSS. The third chapter describes the chosen methodology, the validity of the data collection, and data analysis. The fourth chapter dissects the investigative questions revealing the four trigger points and the changes made to the governance structures. Chapter four also unveils the decision support matrix which illustrates how the trigger points provide relevant application to ECSS. Finally, chapter five provides the conclusions of the study along with a number of invaluable lessons learned and the recommendations for future research.

II. Literature Review

Overview

The following chapter familiarizes the reader with the evolution of Enterprise Resource Planning (ERP) systems by examining ERP technology over the past three decades followed by an in-depth discussion on the benefits and challenges associated with ERP implementation. Next, the chapter introduces transformation and governance.

Transformation, such as an ERP implementation, can fundamentally alter an organization's business model and supporting processes while governance describes the way an organization operates and makes decisions. Members of the Expeditionary Combat Support System (ECSS) governance structure will be responsible for the successful development and implementation of ECSS. Therefore, the supporting literature also applies the benefits of ERP and the importance of governance to ECSS. Specifically, how senior leader communication and enterprise-wide change management activities are key factors to a successful transformation or ERP. The literature review concludes with two ERP examples from within the DOD that are discussed for their lessons learned and application to the ECSS governance structure.

Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is a technology software solution that integrates departments and functions across an organization or enterprise into one computer system (Air Force Journal of Logistics, 2007). ERP orchestrates the communication and data sharing associated with each of the modules from manufacturing, warehouse

management, financial, distribution and many other functional modules. Based on real-time activities and events, ERP enables the seamless flow of information across an enterprise using a comprehensive set of interconnected modules or software application (Preparing the Air Force for ECSS, 2007). The end result of a successful ERP implementation includes the integration and reduction of legacy information systems, standardized business processes, reduced physical inventories as well as quantifiable metric analysis that are linked to operational performance.

Most authors agree that ERP first established its roots during the 1960's and 1970's with the formation of accounting software. In particular, ERPs began with accounting spreadsheets and specialized databases used in conjunction with financial planning and human-resource systems. Over the next few years, ERP development spread from simple accounting systems to fulfilling the production and scheduling needs of other departments throughout the entire organization. As manufacturing processes became increasingly automated, the need for system integration across all the departments became necessary. To integrate the organization's production systems, materials requirements planning (MRP) was used successfully throughout the 1980's as the primary information system (IS) program to schedule manufacturing processes to meet customer needs as laid out in a master production schedule (MPS) (Lawrence, 2005). MRP was later enhanced by the development of capacity requirements planning (CRP) which further strengthened the information-sharing links between the manufacturing processes, scheduling, and customer requirements. However, distribution processes, financials and HR were still isolated in terms of integrated communication flow

throughout the organization. As technology continued to improve, the need for integrated communication among all departments of the organization became apparent and was later realized by the MRP II system. MRP II connected many parts of the organization under one IS umbrella and evolved into the current ERP system (Lawrence, 2005).

After the MRP II transformation, ERP software experienced considerable growth during the 1990s among companies seeking to replace their outdated legacy systems and avoid problems with the menacing Year 2000 (Y2K) bug (Grossman, 2004). Y2K was a glitch in virtually all software programs operating from 1970's methodologies that entered calendar dates in two digits. At the stroke of midnight, Y2K threatened to revert internal computer calendars back to January 1, 1900 instead of January 1, 2000 thus wreaking havoc across all commerce-driven communities. As a result, "many companies chose to adopt new ERP systems rather than trying to eliminate the Y2K bug from their legacy systems" (Lawrence, 2005). Since then, ERP software has significantly improved its technological capability and is now common place in manufacturing, distribution and service oriented operations. ERP represents a modernized capacity for enhanced data and information sharing properties. Currently, ERP is the corporate standard for synchronizing multi-functional business processes. More than 70% of the world's multinational corporations use ERP as their means to provide real-time information, spread the workload, anticipate demand, and plan for the future, all without adding personnel or increasing physical inventory levels (Preparing the Air Force for ECSS, 2007).

ERP technology also provides enormous potential to improve an organization's competitive advantage and business processes. However, organizations should be aware of the various risks and challenges associated with ERPs. ERP implementation is a massive undertaking fraught with immense risk (Grossman, 2004). Unfortunately, not all organizations have been able to seamlessly implement their ERP system and immediately see a return on investment (ROI). In fact, for many organizations ERP has become better known for the challenges encountered during implementation than for the technology solutions provided by ERP (Fawcett et al., 2007). Due to implementation difficulties, approximately 90% of all ERP initiatives are plagued with issues such as an overdue timeline, exceeded budget, and/or technical problems that ultimately result in unfulfilled expectations and unrealized benefits across the organization or enterprise (Moon, 2007). For example, depending on the number of business units, functionality scope and the configuration's complexity, implementation time for a medium-size organization will range from six months to four years (Welch and Kordysh, 2007). In addition, post-ERP implementation challenges can often stem from insufficient employee training, inadequate revision of corporate policies and flawed legacy deconstruction of previously used information technology (IT) systems. Understanding these organizational challenges prior to implementation can allow the senior leadership to protect their three most important components; people, processes and policies.

Transformation

Transformation fundamentally alters an organization's business model, supporting processes and systems architecture (Transformation Roadmap, 2006). Business transformation can be a strategic commitment to improving tactical business processes across an entire enterprise. Furthermore, there are many different types of transformation with both positive and negative impacts. Regardless of the type or scope of transformation implemented, there is usually some degree of resulting chaos within the organization. For instance, an ERP implementation is a form of technological transformation, but in reality ERP is more of a transformation in business processes than IT (Dredde and Bergdolt, 2007). In their article, *Seven Keys to ERP Success*, authors Welch and Kordysh state that after an ERP has been implemented, "the best performing organizations were the ones who ensured that business process management, governance and other nontechnical issues were addressed properly" prior to and during implementation (Welch and Kordysh, 2007). The ERP can result in disruption or chaos to the existing culture, traditions, and personal comfort levels for the members of the enterprise. The reason for this is simple; ERP systems leverage modern computer programs and drive new business processes that members of the organization are expected to embrace and utilize to accomplish the organization's new objectives and metrics. One of the organizations examined during this case study research was the Defense Logistics Agency (DLA). Throughout their ERP implementation, the people, processes and policies within DLA experienced a number of transformation effects. Some transformation effects were positive by improving their business processes while others were negative with perceived and actual disruption to existing culture and

organizational structures. However, DLA is an excellent example of how transformation was implemented throughout the organization with a focused approach to minimize the resulting chaos and produce a quality ERP. Without commitment and focus the chances for project failure are greatly increased (Dredden and Bergdolt, 2007).

DLA Transformation

DLA is the DOD's largest logistics combat support agency. DLA provides worldwide logistics support in both peacetime and wartime to the military services as well as several civilian agencies and foreign countries. A DLA news release published the following statement saying that, "If America's forces eat it, wear it, maintain equipment with it, or burn it as fuel...DLA probably provides it." DLA's longstanding support to the military spans four decades from the Vietnam War to present day Operation Iraqi Freedom (DLA news release). To continue DLA's outstanding record of support to the United States military, DLA's highest-ranking leader clearly outlined the path used to transform their former operations and legacy business model to that of a robust customer-focused agency with world-class services and capabilities. Under the leadership of then acting Director, Vice Admiral Keith Lippert, DLA published a Transformation Roadmap (The Defense Logistics Agency, Transformation Roadmap: Transformation in Support of the Future Force, 2006) highlighting DLA's "plan and commitment to dramatically improve warfighter support at a reduced cost through business process re-engineering, workforce development, technology modernization, and organizational change." In the Director's Foreword of the Transformation Roadmap, Vice Admiral Lippert states "transformational change is the right thing to do for DLA's ultimate customers, America's warfighter, who

expect, demand, and deserve dramatically improved support at less cost.” Next, Vice Admiral Lippert states that it is the right thing to do for the nation’s taxpayers in terms of additional cost reduction. “As stewards of the public trust, it is incumbent upon the agency to leverage best business practices to achieve all appropriate savings.” Lastly, “as the Defense Department’s only combat Logistics Support Agency, DLA has a broad-based, joint service mission.” Vice Admiral Lippert stated that transformational change was the right thing to do for DLA. He saw logistics transformation as a continual process of improvement and not an end state (Transformation Roadmap, 2006).

DOD Transformation

The DOD is one of the largest and most complex organizations in the world. Similar to the DLA, the DOD is also in a state of initiating rapid transformation throughout its organizational structures and processes. Although the DOD is far more intricate than DLA, it seems that the DOD has not benefitted from a similarly focused “transformation roadmap” as provided to DLA. Within the DOD, business transformation is broad, encompassing people, planning, management, structures, technology, and processes in many key business areas. “Although transformational efforts have been made among individual branches of the military, enterprise-wide governance providing sustained leadership has yet to be implemented (GAO -07-229T). Without formally designating responsibility and accountability for results, reconciling competing priorities in investments will be difficult and could impede DOD’s progress in its transformation efforts.” Transformation across the DOD will take years to accomplish and continues to be a significant management and governance challenge (GAO -07-229T).

Governance

The scope of governance is far-reaching, having broad definitions and many applications.

According to Joe Tucci, the current CEO of EMC Corporation, “the essence of governance is to promote accountability for performance and results and to provide a transparent view into the way an organization operates and makes decisions.”

Governance can be defined as “the means by which order is accomplished in a relationship in which potential conflict threatens to undo or upset opportunities to realize mutual gains” (Wang, 2006). Governance can also be defined as “the processes, structures and organizational traditions that determine how power is exercised, how stakeholders have their say, how decisions are made and how decision-makers are held accountable” (Gill, 2001). The organization’s top decision-makers and other senior program managers typically comprise the membership of a governance structure.

Additionally, a governance structure can take many different forms depending on the levels or membership, the program being implemented and the goals of the organization.

Throughout this research, the term governance structure consistently denotes a multi-echelon and multi-functional hierarchy of decision makers within an enterprise who make timely and effective decisions affecting all aspects of the development and implementation of an ERP or transformation. *Multi-echelon is defined as having the hierarchal echelons or levels commonly found in organization staff charts.* A key benefit of the multi-echelon governance structure is having one principal person in charge and responsible for the implementation decisions at their individual level. *By multi-functional, this describes a body of members having experience and knowledge across a broad scope of areas.* A multi-functional governance structure tries to reduce the

opportunity for decisions made by the members of the governance structure to be “stove-piped” having a single focus and objective. In contrast, decisions that are integrated, take into consideration the transformation impacts and challenges of the implementation affecting the entire organization.

The Importance of Governance

The shift from a functionally driven organization with many legacy systems and limited visibility to a cross-functional organization with improved visibility and effective decision making requires a new governance structure (Welch and Kordysh, 2007). The overarching goal of a governance structure should be effective and timely decision-making and the application of effective change management techniques throughout the organization. To be most effective, the governance structure should incorporate senior program managers together with process owners from within the organization.

Additionally, success during an ERP implementation also requires a sound transformation roadmap and garnering employee acceptance. Members of the governance structure should provide the transformation roadmap clearly articulating the business process changes to the organization. Since the governance structure is responsible for initiating the change management activities, one of the most important change management activities is to convey the importance of the transformation and the enhanced future state capabilities to all members of the organization. As applied to ECSS, the Air Force seems to understand the importance of governance and the requirement for change management. For example, road-show briefings are currently underway with the goal of ensuring that every member of the Air Force logistics

enterprise understands the importance and scope of changes that will take place once ECSS is implemented (White and Bergdolt, 2007).

Expeditionary Combat Support System (ECSS)

Pioneered by the Office of the Secretary of Defense (OSD) in 2003 to improve Warfighter support and reduce operating costs, the Air Force entered the multi-year process of developing and implementing a new ERP that would fulfill the OSD transformation objective. The Expeditionary Combat Support System (ECSS) is the world's largest ERP initiative and the most comprehensive facilitator for logistics transformation in Air Force history. Using the Oracle Product Suite (Oracle E-Business complimented with Industrial Financial Systems (IFS) and Click Commerce software modules), ECSS will utilize redesigned logistics processes and the enabling technologies of commercial off-the-shelf (COTS) software applications. When ECSS achieves full operation capability (FOC) in FY 2013, it will result in the integration of base level, intermediate and depot level logistics functions and their supporting processes and data. If implemented correctly, ECSS will support or eliminate over 250 legacy logistics information systems that collectively cost over \$1 million annually to upgrade and sustain. With over 250,000 primary, secondary, and casual users, ECSS will enable transformation of every process, policy, system, and job skill within the end-to-end (E2E) supply chain (Hartman, 2007).

ECSS is the technology enabler for the Expeditionary Logistics for the 21st Century (eLog21) campaign that includes over 20 transformation initiatives to revamp current Air

Force operations, specifically logistics operations. Some of the eLog21 initiatives include business process redesign, performance metrics, supply chain management, maintenance and many others. In order to meet the overarching eLog 21 goal of increased weapon system availability by 20% and decreased operations and sustainment costs by 10%, (White and Bergdolt, 2007) ECSS will support an expanded range of functionality that will include the following modules shown below in Table 1.

Table 1. ECSS Modules and Descriptions

ECSS Module	Description
Advanced Planning and Scheduling (APS)	Click Commerce product that utilizes high level usage data to create demand forecasts and collaborate plans development
Material Management, Contracting, and Logistics Finance	Procurement and purchasing, inventory and contract management, repair and maintenance support, and finance transactions
Configuration and Bill of Material (BOM)	Primary, alternate, common, phantom, planning and configuration BOMs. As well as integrated bill structure with unlimited levels for planning bills
Repair and Maintenance	Contract and manage repair and maintenance planning and operations, visibility into maintenance costs, equipment history, maintainability and reliability costs
Product Lifecycle Management (PLM)	Integrates engineering and execution functions, provides lifecycle view of assets including repair history, cost, engineering change and relationship to other assets
Customer Relationship Management (CRM) and Order Management (OM)	Brings customer information together by tracking order fulfillment process
Distribution and Transportation	Physical control of material to include cycle counting, storage, shipping, transportation, and inventory tracking
Decision Support	Integrates information across process and functional areas and can include legacy system data
Facilities Management	Equipment asset visibility and management
Quality Control	Data collection, reporting with traceability back to the transaction, and trending analysis
Document Management	Document maintenance for document searching and retrieval, data cleansing standardizes formats and methods used to link data
Budgeting	Develop budget proposals, monitor expenditures, develop revised budgets based on activity plans created in APS and historical data

Source: The Road to Success, White and Bergdolt, 2007

Source: Enterprise-wide Business Rules, briefing, 8 Jan 2008

In addition to improved Warfighter support and reduced operating costs as directed by the OSD and eLog 21, the implementation of these modules within ECSS will provide many more benefits to the Air Force. For example, not only will ECSS merge base level and depot logistics systems together, it will also provide near real-time enterprise-wide visibility of assets generating more responsive demand and planning capabilities. In addition, ECSS should reduce accounting errors and establish a common set of logistics business processes throughout the Air Force that will unlock improved data quality, timeliness and availability of useful information. These and other benefits are needed not only to fulfill the OSD mandate for transformation with our military, but are need to drive the integration of standardized business processes and subsequent metrics that will accurately report the current status of people and equipment supporting peacetime and wartime operations. However, in order to realize these benefits and enhanced logistics capabilities, Air Force leaders need to ensure that ECSS has all of the necessary resources it will need to succeed. The leading factor for improved success during an ERP implementation is establishing an effective governance structure (Moon, 2007). Air Force leaders along with the System Integrator (SI), Computer Sciences Corporation (CSC) and the industry partners have developed a robust governance structure to drive the successful design and implementation of ECSS. The ECSS governance structure has been strategically designed to facilitate the swift escalation of tactical program issues that could negatively impact the current contracting costs, implementation timeline or the anticipated performance of ECSS. The ECSS governance structure will be the single most important and influencing factor for a successful outcome and positive acceptance of ECSS throughout the Air Force.

ECSS Governance

The ECSS governance structure was established in April 2007 and is a multi-echelon and multi-functional body of logistics professionals dedicated to the successful end-to-end (E2E) development and implementation of ECSS. Members of the ECSS governance structure facilitate rapid decision-making and issue resolution of all concerns affecting implementation. The ECSS governance structure, illustrated in Figure 1, consists of six levels of escalation hierarchy.

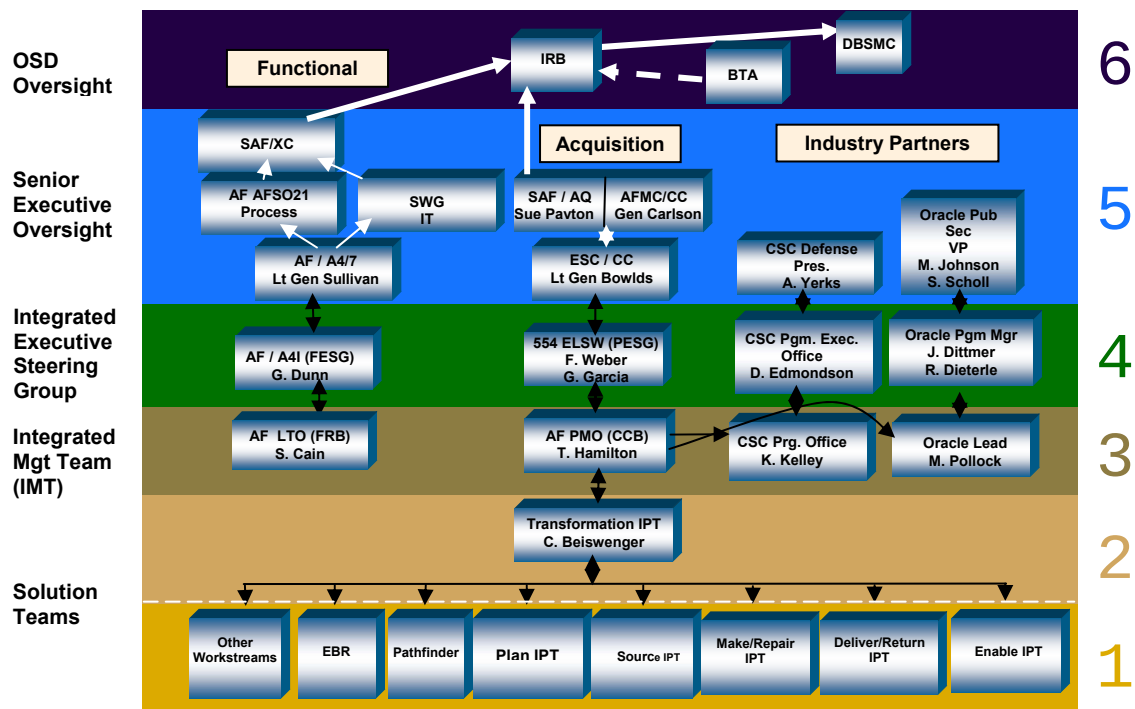


Figure 1. ECSS Governance Structure (2008)

The term “issue” is used to describe a problem, constraint or required technical solution that is beyond the scope of knowledge or authority of the person or level addressing the concern. Ideally, issues are promptly elevated from the lowest level of the governance

structure to the next highest level. As shown in Figure 2, levels 1-3 are responsible to resolve approximately 90% of all issues elevated by subordinate levels with less than 1% of all issues requiring resolution at the highest echelon. Successful governance requires that “members of the governance structure know the one person in charge with senior leadership support, what decisions they are empowered to make, and how issues get escalated to a higher decision authority in the event resolution is not forthcoming in a specified period of time. Furthermore, the governance structure is designed to capture issues affecting ECSS policy, architecture, technology and data” (Hamilton, 2007).

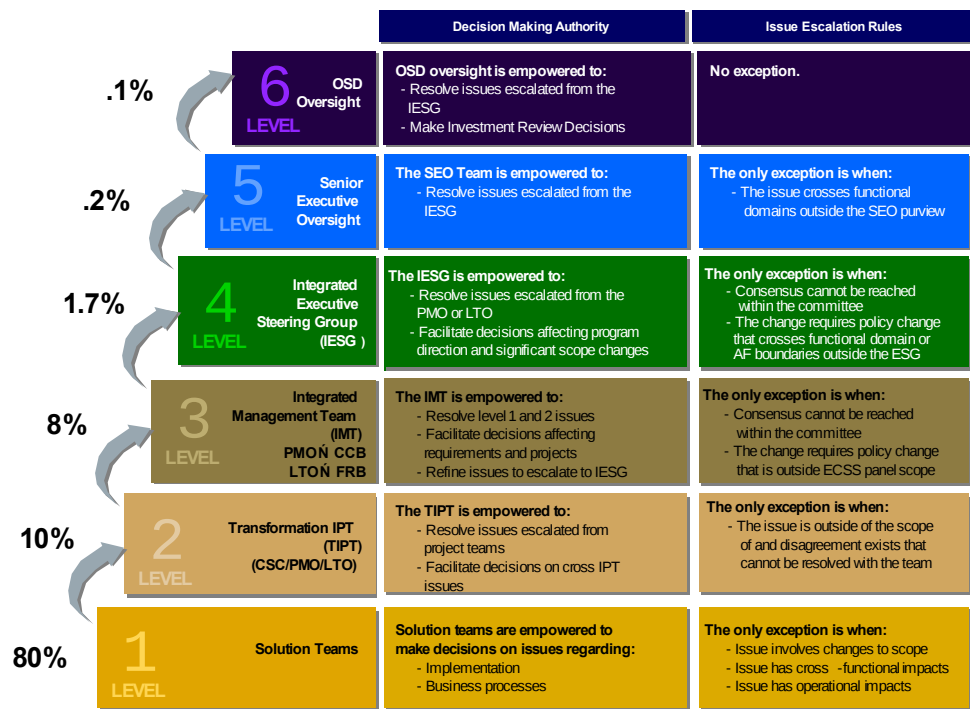


Figure 2. ECSS Issue Resolution

Level 1 of the ECSS governance structure consists of eight diverse Integrated Process Teams (IPTs). The IPTs are comprised of Team CSC consultants, Oracle contractors and over 14 major command (MAJCOM) representatives referred to as subject matter experts (SMEs). Together they have first-hand expertise on topics such as the Oracle Product Suite, Air Force Logistics, commercial supply chain operations, Air Force legacy systems, data lifecycle management, and organizational redesign. The IPTs are responsible for driving transformation through the analysis, design, and development of the business and functional aspects of the ECSS future state. In addition to the IPT members listed above, the Logistics Process Owners, (LPO₁) have informally been added to the first level of the ECSS governance structure. LPO₁ are identified as senior executives for oversight of specific work streams of the AF/A4-7 Logistics Enterprise (LogE). As such, members of the LPO₁ are responsible for ensuring all enterprise and process specific blueprinting of the future LogE are consistent with the transformation goals and objectives as outlined in the AF A4-7 Logistics Enterprise Architecture (LogEA). The second level of the ECSS governance structure, the Transformation IPT (TIPT), is responsible to resolve decision items identified from each of the either program work streams. Any decision item not resolved at this level will be escalated to the next appropriate governance echelon. This group is chaired by Team Computer Sciences Corporation's (CSC) Transformation Executive. In addition, Team CSC Director's from the following offices are members of this group: Solution Architect, Solution Development, Systems Engineering & Integration, Release Services, Organizational Change Management, and Program Management. Air Force members within the second level of governance include the Air Force Logistics Transformation Office (LTO) and

ECSS Program Management Office (PMO) Branch Chiefs and representatives from the Enterprise Blueprinting efforts (ECSS Governance Charter, 2007).

The Integrated Management Team (IMT) or level 3 is jointly divided among the functional, acquisition and industry partner areas of expertise. The LTO is the functional lead of the IMT while the PMO is the acquisition lead. Industry partners have dual representation from both CSC and Oracle. The LTO is responsible for gathering end-user requirements and ultimately is the voice of, and advocate for, the end-user community. The LTO will align logistics requirements with the expertise of the logistics community and the capabilities of the ECSS product suite (Cain, 2007). The primary responsibility of the PMO is to ensure that logistics community requirements are met on time and within budget. To do this, the PMO adopted the Supply Chain Operations Reference (SCOR) model and instituted monthly program reviews with Air Force senior leadership (Hamilton, 2007). The System Integrator (SI) is CSC that brings a business transformation approach to Air Force processes and culture supported by an enterprise-wide logistics solution to realize the objectives of ECSS (Kelley, 2007). CSC, along with Oracle, the leader in innovative software technologies for enterprise information management, will configure, integrate and implement the COTS Oracle suite and provide support to help the Air Force achieve its logistics business performance objectives (White and Bergdolt, 2007).

The Integrated Executive Steering Group (IESG), or level 4 includes representatives from the functional, acquisition, and industry partners organizations who provide additional

oversight/guidance to the IMT. The functional community is represented by AF/A4I and the acquisition community by the 554 Electronic Systems Wing. Additional members also include General Officer/Senior Executive Service MAJCOM A4/A6 members, Logistics Process Owners, senior acquisition officials, and other affected communities. CSC Program Executive Office and the Oracle Program Manager for ECSS are also members of this fourth governance level (ECSS Governance Charter, 2007). The Senior Executive Oversight or level 5 of the ECSS governance structure is comprised of the SAF/XC and SAF/AQ, along with the commander of Air Force Materiel Command (AFMC/CC) and CSC Defense President and Oracle Public Sector Vice President. Level 6 is the highest echelon of the ECSS governance structure and comprised of Secretary of Defense (OSD) oversight culminating in the Internal Review Board (IRB) and sister service ERP counterparts.

DOD Case Study Examples

The case study analysis of DOD ERP implementations is timely and applicable information that can increase the likelihood of successfully implementing ECSS. Throughout the DOD, a number of ERP initiatives have been employed with implementation phases and final outcomes ranging from less successful to very successful. Therefore, initiatives such as the Army's Logistics Modernization Program (LMP) and the Defense Logistics Agency (DLA) Business Systems Modernization (BSM) program provide additional understanding to the complexities and challenges of ERP implementation.

Army LMP

Over the past 15 years, the Army identified three primary system initiatives directed at achieving total asset visibility (TAV): 1) Logistics Modernization Program (LMP), 2) Global Combat Support System-Army Field/Tactical (GCSS-Army), and 3) General Fund Enterprise Business System (GFEBS) (GAO-07-860). LMP was designed in 1998 to replace Army legacy material and maintenance management systems which had been in use for over 30 years. In July 2003, LMP first became operational at two separate locations and consisted of inventory management for various electronic and intelligence equipment items. After a number of system revisions and surpassed deadlines, LMP is finally expected to reach full operational capability (FOC) in fiscal year (FY) 2010. LMP is expected to include more than 17,000 users at 149 locations and with six million Army-managed inventory items valued at approximately \$40 billion (GAO-07-860).

Even though the outcomes of these three TAV initiatives are steadily improving, the United States Government Accountability Office (GAO) recently identified four major problems areas with the implementation of LMP, GCSS-Army and GFEBS. Although four problem areas were discussed, the third problem is specific to governance. The GAO identified that the LMP governance structure viewed each of the business systems individually rather than evaluating all the business processes from an enterprise-wide perspective. As the GAO report states, “an enterprise perspective permits an organization to view its business processes in a comprehensive manner to help ensure that the organization’s missions, strategic goals, and objectives are achieved.” According to the GAO, the Army also needs to have disciplined processes to implement the program on

time, within budget, and with the promised capability; thus emphasizing the need for a robust governance structure. Without having a robust governance structure, the Army's efforts to achieve TAV are more likely to be unsuccessful (GAO-07-860).

DLA BSM

In 1999, DLA designed the Business Systems Modernization (BSM) program in an effort to replace its vintage material management systems – the Standard Automated Material Management System (SAMMS), the Defense Integrated Subsistence Management System and approximately 200 other independent legacy information systems. Similar to the Army's legacy material management systems, these systems had also been in use for over 30 years managing DLA inventory. Using a COTS application, BSM was intended to transform how DLA conducts its operations in five core business processes: order fulfillment, demand and supply planning, procurement, technical/quality assurance, and financial management. Between the years of 2002 and 2006, BSM was painfully, yet successfully designed and implemented throughout all five defense supply centers, including DLA Headquarters in Fort Belvoir, Virginia. In 2008, BSM is currently FOC and includes approximately 5,000 end-users with control and accountability for 5 million inventory items valued at approximately \$12 billion (GAO-04-615). BSM brings improved and/or new capabilities in which to support and meet the Warfighter's requirements. Further evidence of DLA's success with BSM includes an improved logistics response time by approximately 16 percent and a reduction from hours to minutes when receiving a requisitions receipt to the material release order (Transformation Roadmap, 2006).

The successful outcome of DLA's ERP implementation is a direct correlation to the dedicated efforts of the members within their governance structure. The DLA governance structure itself is multi-functional and multi-echelon consisting of members from the Headquarters and Corporate Board, in addition to their Transformation Executive Board (TEB) members and directors from each of the functional areas. During all of DLA's numerous transformation efforts, the governance structure "ensured the agency had an agile, efficient and effective enterprise-wide structure for governing its performance, business process improvement initiatives and transformation commitments" (Transformation Roadmap, 2006). As proof of their commitment to enterprise-wide governance, all members of the governance structure met twice a month for five years during the design and implementation phases of BSM – instilling a grueling "battle rhythm" that permeated through every process and employee throughout the organization. The successful implementation of BSM is a direct output and testament to this robust governance structure.

Conclusion

This second chapter described the evolution of Enterprise Resource Planning (ERP) and that ERP software is a technology solution that integrates the communication between manufacturing, financial, distributions and other business functions. Next, the chapter discussed a few applications of transformation, such as ERP implementation and discussed the importance of having an effective governance structure during a transformation. Most importantly, the literature discussed how the implementation of

ECSS and the reduction of over 250 legacy systems will transform the Air Force logistics community and will ultimately provide better support to the Air Force's primary customer, the Warfighter. Finally, by revealing case study ERP implementation analysis on the Army's LMP and DLA's BSM, members of the ECSS governance structure can heighten their awareness concerning the strengths and weaknesses experienced by these two DOD programs.

III. Methodology

Overview

The purpose of this chapter is to discuss the selected methodology, the research questions, research design as well as the data collection and analysis techniques used throughout this study. A qualitative case study methodology was employed, specifically an explanatory type case study. This methodology approach was proven to be the most appropriate form of data collection since the research focused on “how”, “why” and “what” type of questions (Yin, 1994). Structured interviews served as the primary instrument for data collection. As such, interviews were conducted with a diverse sample of employees having first-hand knowledge of their organization’s ERP implementation or transformation. The personnel interviewed are considered to be subject matter experts (SME) and provided a detailed level of understanding of the changes that were made to the organization’s governance structure, the reason or trigger points for those changes, and how the identified changes and trigger points can be applied to the ECSS governance structure.

Research Questions

To guide the direction of the study in a sound and logical manner, three overarching research questions were proposed:

1. What specific changes were made to the governance structure during the transformation effort?

2. What was the precise trigger point or cause of the change made to the governance structure?
3. How can these trigger points and changes be applied to the ECSS governance structure?

The three research questions provided a structured approach to the purpose and motivation of the study. However, in order to capture the necessary information needed to fully answer each of the research questions and to leverage the personal experiences from each SME; the following ten investigative questions were developed. Each of the investigative questions was carefully designed to build the framework for data collection and data analysis. They were designed to identify the changes that had been made to both civilian and DOD organization governance structures during various transformation efforts or ERP implementations, and when viewed collectively, provide insight to each of the research questions.

Investigative Questions

1. What did your organization's governance and/or issue resolution structure look like during the implementation of your ERP or major transformation initiative?
2. What was the design of your organization's governance structure based upon?
3. How influential was your organization's senior leadership in designing the purpose and objective of the governance structure?
4. a) How was information concerning the governance structure communicated among the organization and to members responsible for the transformation?

b) How did your organization communicate and distribute the scope of issues that would be addressed through the use of the governance structure?

5. How well did the users of the organization understand and buy into the purpose and objective of the governance structure?
6. How did your organization “test” or “tweak” the governance structure for time efficiency, effectiveness and/or quality of decisions made prior to implementing transformation efforts?
7. As you went through the ERP implementation or transformation activities, what significant changes did your organization make to the governance structure in terms of people, processes and/or policies?
8. What “trigger points” would your organization consider to be the influences or causes for making these significant changes to the governance structure?
9. Based on your experience, what would you have done differently or suggested to the organization in hind-sight?
10. On a personal note, what additional knowledge can be gained from either a positive or negative outcome of the ERP implementation or transformation activities?

Research Design

The research design logically connects the empirical data to the study’s initial research questions (Yin, 1994). The research design in this study sought to identify specific changes that had been made to civilian and DOD organization governance structures during various transformation efforts or ERP implementations. The study also sought to identify how those changes and their trigger points can be applied to the ECSS governance structure and the implementation of ECSS. In order to attain an understanding of these empirical changes and their corresponding trigger points, supporting information was gathered from a convenience sample of SME interviews. Each SME had significant personal knowledge in the areas related to their civilian or DOD organization’s ERP implementation and governance structure issue resolution

processes. Once the data from each of the interviews was collected and analyzed using pattern-matching logic, the most significant trigger points were revealed.

Unit of Analysis

Units of analysis are often defined in relation to the research questions. Accurate identification of the unit of analysis is important for determining the limits of the data collection and analysis (Yin, 1994). In this study, the units of analysis are the mid to senior level program managers who were directly involved with the governance structures during the transformation or ERP implementation projects for each of the case study organizations. Figure 3 illustrates the units of analysis for this study. Each of the research questions were precisely designed with the units of analysis and governance structures in mind so as to clearly identify the trigger points for those changes.

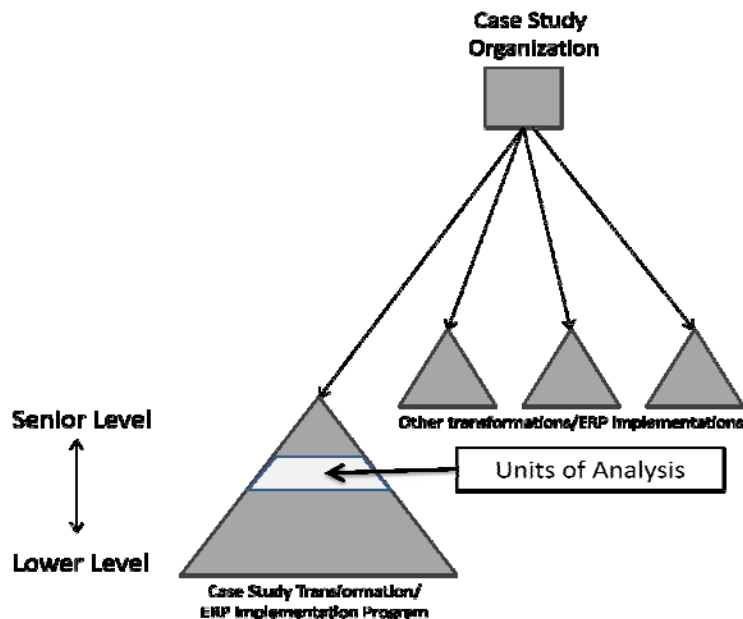


Figure 3. Unit of Analysis

Case Study Selection

To ensure that the identified changes, trigger points and overall lessons learned from each case study have the most applicability to the ECSS governance structure, it was important to only select the most relevant cases. To select these organizations, the researcher used three conditions to vet each of the case study examples.

1. Availability of the respondent
2. Personal experience of the respondent
3. Organization's governance structure similar to ECSS.

Availability and willingness of the respondent to participate in a timely manner was the most significant consideration for this interview-intensive research methodology. The collection of data was accomplished solely by the use of SME interviews and their direct answers to the ten investigative questions. Additionally, the respondents each had to possess in-depth personal experience surrounding transformation initiatives, such as an ERP implementation, as well as knowledge of the governance structure operating within their respective organization. A comprehensive understanding of ECSS was not an eliminating factor for respondent selection; however the vast majority of respondents were also familiar with the objectives and governance structure of ECSS. Lastly, the decision was made to only include organizations with governance structures that were similar to the ECSS governance structure. By similar, this means that the organization's governance structure was both multi-echelon and multi-functional in its design and

operability. All of the case studies and their governance structures discussed throughout this research met both the multi-echelon and multi-functional selection criterion.

Through the employment of respondent interviews, data collection took place over many months beginning in July 2007 and concluding in January 2008. In total, 15 interviews were conducted with nine potential case study organizations. Upon the completion of data collection and analysis, five different organizations were chosen as the final case study organizations to be examined during this research. The four organizations discontinued from case study research were eliminated primarily due to the lack of information. The primary factor for elimination was the lack of sufficient and applicable information provided by the respondents. Specifically, these organizations were unable to provide clear information concerning the organization's multi-functional and multi-echelon governance structure. The five case study organizations chosen for this study, and each of their respondents, all surpassed the selection process described above in regards to availability, personal experience and having a multi-echelon/multi-functional governance structure. Additionally, in order to maintain a balanced perspective among commercial and DOD organization governance structures, two commercial organizations and three DOD organizations were chosen as case study examples. The five case studies are shown in Table 2.

Table 2. Selected Commercial and DOD Case Studies

Organization	Commercial	DOD
DLA		X
APS		X
DEAMS		X
MeadWestvaco	X	
NCR	X	

Data Collection

Data for this study was collected through a variety of interviews sessions with mid and senior level SMEs. On average, each SME had approximately 15.2 years with personal experience in the areas of ERP implementation, program management, consulting, and/or software management. A small number of the SMEs also had prior military experience. The majority of interviews were initially coordinated based upon recommendations from the thesis sponsor. In fact, the first contact made to each potential case study and SME was initiated directly by the sponsor through the use of electronic mail. This e-mail message included thirteen names with contact information and the name of the civilian or DOD organization they represented. The purpose of this e-mail message was not only to establish initial communication between the researcher and a potential case study example, but to also publicly endorse the research effort in hopes of soliciting a broader range of participation. After the initial contact was made, it became the responsibility of the researcher to accomplish follow-up correspondence, to include the formal request for

participation, dissemination of the investigative questions, and coordination of the interview session.

Once each respondent agreed to participate with the study, an interview date was established. Face-to-face interviews were the preferred method of data collection. These types of the interview sessions were recorded. The ten investigative questions mentioned earlier were used to lead the interview discussion. Each of these interviews lasted approximately 60 minutes. For some of the organizations, interviews were conducted using the computer as the primary means of communication. In the circumstances where the respondent and researcher were unable to conduct a face-to-face interview, the investigative questions were completed electronically by the respondent and emailed directly to the researcher. In either case, the investigative questions were the principal means of extracting the personal experience and knowledge from the respondent, in addition to revealing the necessary information about the organization's governance structure and any changes made to it.

Once each face-to-face interview session was complete, the recorded session was carefully transcribed to accurately reflect the content and intent of the respondent. Hand-written notes that were also taken during the interviews served to supplement the transcription process. Once each interview was completely transcribed, it was emailed to the respondent for their final approval and consent for use within the research document. For the investigative questions that were sent electronically to the researcher, unless

stated otherwise, it was implied that the information provided by the respondent was approved and available for use within the research document.

Data Analysis

As discussed in the preceding chapters, the term trigger point is used to describe a specific cause or reason influencing members of the governance structure to make some type of change to their current governance structure. Over the course of many interview sessions, numerous trigger points were identified. Each SME provided key information concerning the design and operability of the organization's governance structure and the processes managing issue resolution. In line with the investigative questions, they also provided valuable insight and personal experience about the changes and trigger points that occurred during their organization's transformation.

For case study analysis of these changes and trigger points, one of the most desirable techniques is pattern-matching logic (Yin, 1994). At the conclusion of each interview, all of the identified governance structure changes and corresponding trigger points were maintained in one centrally located Microsoft Excel worksheet. In this worksheet, all of the specific changes and trigger points for each question were listed according to their originating organization to ease the analytical process of pattern-matching. This form of data analysis compares an empirical based pattern with a predicted pattern (Yin, 1994). In this study, the predicted pattern for changes made to a governance structure and the related trigger points are listed in investigative question number seven. This investigative question predicted that changes made to a governance structure would transpire amid the

organization's people, processes and/or policies. Furthermore, the study complied with the pattern-matching analysis technique by having the respondents provide the empirical patterns of the changes and trigger points. Both of the predicted changes and trigger points as well as the empirical changes and trigger points were further consolidated to provide a complete inventory of all the trigger points. Although many changes and trigger points were identified, through the pattern-matching logic, the researchers chose to focus on the four most noteworthy contributions. The in-depth discussion of the four actual trigger points and the practical applications to ECSS is covered in subsequent chapters.

Validity and Reliability

Validity and reliability tests are the most common ways to evaluate case study research. Validity establishes operational measures for the concepts being studied (Yin, 1994). This research attempted to increase the construct validity in two ways. First, this research included multiple sources of evidence. This is a common tactic to use during data collection. As previously mentioned, the data collection for this study included 15 total interviews from nine potential case study organizations. Second, the draft case study report was sent for review by key respondents. In fact, each of the individual interviews were carefully transcribed and sent to each respondent requesting their assessment for accuracy and clear intent. Additionally, even the interviews and case studies eliminated from final selection were transcribed and reviewed during data analysis ensuring no relevant information was excluded from this study.

The goal of reliability is to minimize the errors and bias in a study (Yin, 1994).

Reliability is a way of ensuring that another researcher could produce similar results if conducting the same study. The primary factor for a possible low reliability score in respect to this study would result from the heavy reliance upon respondent interviews for the collection of data. There are a number of reasons that could potentially impact another researcher's result. For example, the personalities of both the respondent and the researcher could impact the data collected, topics discussed and ultimately the research findings. Even though the investigative questions would still lead each interview session, personality could certainly influence the findings.

Conclusion

This chapter addressed all of the essential elements of a qualitative case study methodology. Beginning with the three research questions, this study seeks to identify specific changes that have been made to various governance structures and how those changes and trigger points can be applied to the ECSS governance structure. By linking the overarching research questions to the research design, the chapter builds credibility for the data collection and analysis. The data was collected by means of conducting interviews with available and knowledgeable respondents whose organization utilized a multi-echelon and multi-functional governance structure during their transformation initiative, such as an ERP implementation. Once the governance structure changes and trigger points were revealed and collected, they were vetted using pattern-matching logic. In line with the overarching research questions presented at the beginning of the chapter,

these noteworthy changes and trigger points are discussed and applied to the ECSS governance structure in the following chapter.

IV. Analysis and Results

Overview

This chapter presents the data analysis and collective research findings resulting from each of the case study interviews. First, the chapter reviews the five case study organizations chosen for this study and transitions to the in-depth discussion of the ten investigative questions. The questions and answers for each investigative question are interwoven and summarized by focus area to convey the purpose of the question and the specific case study finding. Next, the four trigger points and the changes made to the case study governance structure are discussed. Lastly, the decision support matrix is presented and explained with two examples applicable to ERP implementation and transformation. The decision support matrix is a weighted, multi-variant analytical tool founded upon five criteria that are each evaluated by members of the governance structure and assist in effective decision making.

Case Study Organizations

- Defense Logistics Agency (DLA) Business Systems Modernization (BSM)
- National Cash Register (NCR)
- MeadWestvaco
- Advanced Planning & Scheduling (APS) Pathfinder
- Defense Enterprise Accounting & Management System (DEAMS)

Governance Structure Specifics

The first investigative question, as shown in Appendix A, initiates the case study explanatory methodology by identifying key aspects about the different governance structures used by each of the case study organizations. In order for the research to have maximum potential and application to ECSS, it is important that the case study governance structures reflect similar qualities to the ECSS governance structure. Specifically, the terms multi-echelon and multi-functional are two fundamental characteristics that each governance structure in this research must possess as discussed in chapter three.

All five of the case study organizations reported having a governance structure that met the intended criteria of both multi-echelon and multi-functional. Although none of the governance structures were identical in terms of size or membership, they all guided the same overall purpose of implementing a complex ERP or transformation effort. Even though all of the governance structures have similar objectives, their structural origins were typically derived from one of three sources. The three governance structure sources include 1) commercial standard, 2) internal design, and 3) ad hoc. Table 3 shows each of the five case studies and three potential sources for a governance structure. The research revealed that two of the organizations used a commercially generated type of governance structure, while two other organizations utilized a governance structure that was internally designed. The commercial standard governance structure is one adopted from a commercial design or 3rd party consultant. Normally, the ERP system integrator (SI)

has a core governance structure they are familiar with and will adapt that governance framework to fit the unique circumstances or requirements of the organization. The second type of governance structure has been internally designed by the organization. In many cases, this governance structure had been used over the course of the organization's history and is considered to be "tested and true" having survived past transformation efforts. Thirdly, a governance structure can be described as "ad hoc" or having been created on the fly without much detailed thought in terms of structure and membership. This last type is usually short lived and takes on more formalized characteristics as the governance structure is refined during the course of the implementation to fit the needs of its members, the organization, or due to a change in the size or scope of the program. As revealed during a research interview, the APS pathfinder case study is an example of an "ad hoc" governance structure. The program leaders quickly developed this type of governance structure during the beginning stages of their project, or proof of concept phase. As the project rapidly expanded in both scope and functionality, members of the APS program changed the governance structure in order to institute more formalized processes for issue escalation and issue resolution. At first, the new governance processes were not widely accepted among members of the governance structure and provided a challenge for change management to the members of the governance structure. However, by having the project members maintain their commitment to use the more structured processes, in time the changes were accepted and lead to comprehensive issue resolution processes both up and down the program echelon hierarchy.

Table 3. Sources for Governance Structures

Organization	Internal Design ₁	Commercial Standard ₂	"Ad hoc" ₃
DLA	X		
APS			X
DEAMS	X		
MeadWestvaco		X	
NCR		X	

1. Internal Design: reflects organizational approach of self-reliance; governance process confidence built around previous internal staff expertise.

2. Commercial Standard: reflects organizational approach of benchmarking best practices; governance process confidence built from external expertise.

3. Ad hoc: reflects organizational approach of improvising; governance process confidence built around short-term and dynamic environments.

Senior Leadership Influence, Communication and Acceptance of Governance

The investigative questions in this portion of the study assessed the importance of senior leader communication and involvement as related to the governance structure. For instance, some of the questions asked about the degree of senior leader involvement in developing the purpose of the governance structure and attaining employee buy-in throughout the organization. Other questions addressed how well did members of the governance buy into the objectives of the governance structure.

The literature reviewed for this study supports the position that senior leader support within the organization is a chief inhibitor for failure in ERP implementations. “In order to relieve ERP project hazards, senior leaders should attend to the governance issues so as to increase the likelihood of project success” (Moon, 2007). Corresponding with senior leader support, senior members of the governance structure should also

communicate a consistent purpose and direction to the members of the organization.

“Senior management must provide guidance and keep the organization focused throughout the project. Without this commitment and focus the chances for failure are greatly increased” (Dredde and Bergdolt, 2007).

For example, DLA’s implementation of BSM illuminated the importance of senior management focus and communication flow throughout the organization. Prior to each meeting, senior members of the governance structure required that every attendee be well informed concerning program updates. During the interview, the respondent stated that “everyone attending the meeting had to be acutely familiar with every dimension and capability of the new ERP implementation.” For example, over the course of five years, senior members of DLA’s governance structure maintained their intense dedication to bi-monthly meetings, which were described by the case study respondent as a “deep dive” or highly informative briefings that held all members accountable for the information presented. When the researcher spoke with another one of DLA’s BSM project leaders, the individual interviewee mentioned that, “these briefings covered the strategic, tactical and functional capabilities of the ERP system, ensuring our senior leaders were aware of and resolved implementation issues affecting any aspect of the organization.”

Additionally, during that five year implementation period, the organization had one Director who oversaw the entire project development. Regardless of an employee’s position within the organization, DLA’s Director made ERP implementation a primary focus. The Director communicated that all efforts will drive to one primary objective—the successful implementation of BSM. Frequent meetings and communicating an

unwavering focus among senior members of the governance structure were cited as the foremost contributing factor culminating in DLA's arguably successful implementation of BSM.

Senior Leader Communication

In almost all organizations, directives and decisions are typically communicated downward, from the senior leader level to the lower employee level. Senior leaders make decisions while relying on the lower levels of the organization to carry out each directive in a manner that is advantageous to the ERP implementation and program goals. There are a number of ways to communicate directives and expectations. Three of the most common methods are through the use of computer presentations, email messages and published meeting minutes. Every case study organization in this research used at least one, if not all of the methods to effectively communicate the intentions of their organization's leadership. Other methods of senior leader communication included a published document, formal policy letter or mass auditorium-style briefing. When using a published document, it is important that it contain a well defined purpose and objective of the governance structure, as well as, the intended scope of issues that should be escalated up the governance structure for issue resolution. Regardless of the delivery mechanism used to communicate senior leader guidance to the organization, attaining employee support should be the primary goal of all communication.

One of the respondents of this study had a particularly high level of experience and understanding of the ECSS and its governance structure. During this interview, they

expressed that senior leader communication should be aimed at attaining employee understanding, acceptance and support of the transformation. Similarly, they also mentioned that “members of the governance structure must also understand, accept and support the governance structure processes of which they are a key enabler.” This same interviewee revealed that without member buy-in, issue resolution can suffer in a number of ways. When specifically applied to ECSS, one of the ways issue resolution might suffer is when there is a deficit or void in the number of issues being escalated up the governance structure. Every case study interview expressed the importance of governance and the need for issue resolution during their transformation or ERP implementation. Therefore, the lack of issue escalation usually results when lower-level members of the governance structure and perhaps the LPO₁ do not fully comprehend the type and scope of issues for which they are responsible to resolve or escalate. Without having an understanding of the issue resolution processes, they will likely feel internal pressure to resolve more issues than they actually should; resulting in none or very few issues escalated to the next echelon. Additionally, these same members of the governance structure might also spend too much time trying to resolve an issue internally and fail to work the issue by coordinating horizontally among other IPTs. Either problem may be a significant inhibitor to the effectiveness of the governance structure or the implementation and should be remedied immediately.

Employee Buy-In

All of the case studies agreed that senior leader communication and change management initiatives are needed to combat the negative effects resulting from a lack of employee

buy-in. For example, the absence of employee buy-in can cause an organization to fail in making the leap from the old, legacy-based business processes to the new, ERP-enabled business processes. There are many reasons for a lack of employee buy-in. One case study respondent from MeadWestvaco agreed that employee perception is one of the main reasons. The lack of employee buy-in oftentimes stems from the perception, or the unfortunate reality, that the elimination of the legacy system will result in the elimination of jobs. It is unrealistic for senior leaders to expect employees to embrace the new technology that may potentially be responsible for their dismissal. Therefore, to overcome a lack of buy-in from either an employee of the organization or a member of the governance structure, change management initiatives can help mitigate the negative impacts on the ERP implementation or transformation. Change management focuses more on the people side of the transformation than the technical side and often involves heightening knowledge surrounding the new processes or purposes for transformation. Change management can also include structured activities to help facilitate members of an organization or governance structure make a smoother transition from the old state to the new state.

One of the best case study examples of executing effective change management techniques was obtained from interviews with the respondents from DLA. Prior to the implementation of BSM, DLA made the “case for change” early on and at each location that would be impacted by the change (Bennett et al, 2007). One of the other successful change management techniques used by DLA to build strong employee buy-in was by establishing reoccurring meetings and constant communication flow from senior

executives. As previously discussed, DLA maintained an intensely focused “battle rhythm” for five years consisting of bi-monthly governance structure meetings. An additional way to solidify buy-in is for senior leaders to provide regular and clear feedback to the employees. Nadler states that within organizations, individuals can be expected to sustain behavioral changes only if they receive constant and meaningful feedback. The organization must develop specific objectives so that at each level in the organization people can both receive feedback on their own behavior and give worthwhile feedback to others” (Nadler and Nadler, 1998). Likewise, the governance structure itself should be designed to provide two-way feedback. The consequences from not having a standardized process for member feedback will likely result in a less than satisfactory ERP implementation. A case study respondent from NCR wisely expressed that “receiving mid and senior-level feedback is crucial to encourage and clarify the scope of issues up-channeled for resolution, but more so, to instill confidence in the effectiveness and timeliness of the processes driven by the governance structure.”

Changes Made to the Governance Structure

One of the primary purposes of the governance structure is issue resolution. An organization’s governance structure is only value-added if its issue resolution processes are fast and effective enough to facilitate the high quality of decision making necessary to sustain the rapid pace of the transformation effort. The questions in this next portion of the study asked about any testing or slight modifications made to the governance structure prior to transformation. Another question in this related section addressed the actual changes made to the governance structures during the transformation or ERP

implementation. As a result of the case studies in this research, it was became clear that few governance structures developed for transformations such as ERP implementations remain completely unchanged across the life cycle of the project. In fact, four out of the five governance structures in the study underwent some form of testing or fine-tuning in an effort to streamline decision making timeliness and effectiveness to improve quality of decision output. Both DLA and APS agreed that decision making timeliness is one of the most imperative characteristics of a successful governance structure. *"Speed Wins. Be decisive and do not delay. Speed in execution is the difference between success and failure."* This quote from Richard H. Anderson, Chief Executive of Delta Air Lines supports the need for timeliness in both decision making and execution. Timely decision making is essential considering that future events often hinge on current decisions. One delayed decision can trigger an entire series of delayed actions and thus beginning the downward spiral of on-time program development. None of the case studies revealed information on any formal testing or adjusting of the governance structure. However, a couple of the companies did informally modify their governance structure, particularly when maintaining the implementation schedule was a top priority. For example, DLA decided to re-visit certain decisions at a later time to prevent delaying other important time-sensitive decisions.

As the organization went through the ERP implementation or transformation activities, what significant changes did the organization make to the governance structure in terms of people, processes and/or policies? (Investigative question #7)

In general, organizations commonly encountered a need to change some element of their governance structure during complex transformations, such as an ERP implementation. Throughout this research, there were a number of changes made to the various governance structures. Regardless of the exact change made within a governance structure, most changes are a response to external programmatic issues and have an effect on one or more of the following --people, processes, policies, cost, schedule, or performance. Additionally, each of the changes was further analyzed and can be described by one of two classifications. Harmonization describes a change made to bring balance between different objectives, and synchronization is a type of change that fosters cooperation between two different functions or groups. Each of the changes made to the governance structure and their classification are shown below in Table 4.

Table 4. Case Study Changes and Classifications

Organization	Change Made to Governance Structure	Harmonization	Synchronization
MeadWestvaco	Included additional perspectives (business units) to decision making	X	
APS	Instituted more structured issue escalation and resolution processes		X
NCR	Ensured feedback mechanism		X
DEAMS	Creation of new organizations and management levels	X	
	Instituted more structured issue escalation and resolution processes		X
DLA	Included additional perspectives (process owners) to decision making	X	
	Established frequent and structured communication discussing strategic intent		X

Classifications of Change

Harmonization:

The category of harmonization or bringing balance describes a change made to the governance structure with the goal of maintaining correct emphasis among varying objectives. For instance, one case study in this research, MeadWestvaco, operates under the self-imposed regulation of five guiding principles: Outcome Based, Common, Simple, Global and Standard. Each of the guiding principles represents characteristics that MeadWestvaco would like embodied at the core of each decision solution and business process. For example, a change made to their governance structure often includes supplementing their governance structure with additional perspectives from across various business units within the organization. As such, each decision for issue resolution to this organization's governance structure is evaluated within the context of these guiding principles. The ultimate purpose of this governance structure is to sustain harmonization of business processes across all business units (Welch and Kordysh, 2007).

Another significant harmonization change was uncovered during an interview with DLA. At one time, this organization's governance structure was void of process owners. The process owners represented the lowest tier in the governance structure and were responsible for redesigning the current business processes and identifying requirements for the new ERP. Over time, deficiencies were identified within the initial requirements and blueprinting documents. It became apparent that the only way to correct this situation was to re-accomplish all of the blueprinting activities. However this time, the

blueprinting would be harmonized and occur with the essential input of the process owners in addition to the other governance members. Similarly, DLA made another harmonization change to their governance structure after they had consciously decided to exclude a particular demographic of their personnel from the governance structure. These employees were critical to day-to-day operations; however they are often transient throughout the organization, which was the primary rationale behind the decision to exclude them from the governance structure. At the time, this decision seemed justifiable on many levels, but proved flawed during the actual transformation. The impact of this decision forced a large number of personnel to feel “out-of-the-loop” and unfamiliar with the implementation processes. In addition, since they had been removed from the governance structure, they were also less supportive of the transformation and did not fully understand some of the decisions that had been made. Considering the members of this group were indeed an important element to DLA operations and that their full support was necessary for a successful transformation, this situation was quickly rectified by adding more cross-functional representatives to the governance structure.

Synchronization:

The category of synchronization describes changes made to bring two or more functions together at the same time to facilitate cooperation. During a transformation or ERP implementation, synchronization changes compel inter-dependency among many functional areas and alleviate implementation problems resulting from stove-piped decision making. The significance of this type of change was best revealed by DLA during one of the interview sessions. The Director instructed the functional leaders and

the program manager to work and communicate together. Furthermore, the Director wanted the functional manager and the program manager to be accountable to one another, by providing relevant progress data that would be presented to the entire organization during the monthly meetings. It was later proven that this close working relationship avoided governance structure decisions that were based solely from either a functional or program management viewpoint, but rather took into consideration the challenges and program intricacies affecting all the functional areas. In fact, the individual interview response from DLA mentioned that with respect to their governance structure membership that approximately half of attendees came from the outlying DLA locations and the other half came from the headquarters. These proportions indicate the high level of importance DLA placed on synchronizing input from the end user communities. It would have been detrimental to the success of this ERP implementation had there been a lack of synchronization among all the members of the governance structure and members of the organization involved in this transformation.

Trigger Points

The following section discusses the trigger points that were identified in the research as well as their significance to the ECSS governance structure. As discussed in previous chapters, “trigger points” refer to the causes, influences or reasons compelling the members of a governance structure to make a change from their current governance structure processes to improved processes. The trigger points identified in this study embody the cornerstone of the research and give readers the ability to leverage this insight, affording them opportunities for successful future transformations. The trigger

points in this study are more than just warning signs of potential problems that may arise during an upcoming transformation project. The trigger points represent a myriad of actual obstacles that were evaluated and overcome by the case study organizations. Additionally, they each represent countless hours spent on issue resolution and decision making to determine the best course of action for the respective governance structure and transformation effort. These changes made to the governance structure were distinct solutions aimed at confronting a certain trigger point. Even though the changes were identified from one or more of the case study organizations, both the trigger points and the changes are applicable to other organizations facing similar transformations. Therefore, each of the changes can have varying degrees of significance or impact to the governance structure as needed to resolve the specific problem. An awareness of these trigger points and the actual changes made to the governance structures during other transformations will provide considerable insight to the members of the ECSS governance structure. Such awareness allows them to be proactive versus reactive when these trigger points and other problems arise during the design and implementation of ECSS.

Research Specific Trigger Points

The following trigger points were identified through the collection of numerous case study interviews. Each of the four trigger points are discussed in length and referenced with supporting examples from the related case study organizations. Additionally, the two classifications of change, harmonization and synchronization, are not directly related to the trigger points. However, the classifications are directly related to the changes

made to the governance structure resulting from the trigger points. Therefore, in addition to the trigger point, the two classifications of change are reiterated to further illustrate their relationship to the actual change.

- Lack of balance between guiding principles
- Change in size and/or scope of program
- Deficiencies identified with blueprinting design
- Surprised by decisions made from lower-level governance members

A. Lack of balance between guiding principles:

This first trigger point is a realization that one or more of the organization's internal guiding principles is either dominating or absent from daily operations, thus forcing the governance structure to change its basis for decision making and issue resolution. This first trigger point influences the members of the governance structure to make changes restoring the harmony or balance among all of the organization's guiding principles. As such, this type of change to the governance structure would fall under the classification of harmonization where maintaining correct emphasis among varying objectives is the goal of decision making and issue resolution within the governance structure. The MeadWestvaco case study provided the following example of when an employee requests the development of a customized module. Immediately the word 'customized' is in direct violation of the guiding principles, particularly the 'common' and 'simple' guiding principles. MeadWestvaco acknowledges that customized processes can often have a double cost; a one-time up-front implementation cost and

then additional hidden costs when upgrading (Welch and Kordysh, 2007). Therefore, the request for a customized module would cause the governance structure to evaluate the request and base their decision upon the guiding principles. If the needs for a customized module outweigh the needs for harmonization and standardized business processes, then it might be passed, however such a decision is unlikely.

MeadWestvaco also changes their governance structure by bringing in additional perspectives from other business units or divisions to supplement their decision making consideration. One interview respondent from MeadWestvaco stated that, “when it becomes clear that a proper balance cannot be attained, the decision is quickly escalated.” The guiding principles are to remain in equal proportion to each other; none should dominate another for any significant period of time. By always striving for harmony, these exclusive guiding principles lead the direction and priorities for the organization. For MeadWestvaco, a need to change their governance structure is the direct result of maintaining a properly balanced or harmonized relationship among the guiding principles.

The overall concept of guiding principles is not unique to MeadWestvaco. In fact, the ECSS governance structure has already determined some of its goals and guiding principles for the ECSS program life cycle. For ECSS, the guiding principles are driven by the future state attributes that the USAF hopes will embody the core of the governance structure’s decision making and issue resolution. Some of the ECSS future attributes have been defined and include seamless supply-chain operations,

centralized predictive planning and decentralized execution to plan. Other future attributes include real-time enterprise-wide visibility, data integrity and data transparency, and lastly, having a skilled, well-trained, and equipped workforce to carry out the responsibilities of ECSS. In addition to the future state, the ECSS governance developed some “ground rules” to guide present decisions. These ground rules were briefed on 17 July 2007 during the Organizational Change Management Orientation. As a result of deciding to use 100% COTS application, the first ground rule is no software customization or tailoring. This ground rule will drive the need for process re-design throughout the enterprise. The second ground rule is that the USAF will change its future state operations and processes in order to meet the software instead of changing the software to meet current state operations. Specifically, that ECSS will drive core AF processes. The third and last ground rule is to cease any unique IT development. Similar to the MeadWestvaco example, it seems that the USAF is also going with common and simple and no longer customized and unique. In the same way that MeadWestvaco maintains a balanced harmony among their guiding principle, so should ECSS and the USAF maintain harmony among their guiding principles.

B. Change in the size and/or scope of the program:

The second trigger point is widespread in both commercial and DOD organizations and exists when there is an increase to the size and scope of the ERP implementation or transformation. For instance, the program could increase in scope due to internal or external pressures to add requirements for functionality or capability. Likely, an increase

in scope might cause the program to expand in size thus requiring additional resources across the life cycle of the program. For example, as a consequence to hiring additional personnel, members of the governance structure would need to enforce a more structured and synchronized flow of information among the various echelons of the governance structure. The impact of having more structured processes within the governance structure would help to establish a more effective feedback loop for such concerns as; issue resolution, communication on process changes, and standardized documentation guidance. This type of change would fall under the category of synchronization which describes activities or events made to bring two or more functions together at the same time to facilitate cooperation.

A prime example of this second trigger point emerged during the DEAMS interview. As previously mentioned in chapter three, DEAMS is another DOD COTS ERP designed to support and replace many financial processes and accounting legacy systems. The DEAMS program is currently increasing in size and scope from external demands requiring that it transform from Increment I, a purely United States Transportation Command (USTRANSCOM) program to Increment II, a program implemented throughout the USAF. There are a myriad of issues facing the DEAMS joint-service governance structure as decisions are made about what specific elements will be transferred from the current USTRANSCOM platform to a future state USAF platform. In response to some of these issues, three changes were made to lower levels of the DEAMS governance structure, specifically within the acquisitions domain. The first change was the creation of an entirely new organization. Previous to the change, the new

organization had been much smaller in size with approximately 20 people and was a sub-element of another organization. Once the change was made, the organization became stand-alone and increased in size to approximately 60 people in order to accommodate the additional requirements it was now responsible to manage. As a result of creating the new organization, the second change made was the addition of new layers of management within this organization. Although the additional layers of management were deemed necessary by some to maintain proper oversight of the new organization, this change also reduced direct interaction with senior program managers. The additional layers of management instantly made the organization more “steep” in terms of the organizational chart, thus reducing agility and slowing response time by requiring decisions and issues to navigate through the additional layers of management. The third change in response to the programs increase in size and scope was the creation of a new integration flight to oversee both the internal and external communication within the organization. This new function arose from the need to coordinate internally, but to also provide a consistent response to external requirements.

C. Deficiencies identified with blueprinting design:

The third trigger point is exclusively identified during an ERP implementation when deficiencies or holes exist within the blueprinting design or initial requirements document. For example, when commercial business processes are blueprinted in a future state architect without consideration of the complexities specific to the DOD may result in a blueprinted design which is deficient and not sustainable through an IT enabled

program, such as an ERP implementation. According to the DLA respondent during this interview, this type of deficiency can be prevented by making one of two changes to the governance structure. First, by making the functional and program managers within the governance structure equal in status or rank. In the case of equal status, there is no opportunity for one manager to wield greater influence over the other manager, or, for one manager to exert their position during issue resolution or decision making sessions. The second way to prevent blueprinting deficiencies is by eliminating decision solutions that are “stove-piped” in one direction or another. The elimination of stove-piped decisions is accomplished by involving representation from all areas of the organization affected by the ERP. Furthermore, decision solutions made by the governance structure, commercial or DOD, should be fully integrated and harmonized. If decision making remains stove-piped, the result is missing information and perspectives that are requisite to the continuation of the design and development of the ERP. This type of change would also fall under the category of harmonization in which the change to the governance structure maintains equal emphasis among varying objectives.

D. Surprised by decisions made from lower-level governance members:

This final trigger point has equal significance to the governance structure of an ERP implementation or any transformational activity. The intent of most governance structures is to drive decision making and issue resolution to the lowest level of accountability within the organization. However, with this construct the research revealed the need to have a structured communication approach whereby senior members

of the governance structure are kept informed of decisions made by the lower members of the governance structure.

For example, senior-level members of the governance structure are responsible for determining the future state requirements and strategic intent of the program. As stated above, it is preferred that lower-level members of the governance structure are responsible for resolving a large percentage of issues and therefore eliminating the need for most issues to be escalated for issue resolution. As a consequence, the senior leaders from this case study organization were at times surprised by some of the decisions made by the lower-levels members of the governance structure. The change made to this organization's governance structure was the establishment and synchronization of structured meetings. These structured meetings facilitated discussions between the senior and lower-level members of the governance structure concerning the program's requirements and strategic intent, and thereby greatly reduced the frequency of surprising decisions. By bringing together two or more groups at the same time; this type of change is classified as a synchronization change.

Table 5 displays all four of the research specific trigger points with the resulting change made to the governance structure. Finally, each trigger point and change is classified by the type of change it represents.

Table 5. Trigger Points and Governance Structure Changes

Organization	TP	Trigger Point	Change to Governance Structure	Classification of Change
MeadWestvaco	A	Lack of harmony between guiding principles	Included additional perspectives (business units) to decision making	Harmonization
APS	B	Increased size and scope of program	Instituted more structured issue escalation and resolution	Synchronization
NCR			Ensured feedback mechanism	Synchronization
DEAMS			Creation of new organizations and management levels	Synchronization
DLA	C	Recognized deficiencies	Included additional perspectives (process owners) to decision making	Harmonization
DLA	D	Surprised by lower-level decisions	Established frequent and structured communication discussing strategic intent	Synchronization

Theoretical Decision-Support Matrix

The following theoretical decision support matrix was designed based upon the numerous case study interviews conducted with leading experts in the ERP implementation and transformation fields. The weighted, multi-variable matrix illustrates the interconnected relationships between the trigger points and the changes made to governance structure. The five criteria fields within the matrix were carefully refined during the course of the research. For each trigger point and each criterion, members of the governance structure

should assign a weighted value matching the degree of impact of the change to the governance structure. The weighted values allow members of the governance structure to personally determine which trigger points and changes are the most critical to the organization's governance structure and transformation effort, and which changes can be avoided temporarily or permanently. For a single event change, only the individual trigger point should be weighed. However, the matrix can also evaluate multiple events or a collection of trigger points. Members of the governance structure can weight each trigger point individually, or they can weigh the trigger points collectively by evaluating trade-offs between each trigger points, the changes and the five criterion.

When each trigger point(s) and the five criteria are evaluated, the total values are calculated. First, members of the governance structure should add each of the weighted responses for the trigger point(s) horizontally. Then, the decision support matrix total is calculated by vertically summing all of the individual trigger point totals in the last column. Both the individual trigger point total and the overall total are instrumental to the governance structure by providing a measurable scale of perceived benefit and risk that may result from the change. In the following section, each of the five decision support matrix criteria is explained with the decision support matrix shown in Table 6.

Decision Support Matrix Criteria

1. *Significance to the Governance Structure:* [None=1 Vital=5]

For each trigger point, the level of significance to the governance structure will vary depending upon the value it receives from the members of the governance structure. A trigger point with a high weighted response is indicative of a change with high significance to the governance structure. Likewise, a trigger point with a low weighted response indicates low significance to the members of the governance structure.

2. *Ability of Governance Structure to Accept Change:* [Low=1 High=5]

Depending on the particular trigger point, the resulting changes and factors within the governance structure, there may be differences in the ability of the governance structure members to accept the implemented change. Some governance structures may be willing to accept a change even if there are external factors hindering the decision but the outcome is highly desirable. On the contrary, other governance structures may try to avoid any type of change even if the potential disruption or resulting chaos to current processes is low.

3. *Resulting Degree of Chaos:* [Low=1 High=5]

Not all trigger points will inflict the same impact or degree of chaos upon the governance structure if implemented. Some changes would appear seamless and go practically unnoticed requiring minimal senior leader involvement. However, other trigger points and changes will produce tidal waves of undesirable chaos rippling across the

organization. These changes are likely to be fought against by the employees and will require intense change management. *It is also important to note that chaos itself is sometimes viewed as a positive rather than a negative. Chaos can also be intentionally inflicted upon the organization. Therefore, depending on the intended outcome from the chaos, the matrix should be evaluated appropriately.

4. *Impact to Governance Structure:* [None=1 Vital=5]

Different trigger points will often cause different changes, with each having varying levels of impact to the governance structure. At times the resulting impact will be high, and at other times it will be minimal. Again, depending on the desired outcome, impact to the governance structure should be evaluated appropriately.

5. *External or Internal Factors Hindering Decision:* [Many = 1 None = 5]

There are a number of factors that could prevent or even hamper the implementation of a specific change to the governance structure. Some of these factors may be external or internal and include financial or personnel considerations. If the evaluated change is implemented, perhaps the governance structure will be required to revise a long-standing policy or a related legacy business process.

Table 6. Theoretical Decision Support Matrix

Trigger Point	Significance to Governance Structure	Ability of Governance Structure to Accept Change	Resulting Degree of Chaos	Impact to Governance Structure	External or Internal Factors Hindering Decision	Total
A						
B						
C						
D						
Overall Total						

Using the Decision Support Matrix

By using the theoretical decision support matrix, members of the governance structure are able to objectively input weighted values to determine the significance of the trigger point and the subsequent change to the governance structure. As previously discussed, trigger points can be evaluated as either a single event or as a collection of events. For example, the evaluation of only trigger point B is considered a single event, whereas deciding upon the changes from trigger points B, C and D is considered a collection of events. Objective values for each model criteria range from 1 – 5; 1 having no significance and 5 having vital significance to overall success of the change implemented within the governance structure. For each trigger point, the five distinct objective values are added across the criteria fields for a total sum. A total sum -- specific to the trigger point -- will have a value ranging from 5 – 25. A value of 5 determines a level of little or no significance to the governance structure. In this case, it is unlikely that a change to the governance structure is necessary for that trigger point. However, a trigger point total value of 25 determines an extreme degree of significance to the governance structure and

should generate earnest discussion among members of the governance structure. In this case, a change to the governance structure is likely needed to mitigate the affects of that particular trigger point.

To determine the appropriate objective value for each matrix criteria, users should evaluate their decisions surrounding each trigger point in terms of cost, schedule, performance and risk. Most trigger points will impact at least one of these considerations, if not all four. For example, if the members of the governance structure view a particular trigger point as having considerable significance to the successful design and implementation of the program, they would rate that matrix criterion with a 4 as shown in the grading scale below. Each criterion is stand-alone and should be evaluated individually. Therefore, the same weighted value of significance to the governance structure should not be automatically awarded to the governance structure's ability to accept the change in the second criterion. For example, it might be important to implement a specific change to the governance structure; however it might be difficult for the governance structure to accept the change.

Scale for Matrix Criteria:

- 1—No significance
- 2—Slight significance
- 3—Moderate significance
- 4—Considerable significance
- 5—Vital significance

Depending upon the level of significance the trigger point and change would have on the successful design and implementation of the project, an objective value (1-5) for each criteria of the decision support matrix will be assigned. A total sum will appear in the last column and as previously mentioned, the total sum for each single event trigger point will range from 5 – 25. If there are multiple decisions being evaluated in response to a collection of trigger points, the overall sum will be much larger. For instance, if all four trigger points have been identified within the ERP implementation and all four are being considered as reasons to change the governance structure, then the overall sum could potentially be as high as 100. An overall total of 100 would indicate that all four single event trigger points are of vital significance to the governance structure. As a collection of trigger points, all four will likely require action taken in terms of specific changes made to the governance structure.

Scale for each Trigger Point Total:

- 5 - 9 —No significance (Take no action)
- 10 - 13—Slight significance
- 14 - 17—Moderate significance
- 18 - 21—Considerable significance
- 22 - 25—Vital significance (Must take action)

Using the Decision Support Matrix

Example #1:

Blueprinting is the process of connecting current-state requirements to future-state operations within the ERP. In this example, deficiencies have been identified in the initial blueprinting design, meaning that not all of the organization's legacy processes were captured during the first and second rounds of blueprinting activity. These deficiencies in the blueprint design will disconnect the present processes from the new ERP processes, thus negatively impacting future state capability. The proposed change to rectify this situation requires that all of the blueprinting be re-accomplished, and with the input of the functional process owners who were absent from the previously unsuccessful rounds. Re-accomplishing the entire blueprint design will delay the implementation schedule by approximately seven months and will cost the organization close to \$50 million in additional funding required to bring in the process owners for those seven months. By using the decision making model and awarding objective values from 1-5 to each of the criteria specific to the change unique to this example, the calculated total will determine the amount of significance this change would produce.

Table 7. Theoretical Decision Support Matrix for Example #1

Trigger Point	Significance to Governance Structure	Ability of Governance Structure to Accept Change	Resulting Degree of Chaos	Impact to Governance Structure	External or Internal Factors Hindering Decision	Total
A						
B						
C	4	5	2	5	4	20
D						
Overall Total						20

Evaluating Example #1

Criteria 1:

Re-accomplishing the blueprinting would considerable significance to the members of the ECSS governance structure. [rating = 4]

Criteria 2:

However, out of necessity to keep driving forward with the implementation, the governance structure would need to be highly accepting of any actions required to re-accomplish the blueprinting. [rating = 5]

Criteria 3:

Since both the governance structure and all the employees had previously done the blueprinting process, the resulting degree of negative chaos from re-accomplishing the blueprinting would be rather low. [rating = 2]

Criteria 4:

The improved effectiveness or outcome for re-accomplishing the blueprinting is extremely significant. Conversely, not re-accomplishing the blueprinting would have a

disastrous affects further degrading the performance and schedule of the ERP.

[rating = 5]

Criteria 5:

Lastly, external or internal factors hindering the blueprinting include significant additional funding that was not included in the original budget. [rating = 4]

As shown in the decision support matrix, trigger point “C” sums to a total 20, thus indicating a change that would have considerable significance to the governance structure. It is clear in this simple example that a need to change the governance structure in terms of re-accomplishing the blueprint design is the most advantageous course of action.

Example #2:

Company XYZ is considering implementing a highly technical transformation within their customer service training division. Their current training program has been in place for over 10 years. The training is effective; however Company XYZ believes that a new training program would enhance customer service training and improve the company’s customer satisfaction ratings. In addition, the two training managers are both close to retirement and have grown increasingly resistant to the potential of upgrading the training program. The new training module would involve cutting edge technology and if purchased, would require the company to bring in knowledgeable personnel from other business units to examine potential compatibility problems with the current system, as well as, to conduct extensive employee training needed to operate the new module. The

trigger point for this situation is realizing that the new module is technologically complex. The change made to the governance structure is the addition of functional expertise to assist with resolving the compatibility concerns and final decision making. Members of the governance structure are debating whether or not to purchase the new module and will use the decision support matrix to analyze the affects of adding personnel with functional expertise to the governance structure, as well as, the impacts to the organization resulting from the new training module.

Table 8. Theoretical Decision Support Matrix for Example #2

Trigger Point	Significance to Governance Structure	Ability of Governance Structure to Accept Change	Resulting Degree of Chaos	Impact to Governance Structure	External or Internal Factors Hindering Decision	Total
A	3	5	5	4	4	21
B						
C						
D						
Overall Total						21

Evaluating Example #2

Criteria 1:

Purchasing the new training module and therefore bringing in the necessary personnel with functional and technical expertise would have moderate significance to the members of the XYZ governance structure. [rating = 3]

Criteria 2:

Members of the XYZ governance structure would have a high ability to accept the addition of extra personnel to assist with compatibility concerns and decision making.

[rating = 5]

Criteria 3:

The degree of chaos as a result of transforming the customer service training program would be high, specifically to the organization. In most circumstances, this criterion might be considered negative. However, considering that the current training managers are hindering the process of upgrading the training program, this new module might cause too much disruption that they decide to retire sooner than later. Depending upon the objectives of this company, the resulting chaos may be positive. In this case the chaos is positive and will hopefully allow a more effective training program to transpire once the current managers decide to retire. [rating = 5]

Criteria 4:

The improved effectiveness or outcome for re-accomplishing the blueprinting is extremely significant to both the governance structure and the organization. Conversely, by not re-accomplishing the blueprinting, this would have an even more negative affect further degrading the performance and schedule of the ERP [rating = 4]

Criteria 5:

In this situation, there are not any significant internal or external factors inhibiting the change to the governance structure. This company should not have any difficulty in hiring personnel with the required skills and experience needed to successfully transform all aspects of the new training program. [rating = 4]

As shown in this second decision support matrix example, the total for this trigger point is 21 and indicates a high degree of “considerable significance” to the governance structure and the organization. By using this decision support matrix, members of the governance structure can systematically evaluate the importance of purchasing the new training module and the impacts it would have on both the governance structure and the organization.

Conclusion

This chapter answered the first two research questions by revealing the changes that were made to the governance structure and what trigger points caused the changes. Each investigative question was discussed as it related to the focus area and case study organization. A primary finding throughout the research uncovered that few governance structures developed for transformations such as ERP implementations remain completely unchanged across the life cycle of the project. Therefore, a number of changes made to the governance structures were identified; and four key trigger points emerged during the case study interviews as being a cause for the change. The four trigger points included: 1) lack of balance between guiding principles, 2) change in size and/or scope of the program, 3) deficiencies identified within the blueprinting design, and 4) senior members being surprised by decisions made from lower-level governance members. Each of the trigger points were thoroughly examined with examples cited from the case study organizations. Most important to this chapter was the presentation of the decision support matrix. The decision support matrix is an analytical tool in which

members of the governance structure are able to objectively input weighted values to determine the significance of a trigger point and the subsequent change made to the governance structure and the organization. The scoring intricacies of the decision support matrix was discussed in addition to the two examples explaining how to apply the matrix to any transformation of ERP implementation, thus proving the broad applicability of the matrix to any transformation effort. The following chapter will apply each of the four trigger points and answer the third and final research question by applying each trigger point to the development and implementation of ECSS.

V. Conclusion

Overview

The final chapter reviews all of the key points previously addressed throughout this study by focusing on the three research questions and summarizing each of the four trigger points. Furthermore, the chapter discusses the additional lessons learned acquired from each of the case study interviews. Lastly, the assumptions and limitations specific to this case study research are looked at in addition to the recommendations for future research.

At this point in the study, the magnitude of successfully implementing ECSS should be clearly evident. The Air Force needs to systematically support or eliminate approximately 250 disparate logistics legacy systems currently in use and move toward centralized and integrated data sharing capabilities provided by ERP technology. The main objective of ECSS is to offer the capability for predictive and centralized planning in comparison to the reactive and decentralized planning and decision making currently employed throughout the Air Force. If successful, ECSS would become a valuable tool not only for enhancing command and control operations and decision making, but would also become the nucleus for transformation and business process redesign across the entire enterprise. Other benefits of ECSS include improving worldwide visibility of assets, reduced inventory levels and maintenance cycle times, and most importantly, improving support for today's Warfighter. A comprehensive understanding of the advanced capabilities and improvements to current processes resulting from ECSS drives the motivation and significance for correctly implementing ECSS. In order to

accomplish the eLog21 objectives and realize the benefits of ECSS across the Air Force, the requirement for an effective governance structure becomes readily apparent.

Therefore, it is the primary responsibility of the ECSS governance structure to provide senior leader program oversight concerning the development and implementation of ECSS. Additionally, the ECSS governance structure that is responsible for resolving all issues affecting the cost, schedule or performance of ECSS. This research has shown through a number of literature references and case study examples that not having an effective governance structure during a transformation effort, such as an ERP implementation will result in a less successful outcome.

Trigger Point Application to ECSS

The research questions were designed to identify changes that had been made to both civilian and DOD organization governance structures during various transformation efforts or ERP implementations. The study sought to identify how those changes and their trigger points can be applied to the ECSS governance structure and the implementation of ECSS. To answer these questions, case study interviews were conducted with SME representatives from each of the five case study organizations. A number of changes were identified from the interviews, but more importantly, four primary trigger points emerged as having direct application to the ECSS governance structure. The four trigger points identified in this study embody the cornerstone of this research and allow readers to leverage this insight, affording them opportunities for future success in transformation, such as an ERP implementation.

The four trigger points are listed below and discussed in further detail during the data analysis and results chapter.

1. Lack of Balance Between Guiding Principles

The first trigger point influences the members of the governance structure to make changes that restore harmony or balance among all of the organization's guiding principles. Like the case study organization, MeadWestvaco, both the Air Force and the ECSS governance structure have guiding principles, or rather "ground rules" they have each agreed upon to uphold during the implementation of ECSS. For instance, no software customization or tailoring is one of the ground rules that will eventually be addressed when a request for customization is escalated to the governance structure. At that time, the ECSS governance structure will need to make a decision based upon a balance between the needs of the Air Force and guiding principles.

2. Change in the size and/or scope of the ERP

The second trigger point is widespread in both commercial and DOD organizations and exists when there is an increase to the size and scope of the ERP implementation or transformation. For instance, the program could increase in scope due to internal or external pressures to add requirements for functionality or capability. This was the provided by the APS pathfinder case study and will inevitably apply to ECSS. Since ECSS is already the world's largest ERP implementation and will have approximately 250,000 end users, the scope of ECSS is likely to expand as the program approaches FOC in 2013. In light of this, the ECSS governance structure needs to be prepared for the

additional issues and challenges that training such a large logistics community will bring forth. To accommodate these and other challenges, the ECSS governance structure should also prepare to establish a more structured flow of communication throughout the governance structure.

3. Recognized deficiencies in blueprinting design

The third trigger point can result when commercial business processes are blueprinted in a future state architect without consideration of the complexities specific to the DOD may result in a blueprinted design which is deficient and not sustainable through an ERP implementation. This trigger point would have disastrous effects to ECSS in many ways. First, in order to re-accomplish the basic blueprinting processes, a conservative \$50 million would be required to cover the variety of costs for approximately 125 IPT blueprinting members. The second effect is to the timeline. The phased implementation schedule of ECSS is already rigid with key milestones tracking the progress made toward the goal of achieving FOC in 2013. Any setback to the blueprinting would cause a ripple-effect of timely delays and unmet milestones. Lastly, this scenario would shake an already skeptical logistics community in addition to harming the change management efforts currently underway attempting to establish confidence and acceptance of ECSS throughout the Air Force. Therefore, deficiencies in the blueprinting would have far-reaching and significantly negative impacts to all aspects of the implementation plan. In order to prevent this trigger point, the ECSS governance structure can ensure that all functional areas and process owners are represented during the blueprinting sessions. Cross functional representation will help eliminate decision solutions that are “stove-

pipeds” in one direction or another. Additionally, this trigger point can also be avoided by making the functional and program managers within the governance structure equal in status or rank. By having equal status, there is no opportunity for one manager to wield greater influence over the other manager, or, for one manager to exert their position during issue resolution, decision making and on the blueprinting processes.

4. Senior leaders surprised by decisions made by lower level personnel

The construct of the research for this final trigger point revealed the need to have a structured communication approach whereby senior members of the governance structure are kept informed of decisions made by lower members of the governance structure. Like most governance structures, the ECSS governance structure’s primary function is to resolve issues affecting program cost, schedule or performance. Additionally, most governance structures aim that the majority of issues be resolved at the lowest level of accountability. Therefore, the ECSS governance structure will need to maintain the authority of decision making within the lowest levels, however, it may also need to incorporate a more frequent and structured communication approach. This will help ensure that senior members communicate their strategic intent but also remain informed of the decisions made by the lower levels of governance.

Classifications of Change

For all of the changes made to the case study governance structures, each change was classified as either a harmonization or a synchronization change. The change classification of harmonization refers to bringing balance to the governance structure

with the goal of maintaining equal emphasis among varying objectives. One case study organization in this research, MeadWestvaco, operates under five guiding principles which represent the five characteristics they would like to have embodied at the core of each decision solution and business process. As such, each decision escalated for resolution is evaluated within the context of these guiding principles.

The category of synchronization describes a change to bring multiple functions together and to facilitate cooperation between multiple business units. During an ERP implementation, a synchronization change would drive cooperation between functional areas alleviating problems resulting from stove-piped decision making. The significance of this type of change was best revealed by DLA when the Director instructed the functional leaders and program managers to work and communicate together, and to be accountable to one another during the implementation of BSM.

Additional Lessons Learned

In quoting the proverbial expression “hind-sight is always 20/20.” This next section of the research is stand-alone from the previous chapters and seeks to summarize some of the lessons learned and wisdom gained from an assortment of the respondent interviews throughout this study. Once an organization’s ERP implementation or transformation is finalized, the doors of communication widen and the organization is more willing to share their experiences. At this time the environment becomes conducive to the disclosure of any errors or mistakes made, as well as, revealing ideas or processes that led to a successful implementation. This research should have significant value to the USAF

and to the readers of this study, but ultimately the following information should influence future relationships and actions within the ECSS governance structure.

SI Relations

One interview respondent shared their four most valuable lessons learned focusing on SI relations. First, they said to always challenge the SI on every decision to ensure the program and organization achieve the right product outcome. This statement seeks not to question the integrity of the SI, but only to make sure that the organization is in full agreement with all decisions made by the SI that could affect the cost, schedule or performance of the program. Second, this organization also stated that the process owners (level 1) in the governance structure need to drive future state requirements, not the SI. Typically the process owners have the most experience in the room concerning the organization's functions and processes; therefore, they should be the ones pushing for future state processes and requirements. Third, this respondent recommended insisting on designing and keeping to a finite schedule to meet deadlines and avoid costly delays during implementation. At times it is possible to delay the resolution of some issues while you must push to adamantly resolve others – especially the issues that sequentially precede other actions and events. Fourth, it is to immediately establish standardized processes for the documentation and escalation of issues. If processes are standardized, this will hopefully eliminate personal or organizational agendas from influencing the resolutions made by the governance structure. The ECSS governance structure can take these four lessons learned to help frame their current working relationship with CSC to ensure that ECSS gets the right outcome, on-time and within budget.

Importance of Change Management

Another case study respondent stressed the importance of change management and the need to “spend more time on the ‘people stuff’ than the ‘system stuff.’” Examples of this include training that addresses the “why” questions of the new implementation and not just the “how” questions. The training must also include communication of change management activities, organizational structure changes, new job descriptions, and new metric capabilities.” This particular respondent shared that, “your organization will always need more resources than you are able to support – therefore, spend the money to train as many people as possible to be knowledgeable of the basic capabilities.” This case study organization wished they had been able to take their own advice proving once again that change management is absolutely critical to attaining employee buy-in and program success. Conversely, the respondent went on to say that, “senior and middle leaders within the organization need to know how their day-to-day actions must change in order to support the new system. Without that knowledge and training they will be asking the same old questions and doing the same old processes.” This invaluable piece of insight is key to the Air Force’s ECSS training program and to decisions made by the ECSS governance structure if the Air Force hopes to achieve any degree of success and acceptance during the ECSS implementation phases.

Data Cleansing

“Comprehensive data cleansing of legacy systems is an absolute must – without this, the program will be a disaster!” These explicit words were uttered from a truly seasoned ERP

implementation SME during one of the interviews, offering either sincere advice or a solemn warning. Additionally, in order to avoid this particular organization's unforeseen need to purchase a bolt-on storage capability, the respondent suggested that the ECSS governance structure address potential needs for data warehousing sooner than later.

Comprehensive Blueprinting

Lastly, blueprinting efforts must be painstakingly comprehensive in scope and depth to support future state design. Ensuring this action will prevent the third trigger point which identifies deficiencies in the blueprinting design and initial requirements document. The case study respondent who recommended this lesson learned, experienced blueprinting failure first-hand, thus requiring the organization to re-accomplish the entire blueprinting process. The application to ECSS is unmistakable--ECSS simply does not have the luxury in either time or money to experience mistakes or deficiencies in the blueprinting processes design phase.

Assumptions and Limitations of Research

All researchers hope to contribute something of value to the larger body of knowledge surrounding their topic area. Additionally, no research effort is ever completely infallible. Within this study, there are a number of assumptions and limitations affecting the most accurate collection of data and analytical strategy (Yin, 1994). First, it is fair to assume that this research did not uncover all relevant information and published documents concerning the importance of governance and the many different types of transformation efforts, specifically ERP implementations. Second, this study is limited

by not including rival interpretations of the subject area. It is possible that a rival interpretation exists concerning the causes and changes made to a governance structure during times of transformation. Third, the researcher had little previously held knowledge of the subject area and therefore brought a lack of experience concerning ERP implementation and governance to the data collection and analysis portions of the research. Had the researcher acquired prior understanding of transformation efforts, in particular ERP implementation, this knowledge is likely to have influenced the reliability and clarity of the data collection and research findings.

ECSS is the largest ERP implementation in the world. The reality of this statistic is not necessarily a positive in terms of implementation and provides the most substantial limitation of this research. The size and scope of ECSS is unparalleled and uncharted. Therefore, the case study examples and related ERP programs discussed in this research do not compare with the magnitude of issues that will most assuredly plague ECSS from present day until well after FOC in 2013. Regardless however, the trigger points and the lessons learned from this research will provide the ECSS governance structure with a bolstered awareness of the causes and changes made to other governance structures that may also impact the implementation of ECSS.

Future Research

The challenges facing commercial ERP implementations are no longer unique to industry. It has become widely recognized that the Air Force faces many of the same problems and challenges as those found in commercial ERP implementations. The Air

Force's heightened awareness to the trigger points and changes revealed in this study position the Air Force and the ECSS governance structure to better handle the challenges that lay ahead. Therefore, another case study analysis comparing the results of this study to additional organizations and the changes made to their governance structure during an ERP implementation would also be helpful to ECSS. The additional research from this study might yield enhanced insights into supplementary trigger points and changes experienced by these organizations.

Another recommendation for future research would be a case study analysis exploring commercial ERP implementations to determine if an organization's implementation objectives, goals and desired return on investment (ROI) were realized post-implementation. Achieving ROI is a major consideration in the commercial sector when deciding to implement an ERP. Such an analysis could facilitate ECSS and the Air Force in designing the correct metrics and making the right decisions thus improving the likelihood of attaining a timely and accurate ROI.

Appendix A: Investigative Questions

1. What did your organization's governance and/or issue resolution structure look like during the implementation of your ERP or major transformation initiative?
2. What was the design of your organization's governance structure based upon?
3. How influential was your organization's senior leadership in designing the purpose and objective of the governance structure?
4. a) How was information concerning the governance structure communicated among the organization and to members responsible for the transformation?

b) How did your organization communicate and distribute the scope of issues that would be addressed through the use of the governance structure?
5. How well did the users of the organization understand and buy into the purpose and objective of the governance structure?
6. How did your organization "test" or "tweak" the governance structure for time efficiency, effectiveness and/or quality of decisions made prior to implementing transformation efforts?

7. As you went through the ERP implementation or transformation activities, what significant changes did your organization make to the governance structure in terms of people, processes and/or policies?
8. What “trigger points” would your organization consider to be the influences or causes for making these significant changes to the governance structure?
9. Based on your experience, what would you have done differently or suggested to the organization in hind-sight?
10. Are there additional topics or lessons learned that the Air Force should be aware of when implementing ECSS?

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Vita

Captain Elise V. Strachan graduated from Milford High School in Milford, Massachusetts. She entered undergraduate studies at the University of Massachusetts, Amherst. In May 2001, she graduated cum laude with a Bachelor of Science degree in Environmental Sciences and was commissioned through Detachment 370 AFROTC. Her first assignment was the 92nd Air Refueling Wing at Fairchild AFB, Washington where she was the Fuels Management assistant flight-commander. During this assignment she deployed in support OPERATION IRAQI FREEDOM to Al Udeid Air Base, Qatar as the Vehicle Management flight commander. In Aug 2004, she was assigned to the 60th Air Mobility Wing at Travis AFB, California where she served as the Installation Deployment Officer (IDO). While stationed at Travis, she deployed in support of OPERATION ENDURING FREEDOM to Afghanistan in Dec 2006 to spend six months in Kabul as an Embedded Training Team (ETT) logistics mentor to the Afghan National Army (ANA). In Aug 2006, she entered the Graduate School of Engineering and Management, Air Force Institute of Technology. Upon graduation, she will be assigned to the Air Force Logistics Management Agency (AFLMA) at Maxwell AFB-Gunter Annex in Montgomery, Alabama.

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