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NAVAL POSTGRADUATE SCHOOL Monterey, California



THESIS

**REDESIGNING THE UNITED STATES MARINE CORPS
CONTINGENCY CONTRACTING PROCESS OF
KNOWLEDGE SHARING AND TOOL USAGE**

by

Amador Rey Estrada, Jr.

December 2001

Thesis Advisor:

Mark E. Nissen

Co-Advisor:

E. Cory Yoder

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**REDESIGNING THE UNITED STATES MARINE CORPS CONTINGENCY
CONTRACTING PROCESS OF KNOWLEDGE SHARING AND TOOL USAGE**

Amador Rey Estrada, Jr.
Captain, United States Marine Corps
B.S., University of New Mexico, 1994

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

**NAVAL POSTGRADUATE SCHOOL
December 2001**


Author:


Amador Rey Estrada, Jr.

Approved by:


Mark E. Nissen, Thesis Advisor


E. Cory Yoder, Co-Advisor


Kenneth J. Euske, Dean
Graduate School of Business and Public Policy

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ABSTRACT

Marine Corps contingency contracting is a critical function of supporting deployed Marine forces. Contingency contracting provides key logistical support for deployed operational forces when normal supply channels cannot. Characterized by a small number of contingency contracting officers, enlisted personnel and high turnover rates, the contingency contracting knowledge base is not being maintained. The purpose of this study is to design a knowledge management system that captures, retains and shares the knowledge that is essential to the deployed contingency contracting process (DCCP). This study builds upon recent work to integrate knowledge management and system design and utilizes knowledge-based organizational process redesign (KOPeR), a measurement-driven redesign knowledge system, for analytical support. Results from this study suggest that DCCP knowledge management and process performance can be improved substantially.

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LIST OF ABBREVIATIONS

AO: Area of Operations
BP: British Petroleum
CCM: Contingency Contracting Marine
CSF: Critical Success Factors
DAU: Defense Acquisition University
DCCP: Deployed Contingency Contracting Process
DCMA: Defense Contracting Management Agency
DFARS: Defense Federal Acquisition Regulation Supplement
DoD: Department of Defense
DoN: Department of the Navy
DSS: Decision Support Systems
ES: Expert Systems
FAR: Federal Acquisition Regulation
FMF: Fleet Marine Force
FSSG: Fleet Service Support Group
HNS: Host Nation Status
HQMC (LBO): Assistant Branch Head for Policy and Oversight, Contracts Division, Headquarters Marine Corps
IT: Information Technology
IT-A: IT-Automation
IT-C: IT-Communication
IT-S: IT-Support
KBS: Knowledge-Based System
KM: Knowledge Management
KMLC: Knowledge Management Life Cycle
KMS: Knowledge Management System
MAGTF: Marine Air Ground Task Force
MARFOREUR: Marine Forces Europe
MARFORSOUTH: Marine Forces South
Marine Expeditionary Unit
MCCPM: Marine Corps Purchasing Procedures Manual
MCO: Marine Corps Order
MEF: Marine Expeditionary Force
MOS: Military Occupational Specialty
NMCI: Navy/Marine Corps Intranet
NPS: Naval Postgraduate School
RCO: Regional Contracting Officer
SDLC: System Development Life Cycle
SEP: Special Education Program
SRB: Service Record Book
T/O: Table of Organization
KOPeR: Knowledge-Based Organizational Process Redesign

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I. INTRODUCTION

A. BACKGROUND

As stated in the “Marine Corps Strategy 21,” General J.L. Jones, Commandant of the Marine Corps, has referred to the Marine Corps as the Nation’s “Total Force in Readiness” (Department of the Navy, 2000). With capabilities that span the entire spectrum of conflict, the Marine Corps has been called upon at an ever increasing rate to deal with situations ranging from humanitarian disaster relief to hot spots that erupt around the world.

Getting Marine Corps forces on the deck in response to a crisis, regardless of its nature, is the culmination of a monumental logistical effort. Keeping our Marine Corps forces supported and mission ready is an even bigger logistical challenge that demands innovation and the ability to deal with the unexpected--an ability gained through experience. With limited funding and resources available, knowledge management (KM) is the leverage by which the Marine Corps can capitalize on its prior experiences and bring to bear an arsenal of expertise that will better support the mission commander.

Contingency contracting is a key aspect to supporting Marine Corps deployed forces. Becoming well versed in federal contract law, practices, and methods requires a sizeable investment in schooling, on-the-job training, and money. The Marine Corps utilizes both officers and enlisted personnel in its contracting force. Marine Corps contingency contracting officers attend an eighteen-month acquisition and contracting curriculum at the Naval Postgraduate School (NPS) located in Monterey, CA. It is at NPS that a solid foundation of acquisition, contracting, and business acumen is instilled

into future Marine Corps contracting officers. This education is further enhanced with the real-life experiences gained by Marine Corps contracting officers during their four-year payback tour (spending three years in the field contracting structure and one year back in the Fleet Marine Force) after they leave NPS. After their payback tour is completed, contracting officers are then reassigned to the operational forces in their primary military occupational specialty (e.g., infantry, supply, aviation). Currently, no career path in the acquisition and contracting field exists for Marine Corps contracting officers (Corcoran, 2000).

Enlisted personnel are selected after a Regional Contracting Officer (RCO) interviews them and makes a favorable recommendation to their entry into the contracting field. The majority of education for the enlisted personnel comes from on-the-job training and basic contracting classes. Enlisted personnel lack a formalized educational track and attend contracting courses when their budgets and schedules permit. Unlike contracting officers, enlisted Marines will remain in the contracting force for the remainder of their careers in the Marine Corps.

When contracting officers and enlisted contracting personnel leave the contracting field (e.g., retirement, attend career level school commensurate with their rank, recruiting duty, drill field duty), they take with them a wealth of information, experience, and wisdom. Operating in an environment that is characterized by change, the Marine Corps is losing a vital asset to its ability to effectively support its deployed forces: “An organization relies on its memory for maintaining continuity in a changing environment” (Nissen, Kamel, and Sengupta, 2000). In essence, valuable lessons learned and practical experiences are being lost. Capturing these valuable lessons learned and structuring a

knowledge management system that serves not as a repository of data, but one of knowledge sharing, generation, and retention, is the challenge.

B. GOAL OF THESIS

The goal of this thesis is to serve as an implementation guide for the application of a knowledge management system (KMS) to support the Marine Corps contingency contracting process.

C. SCOPE OF THESIS

An evaluation is conducted to assess how a knowledge management system can be designed for Marine Corps contingency contracting and the potential benefits and drawbacks that such an endeavor would include. A requirements assessment is conducted to identify the users and define what information and knowledge requirements are needed. Lastly, an examination of current successful government and corporate knowledge management systems is conducted in order to understand how such systems work in practice.

D. RESEARCH QUESTIONS

The primary research question is: how can knowledge management be implemented to improve the Marine Corps contingency contracting practice by incentivizing knowledge sharing, generation and retention? In order to answer this primary question, several subsidiary questions need to be addressed:

- What is knowledge management?
- What is the current method of knowledge sharing in the Marine Corps contingency contracting process?

- What knowledge is needed? When? By whom?
- How can the required contingency contracting knowledge be effectively captured, distributed and applied?
- What measures of performance are required to evaluate successful knowledge transfer?
- What tools are required to incentivize the implementation of knowledge management in Marine Corps contingency contracting?
- How can the results of this investigation be generalized to other ongoing actions and processes?

E. RESEARCH METHODOLOGY

The methodology used in this thesis research consists of the following steps:

- Conduct a comprehensive literature review of knowledge management to include: books, magazines, reports from industry leaders, and credible Internet based sources.
- Review the current Marine Corps contingency contracting knowledge management practices and applicable publications.
- Conduct interviews, either in person or by telephone, with Marine Corps contingency contracting personnel and senior contracting officials at Headquarters, Marine Corps (HQMC), Washington, D.C., Camp Lejune, North Carolina, Camp Pendleton, California, Camp Butler, Okinawa and other Department of Defense (DoD) commands to ascertain the knowledge requirements of the users.
- Use a KM framework to analyze and redesign the process of knowledge transfer within the Marine Corps contingency contracting organization.

F. ASSUMPTIONS

It is assumed throughout this thesis that the reader has a basic understanding of the general organization of the Marine Corps. It is also assumed that the reader has a basic understanding of contracting procedures and regulations of the Federal Acquisition

Regulation (FAR) and the Department of Defense Federal Acquisition Regulation Supplement (DFARS).

G. LIMITATIONS

This thesis is not intended to be a comparison of the various military services' knowledge management systems nor is it intended to be a technical guide for setting up a knowledge management site. These topics are beyond the scope and intent of this thesis. Instead, the author seeks to advance a conceptual framework in which the practice of KM can be applied to Marine Corps contingency contracting and hopefully, serve as a model to other fields within the Marine Corps and military services.

H. ORGANIZATION OF THESIS

This thesis is organized as follows. Chapter II provides background information on knowledge management, Marine Corps contracting structure and organization, and the structure and organization of contingency contracting in the Marine Corps. Chapter III discusses the current practice of KM in Marine Corps contingency contracting. Chapter IV innovates Marine Corps contingency contracting knowledge sharing through KM. Chapter V provides conclusions, recommendations, and future research topics.

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II. BACKGROUND

Chapter II provides background information on knowledge management (KM) and the mission of the Marine Corps' contracting force and its structure.

A. KNOWLEDGE

In the 1990's, the concept of knowledge management emerged explosively in the business community. Although knowledge is not new and has been around for centuries (Davenport and Prusak 1998, Brooking 1999), companies are realizing that their competitive edge is mostly the brainpower or intellectual capital of their employees and management (Liebowitz 1999). Nissen, Kamel and Sengupta (2000) state:

The Power of knowledge has long been ascribed to successful individuals in the organization, but today it is recognized and pursued at the enterprise level through a practice known as knowledge management (see Davenport and Prusak 1998). Although knowledge management has been investigated in the context of decision support systems (DSS) and expert systems (ES) for over a decade (e.g., see Shen 1987), interest in and attention to this topic have exploded recently. For example, knowledge capital is commonly discussed as a factor of no less importance than the traditional economic inputs of labor and finance (Forbes 1997), and the concept *knowledge equity* is now receiving theoretical treatment through research (e.g., see Glazer 1998).

Many practitioners in different fields attest to the advantage of embracing knowledge management. Private corporations such as Ford, Chrysler, Amoco, Dow, GM, Monsanto, Columbia/Healthcare, and Texas Instruments have all experimented with KM and are reportedly benefiting from the outcomes (Srikantaiah and Koenig, 1999). Of particular note is British Petroleum (BP). John Browne, BP's Chief Executive Officer (CEO), has been the force behind a KM initiative that has transformed the once

financially strapped company into the most profitable of all major oil companies (Prokesch 1997). The reason for this has been in large part Browne's recognition of the intellectual power that existed within his company, but was not being utilized to create a synergistic atmosphere within BP. Browne states:

No matter where the knowledge comes from, the key to reaping a big return is to leverage that knowledge by replicating it throughout the company so that each unit is not learning in isolation and reinventing the wheel again and again. (Prokesch 1997)

While the business community has embraced KM and profited from it, the United States Marine Corps has not fully committed to this practice. This is especially apparent in its contracting force. Marine Corps contracting is plagued by the lack of a career path for its contracting officers and too few enlisted personnel. This has prevented the contracting force from acquiring a solid contracting knowledge base. With this said, the Marine Corps contracting force is the ideal place to implement a KM program to capture, preserve and utilize its detailed contracting knowledge.

1. Knowledge Management (KM)

Because KM is a new discipline, the degree of interest, the view, and the interpretation of KM vary among practitioners. These different interpretations depend on their environment and are reflected in their professional literatures and in the content of professional conventions. (Srikantaiah and Koenig 1999) The following KM definitions from leading authorities in the field are provided in table 2.1.

Practitioner	KM Definition
Wiig	KM is the systematic, explicit, and deliberate building, renewal, and application of knowledge to maximize an enterprise's knowledge-related effectiveness and returns from its knowledge assets.
Hibbard	KM is the process of capturing a company's collective expertise wherever it resides – in databases, on paper, or in people's heads – and distributing it to wherever it can help produce the biggest payoff.
Petrash	KM is getting the right knowledge to the right people at the right time so they can make the best decision.
Macintosh	KM involves the identification and analysis of available and required knowledge, and the subsequent planning and control of actions to develop knowledge assets to as to fulfill organization objectives.
O'Dell	KM applies systematic approaches to find, understand, and use knowledge to create value.
Van der Spek	KM is the explicit control and management of knowledge within an organization aimed at achieving the company's objectives.
Beckman	KM is the formalization of and access to experience, knowledge, and expertise that create new capabilities, enable superior performance, encourage innovation, and enhance customer value.

Table 2.1 KM Practitioners and Definitions

(From Liebowitz 1999)

Srikantaiah and Koenig (1999) identify three central themes that dominate the field of KM as discovered through communications with field specialists and surveys of professional literature. These themes are: organizational learning, document management and technology. Organizational Learning emphasizes that the efficiency and effectiveness of knowledge workers depends mostly on how workers communicate and collaborate in their efforts and expose themselves to communities of practice within the institution as well as outside the institution. Document management specialists utilize libraries, information centers, record centers, and other document-based resources. They believe that the effectiveness of these information systems relies on factors like response time, throughput, quality of information, accuracy of information, completeness of

information, relevancy of information, and operating costs. The focus for these specialists is on the explicit knowledge component. Technology experts view KM with systems analysis, design and implementation in mind. This approach may emphasize one or several of the following areas: knowledge storage and access “push” and “pull” approaches, networks, and institutional culture.

To make KM effective, bringing explicit knowledge and tacit knowledge together in an infrastructure is absolutely essential (Srikantiah and Koenig 1999). Explicit knowledge is codified knowledge, and is transmittable in formal, systematic language (Nonaka et al., 1996). Figure 2.1 depicts some of the sources of explicit knowledge and its various forms. Tacit knowledge is informal, accessible only through knowledge elicitation in observation of behavior (Liebowitz 1999). It is developed and internalized by the knower over a long period of time and almost impossible to reproduce in a document or database (Davenport and Prusak 1999). Figure 2.2 depicts sources of tacit knowledge and its various forms.

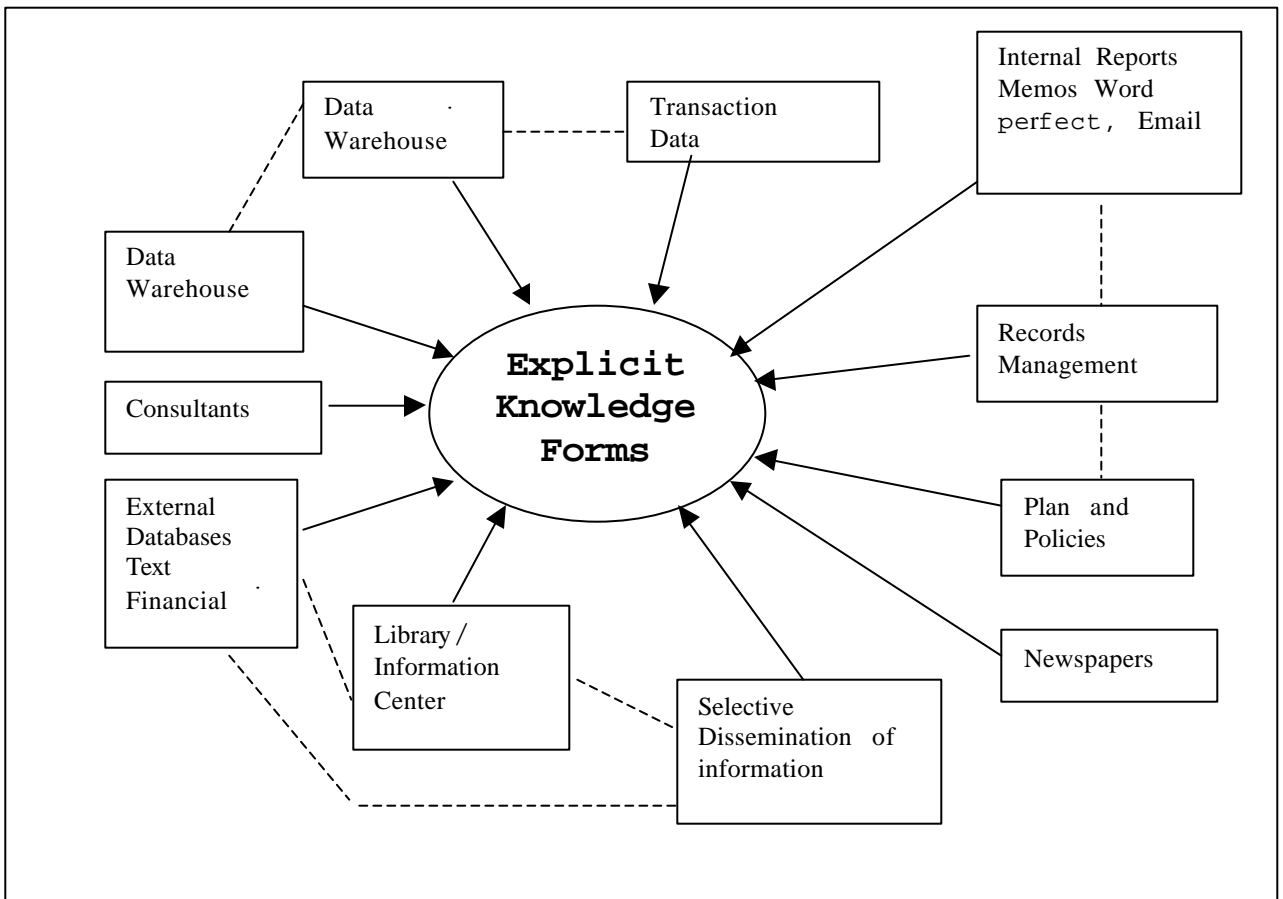


Figure 2.1 Explicit Knowledge: Forms

(After Srikantaiah and Koenig, 1999)

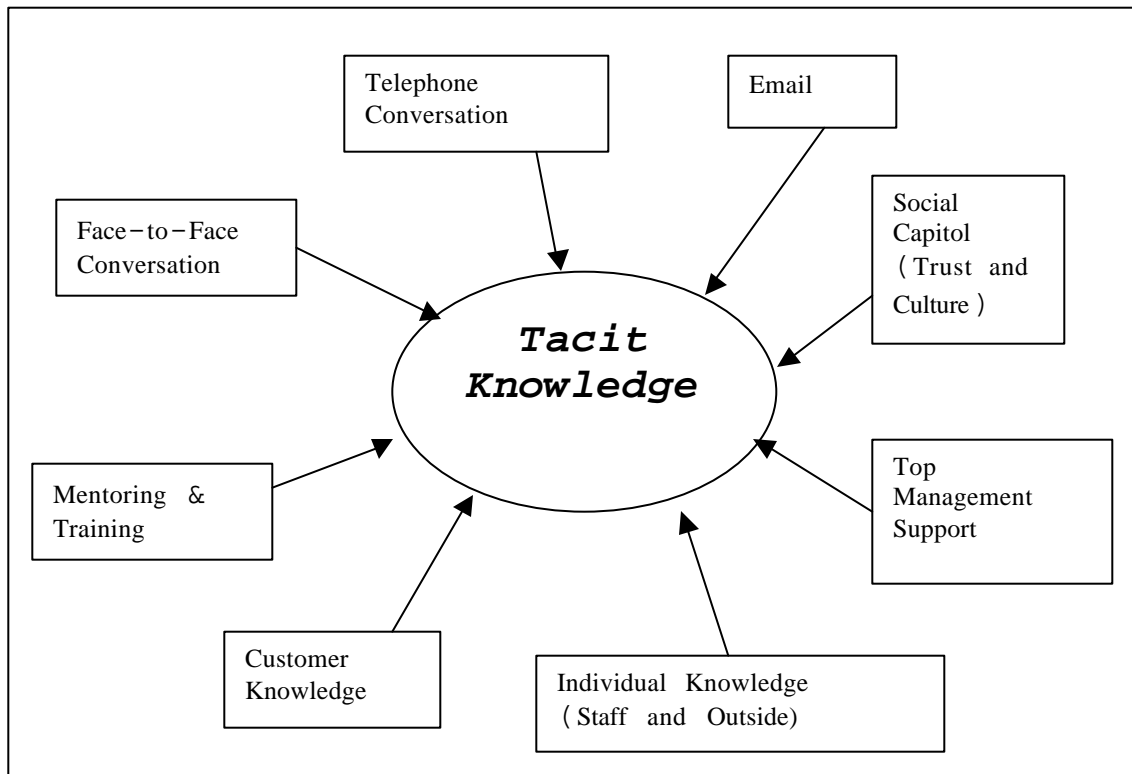


Figure 2.2 Tacit Knowledge

(After Srikantaiah and Koenig, 1999)

Although KM is the latest management discipline, many are discovering that managing corporate knowledge is difficult (Davenport 1995). One reason for this is that knowledge is tacit and unstructured (Nonaka 1994), which in turn makes knowledge acquisition and application difficult. Additionally, information technology (IT) employed to enable knowledge work targets data and information, not knowledge (Ruggles 1997). Nissen, Kamel and Sengupta (2000) believe that this contributes to difficulties experienced with KM.

2. Knowledge Hierarchy

According to knowledge experts, knowledge can be organized into a hierarchy. The basic components of this hierarchy are data, information and knowledge. Davenport and Prusak (1998) discuss how a misunderstanding of these terms has resulted in the failure of many KM programs:

Confusion about what data, information and knowledge are--how they differ, what those words mean--has resulted in enormous expenditures on technology initiatives that rarely deliver what the firms spending the money needed or thought they were getting. Often firms don't understand what they need until they invest heavily in a system that fails to provide it.

With this said, the following definitions from Davenport and Prusak are provided:

Data is a set of discrete, objective facts about events. In an organizational context, data is most usefully described as structured records of transactions. Information is a message, usually in the form of a document or an audible or visible communication. It has a sender and a receiver. Information is meant to change the way the receiver perceives something, to have an impact on his judgment. According to Peter Drucker, information is "data endowed with relevance and purpose" (Davenport and Prusak 1998). Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms. Figure 2.3 is a combination of Alter's and Tobin's knowledge hierarchy models and illustrates how data becomes knowledge.

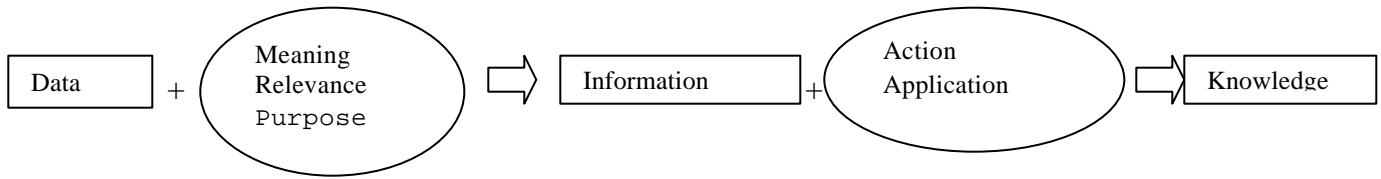


Figure 2.3 Evolution of Knowledge

(After Tobin 1996 and Atler 1996)

3. KM Life Cycle

KM can be described in terms of attributes that flow through a structured process or life cycle, which begins at its conception or creation, and continues until it has evolved into a useful state of sharing and application. There are many different KM life cycles (KMLC). Table 2.2 outlines the KMLCs proposed by several KM experts (Nissen1999, Despres and Chauvel 1999, Gartner Group 1999, Davenport and Prusak 1998). Although differences do exist, the four models are similar. In the amalgamated model, the phases of the KMLC are: create, capture, formalize, distribute, apply, and evolve.

Model	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Nissen	Capture	Organize	Formalize	Distribute	Apply	
Despres & Chauvel	Create	Map/ Bundle	Store	Share/ Transfer	Reuse	Evolve
Gartner Group	Create	Organize	Capture	Access	Use	
Davenport and Prusak	Generate		Codify	Transfer		
Amalgamated	Create	Organize	Formalize	Distribute	Apply	Evolve

Table 2.2 Knowledge management Life Cycle Models

(After Nissen, Kamel, and Sengupta 2000)

Phase 1, *create*, is the discovery and development of new knowledge (Despres and Chavel 1999, Gartner Group 1999). Phase 2, *organize*, involves organizing, mapping or bundling of knowledge (Nissen 1999, Gartner Group 1999). Phase 3, *formalize*, concentrates on making knowledge explicit (Nissen 1999). Phase 4, *distribute*, is the ability to share knowledge (Nissen 1999). Phase 5, *apply*, is the ability to use the knowledge in the organization (Nissen 1999). Phase 6, *evolve*, is the refinement and continual development of existing knowledge (Despres and Chauvel 1999).

4. KM Design Process

Nissen, Kamel and Sengupta (2000) focus on knowledge management and system design from three integrated perspectives: 1) re-engineering process innovation, 2) expert systems knowledge acquisition and representation, and 3) information systems analysis and design. They integrate these three perspectives in a systematic manner, beginning with analysis and design of the enterprise process of interest, progressively moving into knowledge capture and formalization, and then system design and implementation. The four steps that are used in the Nissen, Kamel, and Sengupta model are: 1) process analysis, 2) knowledge analysis, 3) context analysis, and 4) system analysis. By using this integrated methodology, one can identify, select, compose, and integrate the many component applications and technologies required for effective knowledge system and process design (Nissen, Kamel, and Sengupta 2000).

a. Process Analysis

Process analysis requires a thorough understanding of an enterprise's objectives and strategies. This generally entails modeling and analysis that results in one or more (re)designs for the process in question. The process, along with its various

redesign opportunities and required knowledge, must be understood first before designing systems. Although many methodologies have been developed for process (re)design, Nissen's measurement-driven redesign knowledge system "KOPeR", which automatically diagnoses process pathologies and recommends redesign transformations (Nissen, Kamel, Sengupta 2000), is used in this thesis.

b. Knowledge Analysis

Knowledge analysis is mutually dependent on process analysis and directly fed by the process analysis results (Nissen, Kamel, Sengupta 2000). Prior to conducting knowledge analysis, the organization's mission and goal must be fully understood. Knowledge analysis involves identifying key knowledge within an organization. Knowledge analysis results in a thorough understanding of critical success factors (CSF) and identifies the key explicit and tacit knowledge employed to make decisions and take action. CSFs are the key factors that must be addressed to ensure the thorough implementation of a KM program.

c. Context Analysis

Context analysis focuses on the context surrounding two primary factors, the organization and the knowledge underlying the task (Nissen, Kamel, Sengupta 2000). In addressing contextual factors associated with the organization, the role of the organizational memory, its structure, and organizational incentives are the focus. Regarding the task-related knowledge, the practices organizations employ to codify or make explicit, is the focus.

d. Systems Analysis

In system analysis, the organization's current procedures and information systems used to perform organizational tasks are analyzed. The system analysis phase is identical to the analysis and design phases of the system development life cycle (SDLC). In the analysis phase, system requirements are determined principally from the steps above, and an alternate system design(s) is derived to match the system requirements. The output of the analysis phase is a description of the alternative solution. During the design phase, the description of the new or enhanced system is designed meeting the new system requirements (Hoffer, George, Valacich 1998).

B. USMC CONTRACTING

1. Mission

As stated in the United States Marine Corps Contracts Campaign Plan (2001), the mission of the contracting community is directly tied to the readiness of the Marine Air Ground Task Force (MAGTF) by providing the expertise to acquire best value goods and services, whenever and wherever the mission of the Marine Corps is executed.

Marine Corps contracting personnel are specially trained Marines that possess the ability to operate independently, as is the case in contingency operations, anywhere in the world. With the diversity of missions that the Marine Corps is increasingly becoming involved with, from humanitarian relief operations to peace keeping efforts, Marine Corps contracting personnel serve as key logistical force multipliers to the operational commander.

2. Purchasing and Contracting Specialist, Military Occupational Specialty (MOS) 3044

Enlisted Marines are selected after a Regional Contracting Officer (RCO) interviews them and makes a favorable recommendation to their entry into the contracting field. The RCO screens the Marine in conjunction with the criteria of the MOS manual and conducts a review of the Marine's service record book (SRB) to check for any disciplinary and/or personal problems that would preclude the Marine from qualifying as a 3044. The MOS 3044 sponsor (the Procurement Chief of the Marine Corps) approves all nominations of 3044 Marines. Marines enter the contracting field via a lateral move process. The minimum requirement is a Sergeant with not more than two years in grade. Corporals may be selected pending the discretion of the MOS sponsor. Once a Marine is selected for the 3044 MOS, his MOS is temporarily changed to a basic MOS 3000 classification. From this point, the Marine must complete either a six-month period of on-the-job training (OJT) or attend the Defense Acquisition University's (DAU) course in Contracting Fundamentals (CON 101). Additionally, the RCO, who is responsible for providing the Marine with OJT, must give a positive endorsement as to whether the Marine's MOS should be changed to a 3044. After this process is complete, the Marine reports to a regional contracting office for a two-year training cycle. Per the MOS manual, this two-year training period serves as a probation period. If the Marine's performance is acceptable, he is allowed to remain a 3044. If not, then the Marine reverts back to his original MOS. It is important to note that there is no detailed educational path for enlisted contracting Marines, save for the aforementioned courses and probation period. However, enlisted Marines do have the opportunity to attend DAU courses

(pending availability of funding and operational commitments) and earn up to a level three DAU certification. Currently, only two of the 127 enlisted Marines in the Marine Corps possess this level of certification. (Brown, H. 2001)

a. Career Path

During the Marines' first two years, the probation period, they are not deployed to the Fleet Service Support Groups (FSSG). The new 3044 may be deployed as an assistant to a more experienced 3044 or contingency contracting officer to gain working knowledge and experience. After the two-year probation period is complete, the Marine then serves a tour at one of the FSSGs. Upon completion of this FSSG tour, the Marine is transferred to a different contracting office according to the needs of the Marine Corps. All 3044s will remain in the contracting field for the rest of their careers as Marines. All Staff Sergeants and above are still obligated to serve in special billets such as drill instructor and recruiter, and attend Staff Non-Commissioned Officer degree completion programs commensurate with their ranks. (Brown, H. 2001).

b. 3044 Table of Organization (T/O)

Marine enlisted personnel are assigned to all regional contracting offices and limited contracting offices. The table of organization (T/O) for enlisted contracting Marines in the Marine Corps is 127. Currently, there are 124 enlisted contracting Marines (number includes those Marines on B-billets, medical and non-deployable status). Table 2.3 provides a listing of the contracting offices where enlisted Marines are stationed.

Command	Location	Command	Location
HQMC(LBO) ANNEX	Washington, D.C.	SYSCOM QUANTICO	Virginia
HQMC(ARD) ANNEX	Washington, D.C.	MCB Camp Butler	Okinawa, Japan
HQMC HENDERSON HALL	Washington, D.C.	CAMP SMITH	Hawaii
MCB QUANTICO	Virginia	2D FSSG CAMP Lejune	North Carolina
MCB CAMP LEJEUNE	North Carolina	1FSSG CAMPPEN	California
MCB CAMP PENDLETON	California	3d FSSG OKINAWA	Okinawa, Japan
MCAGCC 29 PALMS, CA	California	MARFOR EUROPE	Europe
MCRD PARRIS IL.	South Carolina	MARFORSOUTH	Florida
MCRD SANDIEGO	California	MARFORRES New Orleans	Louisiana
H&HS MCAS MIRAMAR	California	MAR BARRAX 8&I,	Washington, D.C.
MWTC- BRIDGEPORT	California	MATSG PENSACOLA	Florida
EWTGLANT NORFOLK	Virginia	CBIRF, INDIAN- HEAD	Maryland
MCLB ALBANY	Georgia	MCSA, KANSA SCITY	Missouri

Table 2.3 List of USMC Enlisted Contracting Locations

3. Marine Corps Contracting Officer – MOS 9656

Several major laws and policies govern Marine Corps contracting. These are Title 10 of the U.S. Code, DoD Instruction 5000.52M and Secretary of the Navy Instruction 5300.36 (Cocoran, 2000). The most prominent of these is Title 10 of the U.S.

Code, which lists the qualifications required of military personnel who are to serve in the capacity of a contracting officer. These requirements state that a person must:

- Have completed all mandatory contracting courses required for a contracting officer at the grade level that the person is serving in;
- Have at least two years of experience in a contracting position;
- Have received a baccalaureate degree from an accredited institution authorized to grant baccalaureate degrees and have completed at least 24 semester credit hours (or the equivalent) of study from an accredited institution of higher education in any of the following disciplines: accounting, business finance, law, contracts, purchasing, economics, industrial management, marketing, quantitative methods, and organization and management;
- Meet such additional requirements, based on the dollar value and the complexity of the contracts awarded or administered in the position, as may be established by the Secretary of Defense for the position. (Title 10 U.S. Code, Sec 1724)

a. Naval Postgraduate School

In keeping with the stringent requirements demanded by law and policy to become a military contracting officer, the Marine Corps starts its future contracting officers off with a solid education in acquisition and contracting at the Naval Postgraduate School (NPS), in Monterey, California. Assignment to NPS is outlined in the Marine Corps Order (MCO) 1520.9F that identifies specialized billets that are to be filled under the Special Education Program (SEP).

The Acquisition and Contract Management curriculum, curriculum number 815, is a demanding six-quarter (eighteen-month) course of study. This curriculum is comprised of over 960 hours of classroom instruction in subjects such as financial accounting, economics for defense managers, managerial communication,

mathematics, information technology, principles of acquisition and contract management, microeconomic theory, management accounting, statistical analysis for management, contract pricing and negotiations, contract law, organization and management, strategy and policy, contract administration, contracting for major systems, and acquisition and contracting policy. Additionally, the 815 curriculum is enhanced with a weekly seminar that brings in working contracting professionals and agency heads to discuss current contracting and program management issues. Seminars also serve in the added role of catalysts for thesis topic development. A master's thesis serves as the capstone of the formal education received by Marine Corps officers at NPS.

Upon successful completion of the 815 curriculum, Marine Corps officers are assigned a secondary MOS of 9656, Contracting Officer, and are DAWIA Level II certified. Table 2.4 provides the locations where USMC contracting officer billets are located.

Title	Grade	Command	Location
Contracting Officer	Major	Policy & Oversight Branch, HQMC	Washington, D.C.
Contracting Officer	Major	Policy & Oversight Branch, HQMC	Washington, D.C.
Regional Contracting Officer	Major	Marine Corps Base Camp Butler	Okinawa, Japan
Regional Contracting Officer	Major	Marine Corps Base Camp Lejune	North Carolina
Regional Contracting Officer	Major	Marine Corps Base Camp Pendleton	California
Regional Contracting Officer	Major	Marine Corps Support Activity	Missouri
Contracting Officer	Major	Marine Corps Systems Command	Virginia
Contracting Officer	Major	Marine Corps Logistics Base	Georgia
Contracting Officer	Major	Advanced Amphibious Assault Vehicle Program Office	Virginia
Regional Contracting Officer	Captain	Marine Corps Base 29 Palms	California
Regional Contracting Officer	Captain	MCRD Paris Island	South Carolina
Regional Contracting Officer	Captain	MCRD San Diego	California
Regional Contracting Officer	Captain	MARFORRES	Louisiana
Contracting Officer	Captain	Blount Island Command	Florida
Contingency Contracting Officer	Captain	1 st FSSG	California
Contingency Contracting Officer	Captain	2 nd FSSG	North Carolina
Contingency Contracting Officer	Captain	3 rd FSSG	Okinawa, Japan
Contracting Officer	Major	I MEF	California
Contracting Officer	Major	II MEF	North Carolina

Table 2.4 List of USMC Officer Contracting Billets

(After Corcoran, 2000)

b. Payback Tour

After graduating from NPS, the Marine Corps officer is obligated to a four-year payback tour. Three of these years are spent in the field contracting structure and the final year is spent back in the Fleet Marine Force (FMF) (MARCORSEPMAN PARS 2003 and 5002). Under the direction of the Marine Corps Installations and Logistics Department, the billets available for contracting officers fall into three general groups (Cocoran, 2000):

- The policy billets, which are located at HQMC, provide guidance and direction on policies;
- The field contracting billets, which are located at the logistics bases, recruit depots and three major Marine Corps Bases (Camp Pendleton, Camp Lejune and Okinawa), that provide all contracting services for their respective mission areas;
- The contingency contracting billets, which are located in the Force Service Support Groups at the three major bases mentioned above, that provide contracting support to forces deployed.

It is important to note at this time that the current organizational design does not provide Marine Corps contracting officer billets at major buying commands: DoN, the Defense Contract Management Agency (DCMA) and other DoD organizations (Cocoran, 2000). At the completion of the payback tour, the contracting officer returns to his primary MOS in the FMF. This seems counter-intuitive given the fact that the contracting officer has been out of his primary MOS for approximately five years and undoubtedly has lost proficiency in his primary MOS. By returning to the FMF, the detailed skills and experience that the officer acquired as a contracting officer will perish with time. In his thesis, Corcoran (2000) has found that approximately 70% of contracting officers will leave the Marine Corps upon completion of their payback tour.

This high turnover rate of contracting officers, coupled with the high percentage of contracting officers leaving the service after their payback tour is depriving the Marine Corps of a corporate contracting knowledge base. This lack of a corporate knowledge base directly impacts the ability of the Marine Corps to perform its mission and underscores the necessity to implement an effective KM system.

4. CONTINGENCY CONTRACTING

a. Introduction

Contingency contracting differs from the normal contracting process in that the CCM is operating independently or is assigned to a joint contracting cell. The contingency environment is often times one that is removed from a traditional support infrastructure (e.g., communications, IT support, transportation). Additionally, common contracting practices are waived or altered depending upon the classification of the contingency and characteristics of the operating environment (e.g., cash only, security posture, NATO regulations). It is imperative that CCMs be capable and highly knowledgeable contracting individuals who can procure bulk materials and supplies locally to support the operation and prevent the waste of scarce lift resources and funding. The Marine Corps Purchasing Procedures Manual (MCPMP), Appendix B states:

The contingency or low intensity operation will most likely occur in areas of the world where little or no Host Nation Support (HNS) agreements exist. Thus, the requirement for contracting/purchasing support becomes a question of accumulating as much data regarding source availability and the location as quickly as possible. The contracting team must accomplish this amassing of available local resources to offset not only the immediate needs of the U.S. Forces (e.g., bulk class III, class IV, shelters, construction materials, miscellaneous supplies, and services) but also establish support relationships with the local authorities that would serve as a basis for firmer commitments if required.

Additionally, as stated in the MCPPM, the mission of Marine Corps contingency contracting is:

- To locate and obtain resources through contracting and purchasing actions which will legally support U.S. Marine Corps mission requirements in a theater of operations.
- To initiate and execute contracting/purchasing actions with local resource activities to provide required and authorized combat support and combat service support.
- To serve as an initial focal point to manage and coordinate available HNS resources obtained to support the deployed forces and to interface HNS plans, resources, and activities within the overall support structure.

Due to the high level of importance that contingency contracting plays in Marine Corps doctrine, the author has chosen this area as the focus of this thesis.

b. Organizational Structure

Marine Corps contingency contracting falls under the Assistant Branch Head for Policy and Oversight, Contracts Division, Installation and Logistics, Head Quarters Marine Corps (HQMC (LBO)). One of the two contracting officers that are assigned to HQMC(LBO) is designated as the USMC Contingency Contracting Officer. Two of the three Marine Expeditionary Forces (MEFs) have a billet for a contingency contracting officer with the rank of Major. These individuals are mostly responsible for planning MEF level deployments and joint operations. (McMillon 2000) The Marine Corps maintains contingency contracting offices within Marine Forces South (MARFORSOUTH) and Marine Forces Europe (MARFOREUR). These billets are filled by senior enlisted personnel and provide local contracting support to their respective headquarters and limited liaison with other Marine Corps units within their region. (McMillon 2000)

The Marine Corps contingency contracting offices are located within the three FSSGs – Camp Lejune, North Carolina; Camp Pendleton, California and Camp Butler, Okinawa. These contingency contracting offices are headed by either a Captain or a Major and rate a T/O of one Gunnery Sergeant, two Staff Sergeants, and five Sergeants. These contingency contracting offices support their respective Marine Expeditionary Units (MEUs) while they are deployed. However, Fleet Service Support Groups (FSSG) differ in their staffing procedures. For instance, 2nd FSSG (Camp Lejune, North Carolina) attach their enlisted and/or officer contracting personnel to the MEUs for the duration of the deployment while the 1st FSSG (Camp Pendleton, California) and 3rd FSSG (Camp Butler, Okinawa) do not. The 1st FSSG and the 3rd FSSG support major exercises like Cobra Gold in Thailand and Tandem Thrust in Australia.

c. Operating Environment

Contingency contracting personnel operate in many diverse and often times, troubled areas of the world. Deployments to the Persian Gulf, Somalia, and more recently Kosovo, highlight the challenges that contingency contracting personnel face in satisfying logistical requirements for the forces they support. These services include everything from acquiring fresh baked bread to twenty-five ton cranes (Arias, Mrak, 2001). This often requires that the contingency contracting personnel go out into the local communities, whether they are in a friendly or hostile environment, to seek out vendors who can deliver the required goods and/or services. What complicates the situation is that contingency operations are most often conducted in an immature environment that lacks the infrastructure that supports communications, Internet access and basic office administrative functions. This immature environment, coupled with the

fact that contingency contracting personnel often operate independently, warrants that the contingency contracting Marine is well equipped to carryout his duties. Additionally, this is the critical time where knowledge is gathered by the Marine as to who the vendors are, what the operating environment is like, what are the security concerns, what services and goods can be procured locally and which ones cannot.

The aforementioned items comprise the first level of knowledge that is generated by the contingency contracting Marine. Effectively utilizing this knowledge is vital not only for the current operation, but also for follow-on personnel who will find themselves in the same area of operations (AO) or be confronted with a like situation in the future. Therefore, the very nature of contingency contracting warrants a KMS that addresses its specialized needs.

C. SUMMARY

Corporations have recognized the advantage of properly managing the knowledge that is possessed by their workforce. By establishing a KMS to capture, maintain and utilize this knowledge, corporations gain a competitive edge over their competition and operate in a more efficient manner. Private corporations utilizing KMS serve as an example to how and why the Marine Corps contingency contracting force needs to implement an effective KMS. The unique operating environments that contingency contractors operate in demand a KMS system that is capable capturing knowledge and establishing a solid corporate knowledge base for the rest of the contingency contracting force.

III. KNOWLEDGE MANAGEMENT IN MARINE CORPS CONTINGENCY CONTRACTING

Chapter III describes the current environment of KM in contingency contracting. It also utilizes the KM design approach of Nissen, Kamel, and Sengupta to analyze the current KM environment and makes recommendations for improvement based on the pathologies associated with these practices.

A. CURRENT KM PRACTICE IN MARINE CORPS CONTINGENCY CONTRACTING

Currently, there is no standard operating procedure (SOP) from HQMC(LBO) that mandates how KM should be conducted, if at all, in the contingency contracting force. Rather, KM is left to the initiative of the individual unit and CCM without any synergistic cooperation between commands. At the organizational level, HQMC(LBO) has established a KM site called K-21. However, K-21 is not used by its intended audience as a KM site and therefore, it is ineffective as such.

At the unit level, individual contingency contracting offices have their own SOPs and practices regarding KM. In general, these contingency contracting offices maintain hard copies of after-action reports (AARs) and copies of previously used contracts in binders. Although all units do have some type of KMS, making contributions to it (e.g., in the form of AARs after each deployment/exercise, lessons learned, vendor lists) and keeping it updated is not a mandated requirement.

The individual level is the place where the most effective means of KM is conducted in contingency contracting. For it is at this level that the CCM acquires the specialized knowledge necessary to function effectively in the operating environment. For example, the CCM generates listings of vendors in the area and what services/goods

they are able to provide. Additionally, the CCM acquires an intimate working knowledge about the environment, financial/funding points of contact, operational requirements, communication and IT infrastructure and capabilities, transportation capabilities, and limitations, and other factors. In short, the CCM becomes a logistical resident expert on the operation.

Over time, CCMs accumulate an impressive amount of knowledge on exercises and the contracting environment in various places around the world. This knowledge is maintained by the individual CCM in the form of journals, Emails, electronic documents, paper copies of vendor lists, and most recently, on handheld Palm Pilot computers. Palm Pilots have provided CCMs with a greater amount of flexibility and capability, in not only executing their duties as contingency contractors, but also in capturing, storing, and sharing the knowledge they acquire. An example of this is provided by the CCMs at Camp Pendleton. Rotating every few months in support of an exercise in Africa, the CCMs were not being afforded much time to conduct a thorough turnover. However, the CCM who rotated back to the States was able to share a large amount of knowledge and information concerning vendor listings, operational requirements, and operational environment simply by beaming the information from his Palm Pilot to the Palm Pilot (via the infra-red port) of his replacement.

Another example of this is found at Camp Lejune where the contingency contracting officer purchased a digital camera. This digital camera was used to great effect in documenting the condition of rental cars acquired from a vendor in Greece. When the time came to return the vehicles, the photographs were used to dispel claims by the vendor as to the original condition of the automobiles.

What makes these examples all the more impressive is that the Palm Pilots and digital cameras were not provided by HQMC as tools for job improvement or KM. Instead, in an effort to better equip their CCMs, contracting offices purchased the equipment themselves. This illustrates two points. First, that the different contracting commands are using their initiative to acquire available commercial off the shelf (COTS) technology to better equip their CCMs. Secondly, there is no organizational support from HQMC in providing the tools or oversight necessary for increased job performance of CCMs and leveraging the knowledge that they are acquiring.

B. KM DESIGN PROCESS

1. Introduction

Due to the current state of KM in Marine Corps contingency contracting, key knowledge is not being retained, shared or generated amongst its practitioners. In this section, the author identifies a target process for analysis through research and applies Nissen, Kamel and Sengupta's KM design process to improve CCM performance.

2. Research

All three contingency contracting offices in the Marine Corps are contacted for their perspectives and input regarding KM. Interviews are conducted in person with CCMs from Camp Pendleton and Camp Lejeune. Personal interviews are also conducted with personnel from HQMC(LBO). Email is used to correspond with the contingency contracting officer in Okinawa, Japan, as it is with all those who were interviewed.

The objectives of the research was to identify the following key points:

- Identify how KM is currently conducted within contingency contracting.

- Identify critical knowledge/information requirements--what is needed by whom and when?
- Identify critical decision processes.
- Identify who possesses knowledge and expertise.
- Identify how knowledge is acquired in contingency contracting.
- Identify how knowledge is shared within contingency contracting.

In conducting research, two themes become prominent: the need for CCMs to have a mastery of the deployed contingency contracting process (DCCP) and a thorough understanding of the working relationships between all interested parties in the contingency environment (e.g., Commanding Officer, end-user, veterinarian, finance personnel, CCM). Marines Corps contingency contracting appears particularly well-suited for KM, because the large amount of tacit experience required of each CCM to perform their duties varies greatly, both over time and throughout the organization. Although formal education is superb for the officers and available to the enlisted CCMs, considerable experience and OJT is required to master the DCCP. As the research shows, the knowledge and experience in contingency contracting resides within a few individuals.

3. Process Analysis

Drawing from the integrated methodology of Nissen, Kamel, and Sengupta (2000), the first step is process analysis. This high-level analysis occurs in two increments. The first increment involves a redesign analysis that is customary in re-engineering engagements. This type of redesign analysis focuses on work-process flows that are called *horizontal processes*, because their representations are usually depicted as directed graphs, with process activities running horizontally across the page. The first increment of this analysis provides guidance for the (re)design process (e.g., to overcome process pathologies). The second increment involves KM aspects of the targeted process. This KM analysis focuses on cross-process flows that are called *vertical processes*. Vertical process representations are also generally depicted as directed graphs and run vertically down the page, across the kinds of work-process flows (e.g., horizontal processes) being examined. (Nissen and Espino 2000) This thesis uses Nissen's measurement-driven redesign knowledge system, KOPeR, which automatically diagnoses process pathologies and recommends redesign transformations (Nissen, Kamel, and Sengupta 2000). Nissen (1998) describes re-engineering in terms of process-redesign activities organized as an evolutionary spiral to denote increasing process knowledge and understanding as the re-engineering activity progresses. This sequence is denoted in Figure 3.1. Step one is to identify a target process for redesign. Next, a model is constructed to represent the baseline (i.e., "as is") configuration of this process, and configuration measurements then drive the diagnosis of process pathologies. The diagnostic results are used in turn to match the appropriate redesign transformations available to "treat" pathologies that are detected. This sequence of analytical activities

leads systematically to the generation of one or more redesign alternatives, which most experts argue should be tested through some mechanism (e.g., simulation) prior to selection of a preferred alternative for implementation. (Nissen, Kamel, and Sengupta 2000)

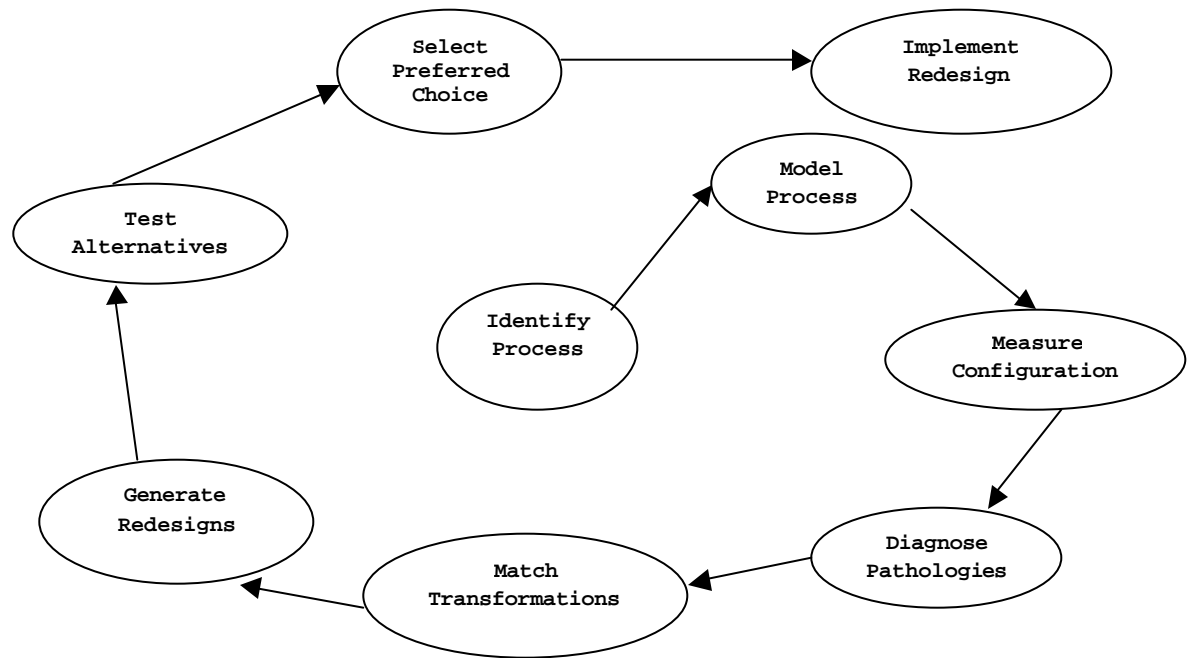


Figure 3.1 General Redesign Process

(After Nissen, Kamel and Sengupta 2000)

The process targeted for redesign in this thesis is the DCCP due to its importance in supporting deployed Marine forces. This process is derived from MCO 4200.15F, Appendix B, Section 4: Duties and Responsibilities. Although this section outlines the duties that are expected of contingency contracting officers, it is used as a model for both officer and enlisted CCMs involved in the DCCP for the purposes of this thesis. The modeled DCCP is depicted in Figure 3.2.

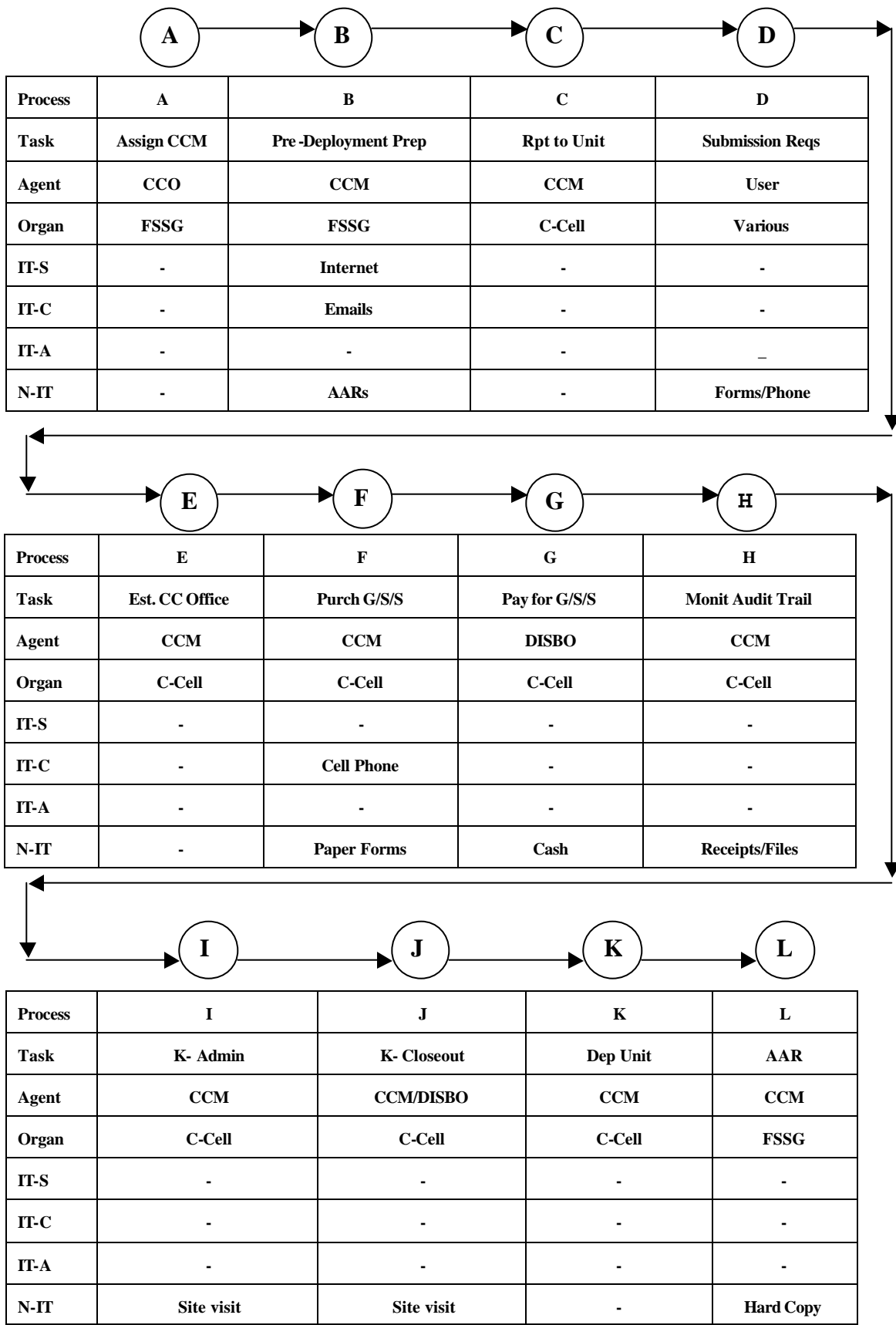


Figure 3.2 Deployed Contingency Contracting Process

In the horizontal process representation, process activities are denoted by nodes in a graph, which are connected by arrows that denote the flow of work through the overall process. Each node contains seven attributes that describe the corresponding work tasks: 1) task name, 2) agent responsible for the task performance, 3) the organization associated with the activity, 4) IT used to support the activity (IT-S), 5) IT used to support communication (IT-C), 6) IT used to automate the activity (IT-A), and 7) non-IT tools and techniques used to perform the activity (N-IT).

The following descriptions are provided to assist the reader in better understanding each of the processes depicted by nodes A through L.

- Node A: Assignment of the CCM. The contingency contracting officer assigns the CCM for the upcoming exercise/deployment.
- Node B: Pre-Deployment Preparation. This responsibility is left largely to the appointed CCM. This entails consulting with CCMs who have participated in the same exercise/deployment in the past and consulting with AARs, Internet sites, etc.
- Node C: Report to Unit. The CCM reports to the command element of the operational unit that he is assigned to. Additionally, the contracting cell (C-Cell) is formed at this stage. The contracting cell is comprised of a disbursing officer (DISBO), a comptroller, a logistics officer, and other CCMs. Usually, the contracting cell will arrive in the AO prior to the arrival of the operating unit to establish the required logistical support infrastructure.
- Node D: Submission Requirements. The CCM, with input from the members of the contracting cell, will determine the policy for the submission of the requirements by the individual units/shops. It is important to note that requests from individual units/shops are “filtered” by the Supply Department (either the S-4 or G-4, depending on scale of operation), logistics officer and comptroller prior to the CCM getting the request.
- Node E: Establishment of the Contingency Contracting Office. The CCM is responsible for establishing a contracting office out of which the contracting cell will operate. This entails installing phone lines, Internet access, furniture, etc.
- Node F: Purchasing of Goods/Supplies/Services (G/S/S). The CCM is responsible for the purchase of the g/s/s that are required by the operational unit.

- Node G: Paying for G/S/S. The DISBO is responsible for ensuring that all g/s/s purchased by the CCM are paid for in a timely manner.
- Node H: Monitoring Audit Trail. Maintaining accurate records of contractual actions, along with any rationale why a particular action was chosen.
- Node I: Contract Administration (K-Admin). This activity is conducted on a daily basis by the CCM and encompasses everything from contacting potential vendors to following up with units to ensure that they are receiving the support that they require.
- Node J: Contract Closeout (K-Closeout). The CCM is responsible for ensuring that all contractual actions are closed out prior to his departure from the operation (this usually means staying a few weeks after the main body has departed). The DISBO is responsible for ensuring that all vendors have been paid prior to contract closeout.
- Node K: Depart Unit. After all contracts have been closed out, the CCM disbands the contracting cell and all members return to their parent commands.
- Node L: After Action Report (AAR). Once the CCM returns to the FSSG, he generates an AAR. This AAR is usually kept at the FSSG contingency contracting office.

As one can see in Figure 3.2, “Assignment of the CCM” requires no IT for scheduling (IT-S), communication (IT-C) or automation (IT-A). Finally, no non-IT (N-IT) support is associated with this activity. This process continues through the other activity nodes depicted in Figure 3.2 and concludes with filing an AAR when the CCM reports back to the FSSG (node L).

The modeled deployed contingency contracting process in Figure 3.2 supports the type of process analysis typically associated with process engineering. It is here that one would try to understand and redesign the process. However, by employing the KOPeR system (see Nissen 1998), diagnostic measurements from the process are obtained to support a more effective redesign of the process. Table 3.1 shows the input measurements submitted for the current DCCP.

Input Measure	Value
Process Size	12
Process Length	12
Handoffs	7
Feedback loops	0
IT-S	1
IT-C	2
IT-A	0
N-IT	8

Table 3.1 Process Input Measurements

After entering these process measurements into KOPeR, the following diagnosis is presented, Table 3.2.

Configuration Measure	Value	Diagnosis
Parallelism	1.0	Sequential process
Handoffs fraction	0.583	Process friction
Feedback fraction	0.0	Feedback looks O.K.
IT support fraction	0.083	Inadequate IT support
IT communication fraction	0.167	Inadequate IT communications
IT automation fraction	0.0	IT automation first requires substantial infrastructure in terms of support and communications

Table 3.2 KOPeR Diagnosis

Multiple pathologies associated with the targeted process have been identified. The diagnosis reveals that the DCCP is a sequential process that suffers from process friction. However, the lack of feedback in the DCCP does not negatively impact the overall process. Most noticeably, the DCCP has a major shortcoming in the area of IT

support. The IT-S fraction indicates that the DCCP lacks adequate IT support. The IT-C fraction shows an inadequate amount of IT communication to support the process. And finally, the IT-A fraction illustrates that not only does the DCCP suffer from a lack of IT-automation, but also it is in need of a substantial investment of support and communication infrastructure. In chapter IV, the author continues the redesign process and generates redesign alternatives to treat the pathologies associated with the DCCP; Thus, improving the DCCP.

4. Knowledge Management Analysis

In support of the integrated knowledge process and system design, the horizontal process above is elongated to reflect its performance through time and between various CCMs. This elongated process depiction augments the horizontal process graph presented in Figure 3.2 and also includes a vertical process that flows across various work process flows. This cross perspective facilitates process design in terms of KM and is illustrated in Figure 3.3.

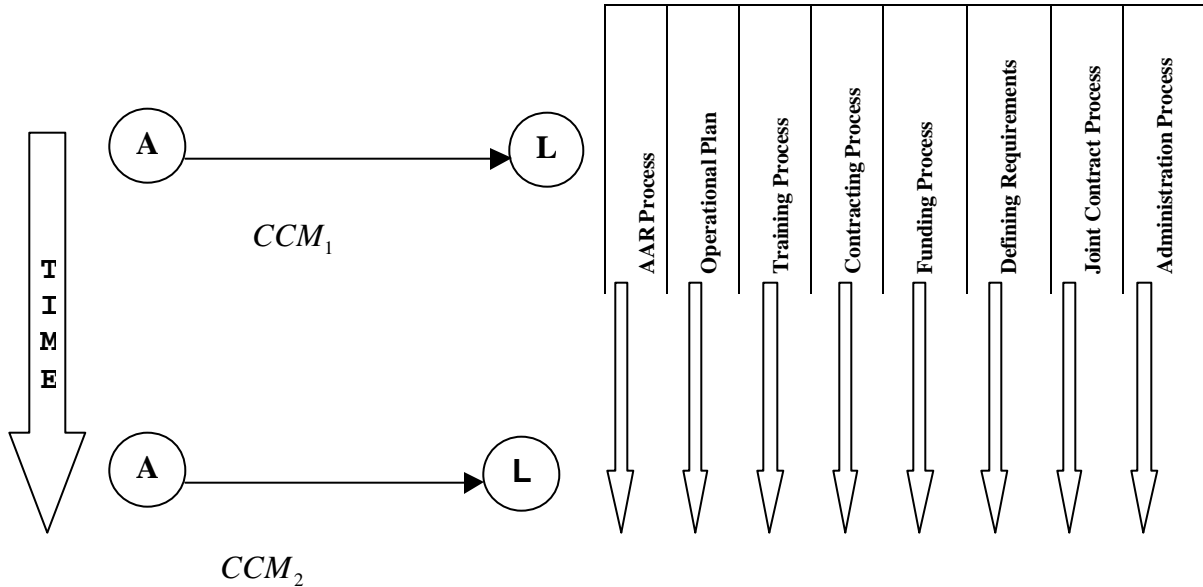


Figure 3.3 Deployed Contingency Contracting Vertical Processes

Figure 3.3 depicts the basic DCCP flow (e.g., activity nodes connected by directed arrows) for two instantiations of the process. In the first instantiation, marked CCM_1 , a particular CCM would perform each of the process activities (nodes A through L) at a particular point in time. At a later point in time, another CCM (depicted by CCM_2) would perform each of the process activities. Since CCM_1 and CCM_2 are two different individuals, the level of experience and proficiency will be different. A principle concern of KM addresses the consistency and efficacy across the horizontal process instantiations. For example, if CCM_2 lacks the level of expertise and know how that CCM_1 possesses, the desired result is to ensure that the process performance of CCM_2 is comparable to CCM_1 in terms of execution and results. Whereas work-process flows pertain to the performance of work in the enterprise, cross-process flows pertain to the process of KM itself. The cross-process analysis represents a marked departure from traditional re-engineering analysis where only the CCM work process

would be analyzed and redesigned (Nissen and Espino, 2000). Listed in Figure 3.3 are the cross-process flows associated with the deployed contingency contracting process. These vertical processes were identified through the research and by interviews with CCMs as being the requisite knowledge to conduct contingency contracting.

The second step involves knowledge analysis. Integrated knowledge process and system design requires a focus on vertical processes as well as on the horizontal work process counterparts (Nissen and Espino, 2000). Although all processes depicted in the horizontal graph of the DCCP are recognized as being important, the research found a high level of interest in Nodes D (Submission Requirements), G (Paying for Goods/Supplies/Services), and I (Contract Administration) as key requirements to successfully carrying out the deployed contingency contracting process. The following list of critical success factors (CFSs) has been determined by analyzing the DCCP:

- Mission Support
- Requirements Determination
- Maintaining Accurate Records
- Paying Vendors in a Timely Manner
- Knowledge of Contracting Procedures

Achievement of each of these CFSs and the success of the deployed contingency contracting process is directly proportional to the success in performing tasks D, G, and I. Accordingly, these tasks require a high level of experience and training. This in turn targets these activities as important in terms of KM and helps focus the analysis in terms of integrated process system design. Tables 3.4, 3.5, and 3.6 summarize the knowledge

required to successfully achieve the named processes and how such knowledge is currently acquired.

Knowledge Required	How Knowledge is Acquired
Identify User	<ul style="list-style-type: none"> • Con 234 • OJT
Description of Requirement	<ul style="list-style-type: none"> • OJT
Process Requirement	<ul style="list-style-type: none"> • OJT • Con 234 • <u>Formal Training</u>
Developing Policy for Requirement Submissions	<ul style="list-style-type: none"> • OJT
Working Relationship between Comptroller and DISBO	<ul style="list-style-type: none"> • OJT

Table 3.3 Knowledge Analysis of Submission Requirements

Knowledge Required	How Knowledge is Acquired
Identifying Funding Source	<ul style="list-style-type: none"> • Con 234 • OJT
Identifying Paying Agent	<ul style="list-style-type: none"> • U.S. Embassy • State Department • OJT
Knowing Which laws/regulations apply	<ul style="list-style-type: none"> • Con 234 • OJT
ID Method of Payment	<ul style="list-style-type: none"> • U.S. Embassy • State Department • OJT
Security Posture	<ul style="list-style-type: none"> • Intelligence Section (S-2/G-2) • U.S. Embassy • OJT

Table 3.4 Knowledge Analysis of Paying for Goods/Supplies/Services

Knowledge Required	How Knowledge is Acquired
Market Survey	<ul style="list-style-type: none"> • Con 234 • Formal Schooling • OJT
Solicitation Process	<ul style="list-style-type: none"> • Con 234 • Formal Schooling • OJT
Award of Contract	<ul style="list-style-type: none"> • Con 234 • Formal Schooling • OJT
Monitoring of Vendors	<ul style="list-style-type: none"> • Con 234 • Formal Schooling • OJT

Table 3.5 Knowledge Analysis of Contract Administration Process

It is important to note that much of this knowledge acquisition is directly related to the vertical processes already mentioned. For example, CCMs must possess a certain level of formal training before they can participate in a contingency contracting environment. These formal courses, such as the DAU’s CON 234—Contingency Contracting Course—provides the CCM with a basic understanding of the contracting policies and methods employed for contingency operations. Unlike enlisted CCMs, officers must be DAWIA Level II certified before being assigned as a contracting officer for the Marine Corps (this level of certification is obtained at NPS). Although formal training does provide the CCM with a basic knowledge of the processes associated with Nodes D, G and I, it does not guarantee the successful completion of these processes.

Formal training provides the CCM with explicit knowledge. This knowledge is canonical and is easily found in books and manuals. In fact, a quick look on the Internet will provide the CCM with many of the laws and regulations needed. Formal training

also provides the CCM with an awareness of other types of knowledge that are required to successfully complete processes D, G and I. However, the knowledge requirements are heavily dependent on tacit knowledge and are far more difficult to encapsulate and transfer between CCMs. This type of tacit knowledge development occurs predominantly through OJT.

5. Contextual Analysis

The third step involves contextual analysis. In Marine Corps contingency contracting, explicit knowledge is readily available to the CCM in various media. However, the Marine Corps falls short in the area of codifying the tacit knowledge that is required to perform the DCCP. The reason for this lies in the fact that there is no formalized process to capture, create or distribute its tacit knowledge. The majority of tacit knowledge is gained through OJT.

A major problem that the contingency contracting force encounters in regards to maintaining and managing its knowledge is the lack of a career path for its contracting officers. Contracting officers serve in their contracting billets for a period of only three years. Just when the officer's level of expertise and confidence solidifies, he or she rotates back to the primary MOS in the FMF. This is a severe blow to the capabilities of the contingency contracting force and its ability to successfully retain its knowledge. The shortage of enlisted CCMs makes it difficult to maintain a broad base of expertise in the contingency contracting force. Coupled with their responsibilities that are commensurate with their ranks (e.g., drill instructor duty, recruiting duty, career level school), enlisted CCMs are not able to maintain a solid knowledge base.

Another obstacle is the lack of incentives for maintaining a KMS. As Nissen and Espino (2000) point out, a major challenge in maximizing such a system's capabilities would be in developing the right mix of incentives for the users of the system to provide useful and timely input. Currently, no incentives exist for CCMs to contribute their knowledge to a KMS. Hence, KM suffers as a result.

Success for a CCM in carrying out processes D, G, and I is highly dependent upon the experience of the individual CCM. The operating environment for CCMs can vary greatly, and a CCM may find himself operating in a joint contracting cell or operating independently in a hostile environment. It is crucial that the CCM possess the knowledge and expertise to think and make decisions on their own.

Finally, the Marine Corps does not provide training exercises for its CCMs. Scenario-driven exercises could be developed that would simulate the conditions of a realistic contingency operating environment for CCMs. These exercises would go a long way in expanding the knowledge base of the contingency contracting force. Current practices, however, limit the acquisition of experience to actual contingencies and operations.

6. System Design

The fourth step involves system design. Information technology is an enabler used to implement a KM system. However, organizations must make the commitment and invest seriously in IT in order to take advantage of the benefits that can be provided (Nissen and Espino, 2000). As indicated by the KOPeR diagnosis, little IT is used to support the DCCP. A thorough process (re)design, along with a detailed knowledge and

contextual analysis, is necessary before implementing IT applications at this stage of the analysis.

For example, take the process associated with AARs. This process can be a useful tool in providing CCMs with the knowledge they need to be successful in a contingency environment. A KM system that utilizes various data-mining technologies, search and retrieval tools, and video files (e.g., containing taped AARs) could be used by CCMs to capture the explicit and tacit knowledge that they need.

Furthermore, with respect to the defining requirements process, a KM system could be developed that would have a database of the various requirements that CCMs have acquired in the past (e.g., cranes, heavy equipment, air ports, fuel). This system can make storing, organizing, and retrieving these requirements much easier and save the CCM a considerable amount of time in the acquisition of these needed items. Moreover, this system could be made available to the user and other key personnel who have an impact on the requirements process to assist them in accurately describing what they need. Utilizing the notion that a picture is worth a thousand words, electronic photographs of the requested item(s) would be attached to the requirements description. This would enable the user to get “eyes-on” the item being requested and ensure that it is indeed the item that is needed.

7. Chapter Summary

The Marine Corps contingency contracting force plays an important role in supporting deployed Marine forces during exercises and contingencies. Therefore, the deployed contingency contracting process (DCCP) is selected as the targeted process for redesign. Although formal knowledge is available through schooling and various

canonical media, there is no formal system in place that captures and utilizes the tacit knowledge that is generated by CCMs. In order for there to be an effective means of capturing, storing, accessing, and sharing this tacit knowledge between CCMs, a KBS that addresses the pathologies identified by KOPeR needs to be implemented.

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IV. INNOVATING KNOWLEDGE MANAGEMENT IN MARINE CORPS CONTINGENCY CONTRACTING

Chapter IV continues the redesign process by applying knowledge management to the deployed contingency contracting process (DCCP). This redesign includes identifying process transformations, generating redesign alternatives, and selecting a redesign alternative to improve the DCCP. Chapter IV also addresses a migration strategy for the implementation of the selected redesign alternative.

A. PROCESS DESIGN

Davenport and Prusak (1998) state: “Technology’s most valuable role in knowledge management is extending the reach and enhancing the speed of knowledge transfer. Information technology enables the knowledge of an individual or group to be extracted and structured, and then used by other members of the organization....”

By utilizing IT, organizations can more effectively capture, retain, and share their knowledge with its members. IT capitalizes on the strength of those who possess the most skills and know-how and enrich the organization by making it available to all. In this sense, IT acts as the catalyst for further knowledge generation.

In this section, the author continues the redesign process by discussing process transformation and redesign alternatives for the DCCP. These redesign alternatives are in-turn analyzed by KOPeR and the most promising alternative is chosen for implementation.

1. Match Transformations

Redesign transformations are mechanisms used to treat the process pathologies identified by the KOPeR analysis. Table 4.1 presents pathologies identified by KOPeR and their associated redesign transformations. These transformations are not mutually exclusive. The following transformation definitions are provided below.

Pathology	Transformations
Sequential process flows	De-linearize
Checking & complexity	Asynchronous reviews or empowerment
Process friction	Case manager or case team
Manual process	Integrated databases or workflow
Paper-based process	E-mail or workflow
Labor-intensive process	Expert systems or intelligent agents

Table 4.1 Redesign Transformations

(After Nissen, Kamel, and Sengupta 2000)

De-linearization involves rearranging a sequence of process activities to be performed in a more parallel or concurrent manner and is used to treat sequential process flows. While this redesign transformation affects the sequence and flow of process activities, it does not affect either by whom or how the process is performed. Asynchronous reviews involve conducting reviews in parallel, while empowerment involves delegating responsibility to front-line employees and authorizing the people doing process work to ensure the quality of their work. Empowerment entails some job

enlargement. Case manager entails replacing specialized employees in a process with a generalist case manager or integrated team that performs all process activities from start to finish. Integrated databases and workflow enriches the last three transformations (e.g., manual process, paper-based process, and labor-intensive process) that involve the use of IT solutions to support process activities. These computer-based tools can augment human performance (e.g., memory, speed, thoroughness) and increase overall efficiency and process performance.

The KOPeR “as-is” analysis of the current DCCP, repeated in Figure 4.1 for reference, indicates a severe lack of IT infrastructure. In phases D through L, IT is not used to capture, store or exchange tacit knowledge that is critical to the DCCP. This immature KM environment highlights the fact that the knowledge and expertise of the DCCP resides within a few key individuals and is not readily accessible throughout the organization or to other CCMs. The lack of IT to capture DCCP tacit knowledge is punctuated by the high turnover rates of the contingency contracting officers and the small number of enlisted CCMs. For these reasons, the author focuses on IT to enhance the DCCP.

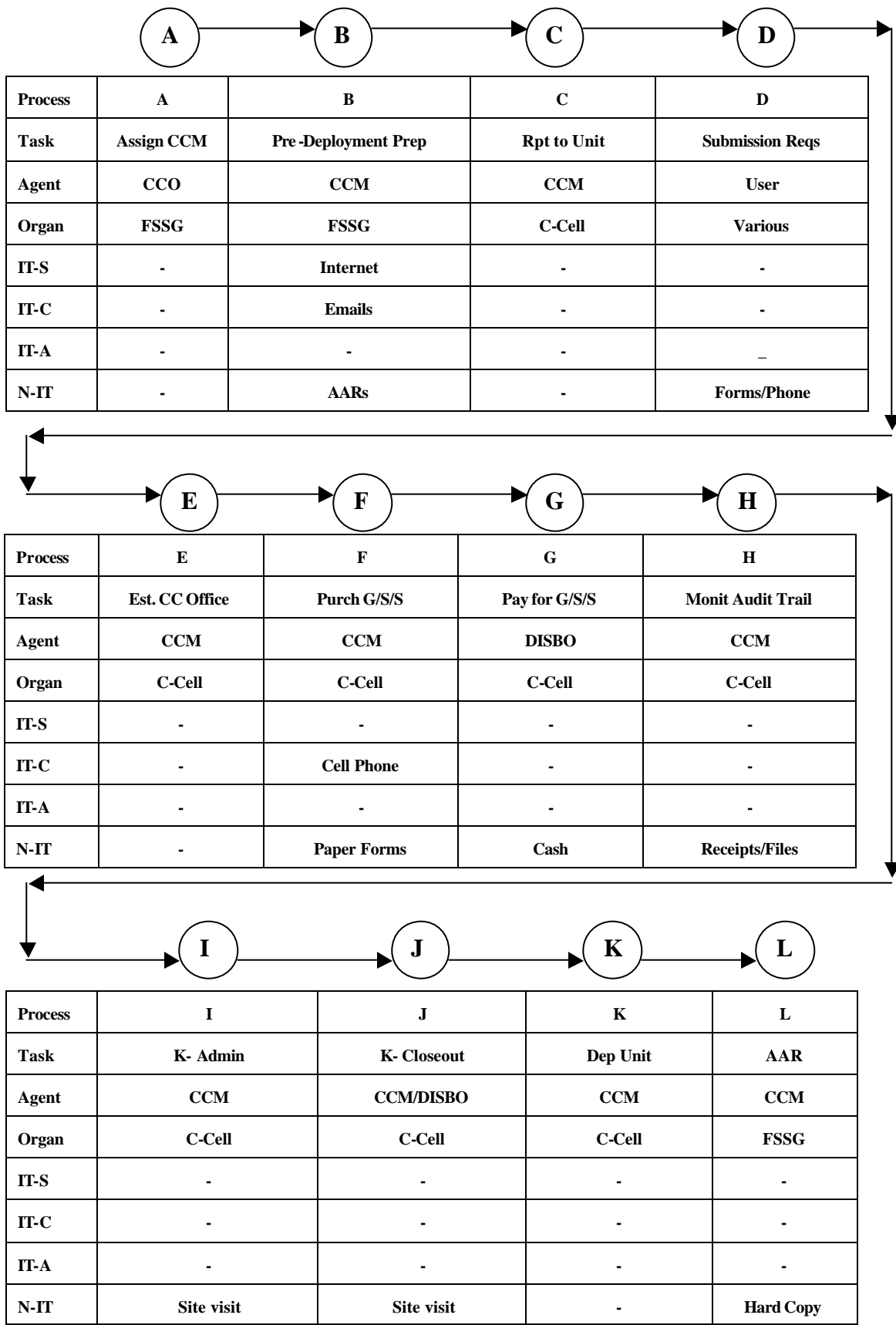


Figure 4.1 Deployed Contingency Contracting Process

There is a number of IT solutions in use today that are used for KM (e.g., E-mail, knowledge inventory systems, knowledge navigation tools). Some of these programs require that the user be highly knowledgeable of its use while other programs are geared towards the less informed user. Figure 4.2 illustrates the dimensions of these IT programs. Due to their characteristics and strengths, knowledge repositories and knowledge-based systems (KBS) are investigated as possible solutions to improve the IT aspects of the DCCP.

Knowledge repositories serve as a vehicle that brings people together so that they can share and refine their expertise (Liebowitz 1999). These knowledge repositories come in the form of Web and GroupWare and require that the user be knowledgeable in the subject because they will have to search for the knowledge that they require. KBS helps to provide knowledge dissemination by automated means. Examples of KBS include expert systems and intelligent agents. These IT solutions do not require that the user be knowledgeable in the subject area. However, the time required to find the necessary knowledge is increased.

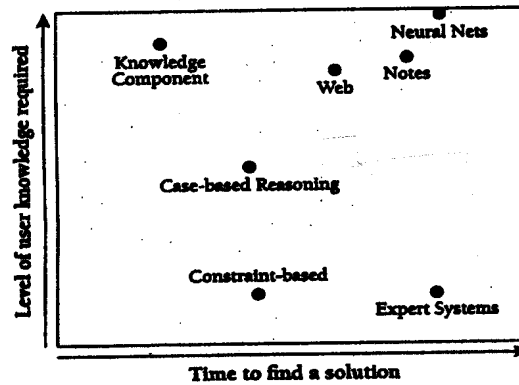


Figure 4.2 Key Dimensions of Knowledge Management Tools

(From: Davenport and Prusak, 1998)

Both knowledge repositories and KBS have the ability to capture and retain tacit knowledge before it is degraded or lost totally by attrition and high turnover rates. Additionally, each effectively shares common knowledge stored in a knowledge base and makes it available to other users. For these reasons, they both offer a strong potential for addressing the pathologies that were noted by KOPeR.

2. Generate Redesign Alternatives

The Marine Corps does not provide its CCMs with a training environment that is conducive to building a solid tacit knowledge base. Instead, the tacit knowledge that CCMs acquire comes from OJT and operational experience. This operational experience is not being retained in a shared knowledge base within the contingency contracting force. Although the contingency contracting force operates in different areas around the world, the tacit knowledge gained in one operation is also applicable to other operations. However, this knowledge is not easily transferable between CCMs or commands. This perishable knowledge lasts only as long as the CCMs who generated the knowledge are

around. Once they leave, their valuable expertise leaves with them. The process redesign addresses two types of IT solutions: knowledge repositories and KBS.

a. Knowledge Repositories

The thrust of knowledge repositories is to take the knowledge that is embodied in documents—memos, reports, presentations, articles, and so forth—and put it into a repository where it can be easily stored and retrieved (Davenport and Prusak 1998). Davenport and Prusak have identified the following three basic types of knowledge repositories:

- External knowledge (e.g., competitive intelligence).
- Structured internal knowledge (e.g., research reports, production oriented marketing materials and methods).
- Informal internal knowledge (e.g., discussion databases full of know-how, sometimes referred to as “lessons learned”).

The knowledge that is required for CCMs to operate efficiently is largely tacit in nature. This tacit knowledge is usually passed on via informal methods, such as through war stories within the community of practice and the socialization of newcomers to organizational practices and methods. Although GroupWare is not currently utilized by the contingency contracting community to pass on this tacit knowledge, it is well suited for this common means of tacit knowledge transmission.

GroupWare is software that is designed to help teams work together in an electronic environment. It offers the means to organize various types of information into organizational knowledge and allows access to company-wide information at any time, at any place and in whatever form (Srikantaiah and Koenig 2000). The strength of

GroupWare lies in the fact that it enables the functioning and survival of an organization long after the original purveyors have departed. Applegate et al., (1998) state:

Information systems will maintain the corporate history, experience and expertise that long-term employees now hold. The information systems themselves—not the people—can become the stable structure of the organization. People will be free to come and go, but the value of their experience will be incorporated in the systems that help them and their successors run the business.

One possible GroupWare application that could be used in the contingency contracting environment is the commercially available Lotus Notes. Lotus is a leading management tool for knowledge repositories (both structured and informal) that permits the capture and exchange of both explicit and tacit knowledge. The following highlight the strengths of the program:

- Database management
- Discussion-group creation and management
- Replication of databases for remote disconnected use in the field
- Ability to integrate web and desktop applications

As previously mentioned, the contingency contracting force does not currently employ any groupware applications for KM. However, with the introduction of the Navy-Marine Corps Intranet (NMCI), there exists a viable opportunity to implement Lotus Notes (or a comparable program) for the contingency contracting force.

The implementation of Lotus technology would be the first step in creating a KM infrastructure for the Marine Corps contingency contracting force. This technology has already proven itself in the Pacific Fleet's KM efforts of its complicated Battle Group Theater Transition Process (BGTTP) (Oxedine 2000). Figure 4.3 illustrates the redesign

process with GroupWare technology. Since GroupWare facilitates electronic communication between users, it is annotated as an IT-communication tool (IT-C). By using Groupware, CCMs will be able to share their knowledge with other CCMs and explain the particulars of their operating environment and the rationale for their decisions. Additionally, CCMs will be able to communicate more effectively with other key players and organizations (e.g., vendors with Internet access, funding sources, commands) that have a stake in the contingency contracting process. This will facilitate a more streamlined means of conducting business in an environment that will support this type of communication. Afterwards, both explicit and tacit knowledge from these exchanges will be stored in a repository that can be accessed by users of the organization at a later date.

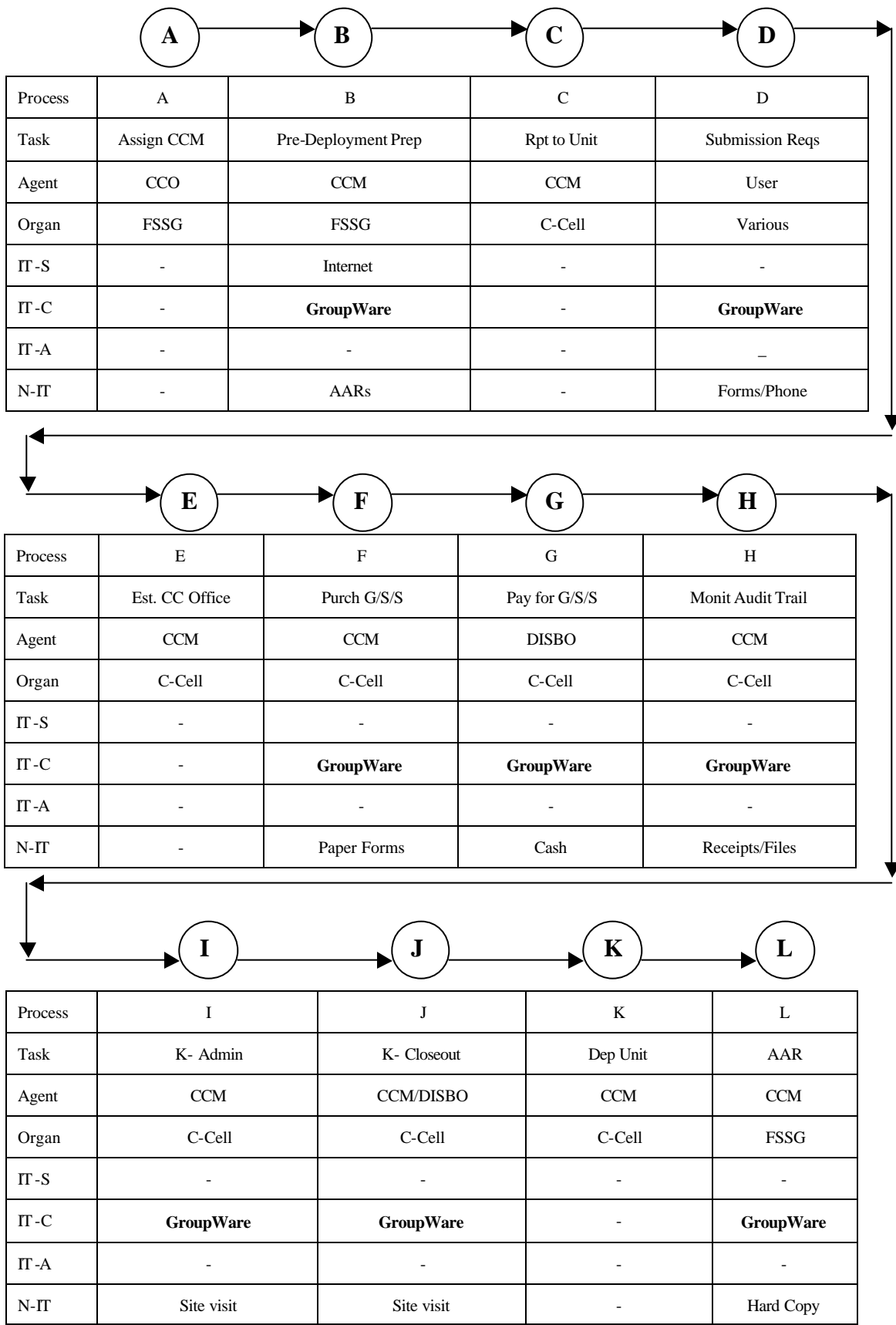


Figure 4.3 Design Alternative One—GroupWare

b. Knowledge-based Systems (KBS)

While capturing knowledge is the goal of knowledge repositories (e.g., GroupWare), KBS is designed to share and distribute knowledge. Although Davenport (1995) states: "...successful knowledge transfer involves neither computers nor documents but rather interactions between people," IT provides a powerful vehicle by which users can access information and knowledge to assist them in the decision making process. KBS share and distribute knowledge by using a knowledge base and inferencing capability. KBS search a knowledge base for relevant facts and patterns. When this has been done, one or several solutions to the problem are then identified. KBS are best suited for sharing and distributing knowledge. For the DCCP, two types of KBS will be investigated—expert systems and intelligent agents.

Liebowitz (1999) rightfully points out that no one can be trained in all areas that impact the decision making process. Likewise, people do not have the time to learn a new subject area when they need an answer to a specific question. Expert systems aim to capture a portion of an expert's decision-making knowledge, codify it in user-friendly terms, and allow for its effective dissemination to users. The strength of the expert system lies with its inferencing capability. This capability can be used to assist the CCM throughout the DCCP by providing him with expertise to make better-informed decisions.

The employment of an expert system in the DCCP would enhance the capabilities of the relatively new, less experienced CCM, and provide wise counsel to the seasoned CCM regarding contingency contracting issues. Codified tacit and explicit knowledge regarding contracting issues (e.g., requirement definition, payment method, contract type) would be available to the CCM via a search function. This would provide the CCM with

the targeted knowledge required for each stage of the DCCP and ensure that critical areas of concern are dealt with in a smart manner. The expert system would also decrease the amount of time and effort that is required of the CCM for conducting analysis and searching for required information. This in turn would allow the CCM to devote his efforts to more pressing issues. Actions taken by the CCM would be stored by the expert system along with any pertinent knowledge developed by the CCM. This knowledge would be codified and available to future users.

Figure 4.4 illustrates the redesign process incorporating an expert system. Expert systems improve the IT-Support (IT-S) function by integrating, analyzing, and evaluating the data used in the DCCP. Additionally, IT-C is improved because it acts as an interface to provide the user with a solution.

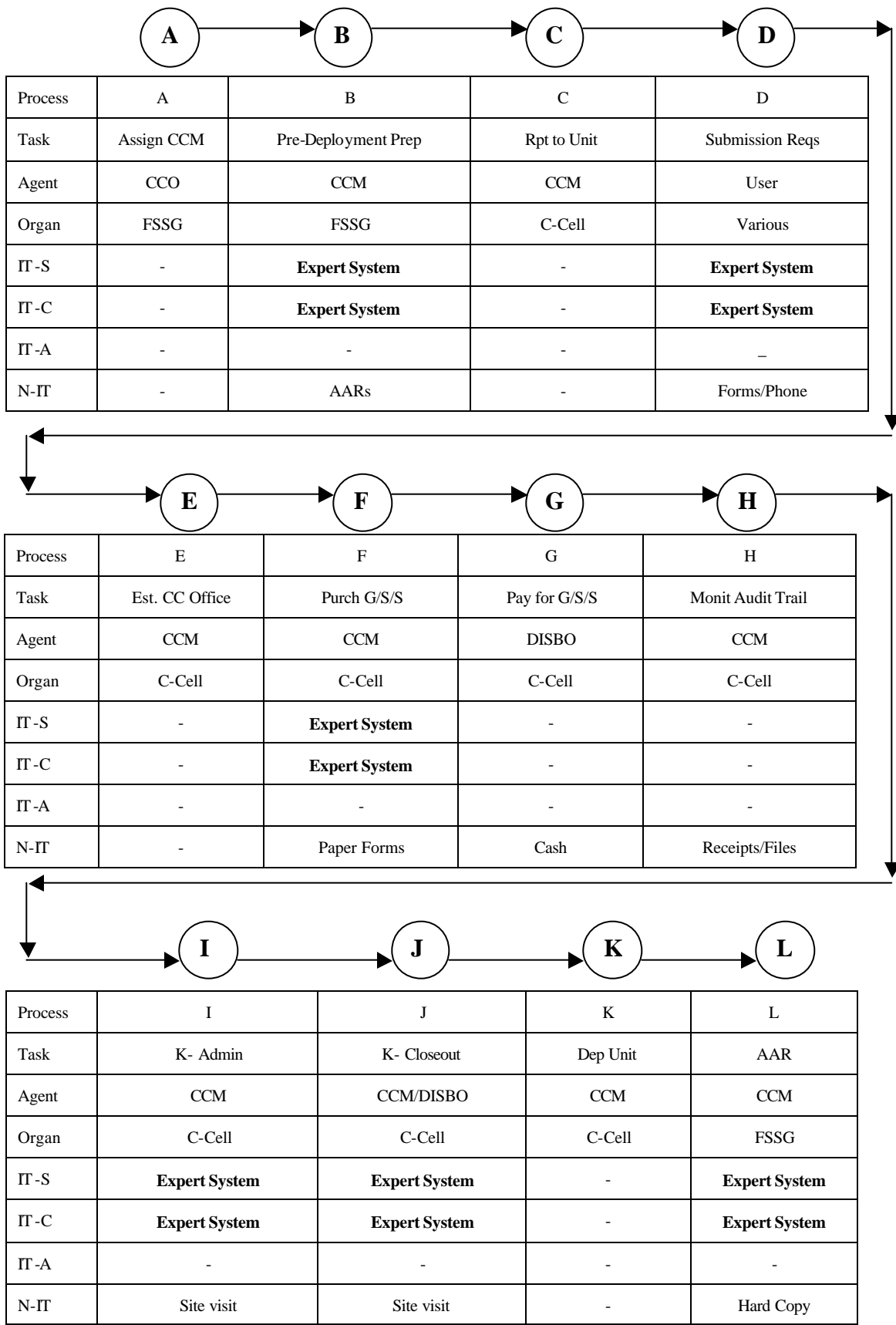


Figure 4.4 Design Alternative Two—Expert System

Maes (1994), defines an intelligent agent as a “computational systems that inhabit some complex dynamic environment, sense and act autonomously in this environment, and by doing so realize a set of goals or tasks for which they are designed.” Foner (1994), succinctly defines intelligent agents as “...systems that collaborate with the users to improve the accomplishment of the user’s tasks.” An intelligent agent, like an expert system, requires that information be codified and stored within its program. Unlike an expert system, an intelligent agent uses its knowledge, rationale, and experience to increase its efficiency at conducting a process. Additionally, an intelligent agent automates the process by integrating, analyzing, evaluating, and interpreting the data itself.

An intelligent agent would automate the majority of the DCCP, from the moment a user submits a request to contract closeout. Linking the DCCP electronically, the intelligent agent would expedite submissions, approvals, contract administration functions, etc. Drawing from its evolving knowledge and experience base, the intelligent agent will continually improve upon the effectiveness and efficiency of the DCCP by providing decisions based on updated knowledge and applying it to the current operational environment. Like the expert system, the intelligent agent would decrease the time and effort that the CCM has to devote to tedious and mundane tasks and allow the CCM to focus his efforts on more pressing concerns. Utilizing an intelligent agent will streamline the DCCP process and allow the CCM to serve in an oversight capacity. If a problem arises with a particular request, then the intelligent agent will identify the problem and notify the CCM who subsequently will deal with it. If no problem occurs with the procurement of the requirement, then minimal involvement by the CCM will be

required to ensure that the requested items are delivered and the vendors are paid in a timely manner.

Use of an intelligent agent benefits the IT-Automation (IT-A) of the process as well as the IT-C since it communicates its recommendations to the user. Figure 4.5 depicts the integration of an intelligent agent in the DCCP.

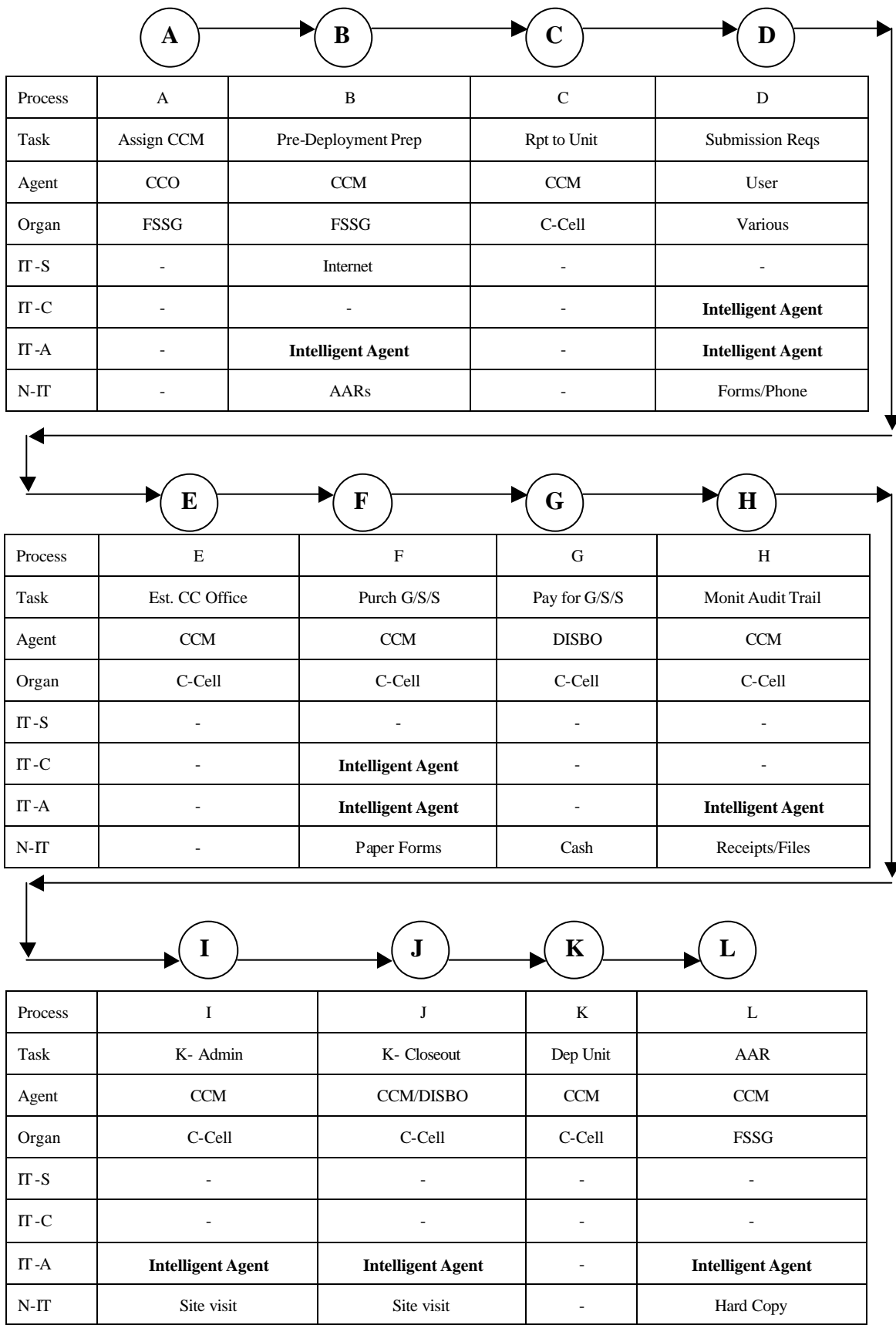


Figure 4.5 Design Alternative Three—Intelligent Agent

3. Test Alternatives

The three alternative redesign transformations proposed are now analyzed utilizing KOPeR. The results from this analysis are compared to the “as-is” DCCP to determine how well the redesign transformations treat the identified pathologies of the current practice. Table 4.2 highlights the comparative findings.

Input Measure	Current Process	GroupWare	Expert System	Intelligent Agent
Process Size	12	12	12	12
Process Length	12	12	12	12
Handoffs	7	7	7	7
Feedback loops	0	0	0	0
IT-S	1	1	6	1
IT-C	2	8	6	2
IT-A	0	0	0	7
N-IT	8	8	8	8
Parallelism	1.0	1.0	1.0	1.0
Handoffs Fraction	0.583	0.583	0.583	0.583
Feedback Fraction	0.0	0.0	0.0	0.0
IT Support Fraction	0.083	0.083	0.5	0.083
IT Communication Fraction	0.167	0.667	0.5	0.167
IT Automation Fraction	0.0	0.0	0.0	0.583

Table 4.2 KOPeR Comparative Measurements

In Table 4.2 the comparative measures that vary across the redesigns are highlighted in bold. This promotes clarity and focuses the reader's attention on the differences between the process designs. The fractions for parallelism, handoffs, and feedback do not change due to the focus on providing an IT solution to the DCCP. Several interesting results can be interpreted from the comparative measures. First, the IT-C fraction improves with the implementation of GroupWare. But the IT-S and IT-A remain unchanged. Secondly, implementation of an expert system would improve the IT-S and IT-C fraction to an acceptable level while leaving the IT-A fraction unchanged. Finally, the use of an intelligent agent would show the greatest improvement in IT-A over any of the fractions associated with the implementation of GroupWare and expert systems. However, the IT-S and IT-C fractions would remain unchanged from the current "as-is" process.

4. Select Solution

The next step in the redesign process is to select a solution that would improve the performance of the DCCP. Given the current lack of KM in the Marine Corps contracting environment and the lack of IT infrastructure, a two-phased solution is proposed by the author. This solution entails a short and long term implementation process that would lay the foundational base of an IT system that could be improved upon in the future.

In the short term--phase one, the Marine Corps needs to capitalize on the strengths of the NMCI. The NMCI is being established to provide a more effective means of communication and business transactions between commands within the

Department of the Navy (DoN). Herein lies the IT infrastructure that would be required to make KM a reality within the Marine Corps contingency contracting force. With the NMCI, a GroupWare application could be implemented with relative ease. Owing to its strengths of encouraging communication between individuals and organizations regardless of their geographic location, GroupWare is best suited to get the KM ball rolling in contingency contracting. Employing GroupWare technology will serve as an instrument to facilitate the exchange of tacit knowledge. Although GroupWare does not treat the IT-S pathology of the current DCCP, it does establish a rich knowledge exchange medium (e.g., the velocity and the viscosity of communication), which currently does not exist in the Marine Corps contingency contracting environment. Additionally, utilization of a GroupWare program will create a level of trust and confidence with the incorporation of IT into the DCCP and between users.

As good as a GroupWare application may be for the short term, it does not guaranty that knowledge will be transferred within the organization or amongst users. GroupWare relies on personnel to share and contribute to the knowledge base. Additionally, GroupWare requires that the user know what knowledge he is looking for and where to find it. Knowledge in a GroupWare program is predominately in text form and indexed by keywords. This represents an elementary level of knowledge management that can make extracting knowledge difficult. At the organizational level, if there is no support and a lack of incentives to share knowledge and make it a priority, than the KM initiative will fail.

For the long term--phase two, the Marine Corps needs to invest in an expert system that would assist the contingency contracting force. This would be an

improvement upon the implementation of a GroupWare program, which requires a high level of understanding on the subject area and time to search the knowledge repository. Over time however, a significant knowledge base would be created by the GroupWare application. This knowledge would then in turn be used to construct an expert system that would cater to the needs of the contingency contracting force. This is important due to the fact that the knowledge stored in the repository defines the knowledge that is pertinent to the organization. Implementing an expert system will allow the user to navigate through the knowledge base to find current key knowledge, then extract and use it to support the DCCP. An expert system will ensure that key knowledge is captured, stored, and shared throughout the organization and amongst key players.

Unlike the GroupWare application that requires a fair amount of knowledge on the part of the user, an expert system does not require the user to be highly knowledgeable to use. Expert systems are characterized by heuristics, or rules of thumb, that specify a set of actions to be performed for a given situation. This is accomplished by the utilization of an inference engine, which automatically matches codified expert knowledge that is in the form of facts, against patterns to determine which rules are applicable to the situation. This inference capability of the expert system can greatly assist the CCM in conducting the DCCP. Using Process D, Submission Requirements, of the DCCP as an example, the CCM could enter a description of the required item and any variables that may affect the final item selected (e.g., size, weight capacity). The expert system will in turn match the description entered by the CCM against patterns of similar requests processed in the past to select the best item for the request. The expert system

will present this selection as a recommendation to the CCM who can either accept it or decline it.

Intelligent agents represent a more mature and advanced means of KM. These programs execute tasks on behalf of a business process, computer application, or an individual. The strength of the intelligent agent lies in the fact that it uses codified knowledge, rationale, and experience to increase its efficiency at conducting a process. This would provide the CCM with a vast amount of expertise in conducting the DCCP. For example, in process I, Contract Administration, the intelligent agent would automate the entire administrative process for the CCM. Key information would be entered into the intelligent agent by the CCM (e.g., contract type, contract length, delivery dates). The intelligent agent in turn would monitor the contract and make recommendations to the CCM concerning what actions are required. Additionally, the intelligent agent would eliminate the time-consuming task of maintaining a myriad of contract files by the CCM. Contract files would be updated continuously, and be made readily available for use throughout the organization.

5. Redesign Implementation

It is important to note here that implementing an IT solution in Marine Corps contingency contracting is not a modification of the current practice—there is no IT currently in place that supports KM. Rather, this IT strategy is one of the changes. A paradigm shift will be required to implement IT into the contracting structure of the Marine Corps. Most importantly, senior management must be an ardent supporter of this IT initiative in order for it to be successful. Davenport and Prusak (1998), found that

support from organizational leaders was critical for transformational knowledge projects and have identified the following types of support that were helpful in doing so:

- Sending out messages to the organization that knowledge management and organizational learning are critical to the organization's success
- Clearing the way and providing funding for infrastructure
- Clarifying what type of knowledge is most important to the company

Due to the small number of contingency contracting offices and CCMs in the Marine Corps, the author recommends that the GroupWare program be implemented at all locations throughout the contingency contracting force. The important factor here is establishing a "critical mass" of users that would both contribute and benefit from the exchange of knowledge and information. This would allow for maximum participation and feedback from the users of the program regarding what areas need to be improved upon, removed, and added. Critical to the success of this GroupWare implementation will be the ease of operation it provides the user and the amount of satisfaction that is gained from it. Again, input from the contingency contracting community will be essential to any KM initiative that the Marine Corps embarks upon.

An expert system should be implemented only after the contingency contracting force becomes convinced of the use and benefit of the GroupWare program. The GroupWare program will act as the catalyst for the design and content of the expert system. For this reason, it is critical that the contingency contracting force is well versed in its use and application. Once this level of comfort is obtained, the expert system will provide the user with a significant increase in performance and communication capabilities.

B. KNOWLEDGE PERFORMANCE MEASURES

The success of any program depends upon the results that it achieves. People are most familiar with judging success upon the financial benefits or losses that are incurred as a result of policy action or inaction. Although economic benefits from KM initiatives in private industry have been quantified, more general indicators must be relied upon to determine the benefits from implementing a KM program in the Marine Corps. The following list of performance measurements is provided to ascertain the success of a KM program in contingency contracting:

- **Mission Support.** The level of support provided to an operation should be improved both in breath and scope. Identifying requirements in a timelier manner and getting the required logistical support to the war fighter when and where he needs it.
- **Decision Making Process.** Everyone makes mistakes. This is especially true in an environment where the current method of acquiring knowledge is in a deployed environment. Helping the CCM to identify problem areas and equipping him with the knowledge and expertise of those who have gone before will provide the guideposts by which the CCM can make better-informed decisions.
- **Level of Familiarization.** Becoming familiar with the AO and its contracting particulars. Knowing whom the vendors are, what contracting methods have been employed in the past and why, what the requirements were previously, etc., will help in the preparation of the CMM and improve the DCCP.
- **Comfort with KM.** Throughout the organization, the comfort level of contributing to and benefiting from KM will provide proof of its worthiness.
- **Innovation.** The ultimate measure of a KM system will be in how much users exchange ideas and use the knowledge acquired from these interactions to innovate processes and generate new knowledge within the organization.
- **Knowledge Availability.** The type and relevance of knowledge that is available to the user. Is it easily accessible? Does it provide the knowledge that I need?
- **Interaction Between Key Players.** Does the KM system allow for the integration and input of key players? Does the KM system improve communication and understanding between these parties?

C. SUMMARY

This chapter utilizes knowledge repositories and KBS (expert system and intelligent agent) to treat the pathologies of the current “as-is” DCCP identified by KOPeR. By conducting a comparative analysis, the author chooses a two-phased IT implementation strategy for the Marine Corps contingency contracting force utilizing both GroupWare and an expert system. In phase one—the short term, the Marine Corps needs to capitalize on the infrastructure of the NMCI and implement a GroupWare program that would serve as the catalyst for KM in the contingency contracting force. In phase two, the Marine Corps needs to implement an expert system that would draw on the strengths of the GroupWare application and assist the contingency contracting force and key players to more effectively capture, store and share key knowledge. An integration of both a GroupWare program and an expert system is the KM system preferred by the author.

V. CONCLUSIONS AND RECOMMENDATIONS

Chapter V summarizes the purpose and content of this thesis. It provides conclusions drawn from analyzing the deployed contingency contracting process (DCCP) and the redesigned alternatives that are chosen to treat the pathologies identified by KOPeR to improve the DCCP process. This chapter concludes with recommendations for future research and the author's final thoughts.

A. SUMMARY

The Commandant of the Marine Corps, General J.L. Jones, has referred to the Marine Corps as the Nation's "Total Force in Readiness" (DoN, 2000). With capabilities that span the spectrum of conflict, the Marine Corps has been called at an ever increasing rate to support operations ranging from humanitarian relief to armed combat.

Keeping deployed Marine Forces supported and mission capable is the result of a monumental logistical effort. Due to limited transport assets and funding availability, deployed forces often need support from the local economy to maintain their operational readiness and capabilities. Marine Corps contingency contracting provides the means of support that traditional supply channels cannot provide in a deployed/contingency environment.

Contingency contracting Marines (CCMs) must be well versed in a number of areas in order to provide support to the operational commander and the war fighter. This entails a sizeable investment in formal schooling and OJT. Over time, CCMs develop a high level of contingency contracting expertise and knowledge that is critical to the mission of the Marine Corps.

There are several problems that exist within the contingency contracting force that are detracting from its ability to support deployed Marine Forces. First of all, there is no career track for Marine Corps contracting officers. All of the knowledge and expertise that is acquired by contingency contracting officers is lost when they depart the contracting force (e.g., returns to original MOS or departs service). Secondly, the small number of CCMs, both enlisted and officer, is inadequate to support deployed Marine Forces. And thirdly, there currently exists no means of capturing, storing, and sharing the tacit knowledge that is generated by CCMs. This is a severe shortcoming for the Marine Corps.

The author's goal in this thesis is to improve the deployed contingency contracting process (DCCP) performance. By implementing the KM design process of Nissen, Kamel, and Sengupta, (2000), the author envisions a knowledge management system that effectively captures and transfers tacit knowledge between CCMs and key players in the contingency environment.

B. CONCLUSIONS

The author identifies the DCCP as the target process for redesign due to the importance it plays in supporting deployed Marine Forces. The KOPeR analysis identifies several pathologies with the current "as-is" process. The IT-Support (IT-S), IT-Communication (IT-C) and IT-Automation (IT-A) fractions all reveal significant shortcomings in how the DCCP is conducted. The analysis also indicates that the DCCP is characterized as being a manual process that lacks the IT infrastructure to capture, store and share knowledge amongst users in the contingency contracting environment.

From the research conducted, the author has found that the KM design process of Nissen, Kamel and Sengupta (2000) could be applied to other organizations within the Marine Corps, especially with supply, maintenance, and logistical organizations. The KM design process would help identify pathologies with current practices and offer redesign alternatives. These organizations are complex in nature and require the benefit of the knowledge that is generated by its practitioners to ensure that the best possible level of support is afforded to the war fighter.

C. RECOMMENDATIONS

As indicated by the KOPeR analysis, the DCCP suffers from a number of pathologies. In order to address these pathologies, IT is selected as the process transformation to improve the DCCP performance. Knowledge repositories and knowledge-based systems (KBS) are selected due to their ability to capture, store and share knowledge.

Based on the current KM environment in contingency contracting, the author recommends that the Marine Corps implement a two-phased IT strategy. In the short term, phase one, the Marine Corps needs to implement a GroupWare program that will capitalize on the strengths and flexibility of the Navy and Marine Corps Intranet (NMCI). A GroupWare application will lay the foundation for knowledge exchange and storage within the contingency contracting force and with key players involved in the DCCP. The knowledge acquired from the GroupWare application will in-turn be used to construct an expert system that will be implemented in phase two, the long term IT solution. In combination, both the GroupWare application and expert system will increase the velocity and viscosity of knowledge exchange, storage, and generation

within the contingency contracting force and ensure better operational support to deployed Marine Corps Forces.

Based on the research and interviews conducted, the author makes the following recommendations regarding KM in Marine Corps contingency contracting:

- **Do Away with K-21.** The Marine Corps KM site, K-21, does not serve in the capacity that it was initially intended for. This is evidenced by the fact that its intended audience, contracting Marines, do not utilize it to exchange knowledge or information. K-21 treats knowledge as a static entity and has not allowed for the dynamic and fluid aspects of KM. This is evidenced by the lack of oversight at HQMC (LBO) in maintaining the K-21 site and the contractual agreement that prevents HQMC (LBO) from making all but the simplest modifications to the web site. Do away with K-21 and replace it with a GroupWare application such as Lotus Notes.
- **Better Equip CCMs.** For being such an integral part of the support structure for deployed Marine Forces, CCMs are inadequately equipped to effectively carry out their mission. Marines always “make it happen,” but if there are resources available (e.g., commercial off the shelf items) that could expedite a process—especially the DCCP—then these technologies need to be vigorously pursued and implemented throughout the contingency contracting force. Tools such as Palm Pilots, lap top computers, digital cameras, satellite cell phones, wireless Internet access, and others, need to be part of the CCM’s repertoire. These tools will assist the CCM to “shoot, move, and communicate” more effectively and enable KM to take hold.
- **Create Incentive System for KM.** One of the shortcomings of the K-21 site is that its intended audience has no incentive to use it. HQMC (LBO) needs to establish an incentive system that would encourage the use of KM within contingency contracting. One idea would be to establish an award for the most innovative use of KM in the DCCP. Another idea would be to have CCMs officially recognized for their efforts. This would breed a higher level of job satisfaction and act as a catalyst for the recognized CCM to share his knowledge with other CCMs.
- **Create Career Track for Contracting Officers.** KM is dependent on the knowledge and expertise of its practitioners. Serious consideration needs to be given to maintaining the corporate knowledge base that the Marine Corps has invested so much in terms of educating and training its contracting officers, but loses after three short years. Utilizing the model proposed in the thesis by Corcoran (2000), and the Army’s Acquisition Corps and the Air Force’s Contracting Command as benchmarks, the Marine Corps needs to implement a career path for its contracting officers. This will ensure that the corporate

contracting knowledge base is retained and that this high-level of expertise is better utilized by the Marine Corps.

D. FUTURE RESEARCH

The author presents three areas that are worthy of future research. These topics are not covered in this thesis due to space and scope considerations. These areas will support and enhance the performance of the DCCP.

1. Other DCCP Applications

A common theme that continually surfaced throughout the interview and research process was the number of individuals and units who were in some way, shape or form involved in the DCCP. These units and individuals come not only from within the deployed unit, but from other services (joint operations), countries and agencies. To make support of deployed Marine Forces more efficient and responsive, the relationship amongst these agencies and individuals (e.g., finance, vendors, supply, motor pool, aviation maintenance shops) needs to be investigated. With this in mind, a KM system needs to be designed that would facilitate communication and support among all those involved.

2. Incentivizing KM in the Contingency Contracting Force

Being that the Marine Corps is not a “for profit institution,” creating an environment where incentives could be used to motivate its practitioners to use a KM system is a major challenge. The Marine Corps lacks the ability to issue monetary incentives to those who contribute to and benefit from a KM system. The Marine Corps needs to investigate what type(s) of incentives would encourage practitioners to

contribute to and benefit from a KM environment not only in contingency contracting, but also throughout the Marine Corps.

3. Other KM Applications

Due to the huge investment of money, personnel and time required to implement a KM program, the Marine Corps needs to investigate the possibility of moving towards an already established and proven KM system with one of the other services, either with the Army or with the Air Force. Specifically, what would the requirements be to make this transition and what would the costs be both in terms of money and shared control of KM assets?

E. FINAL THOUGHTS

Contingency contracting is a key element in supporting deployed Marine Forces. Confronted with an ever-changing environment, CCMs must possess the ability to think on their feet and make the best-informed decisions that they can possibly make. Given the current lack of KM in the contingency contracting force and the high turnover rates among its officers and small number of enlisted personnel, the Marine Corps needs to aggressively pursue a KM system to capture, store and share the knowledge that is specific to contingency contracting. This knowledge is the leverage by which support is improved and operational readiness remains high. The redesigned alternatives proposed in this thesis, if implemented, will offer the potential to improve the DCCP performance and knowledge sharing in the contingency contracting community. By employing these measures, the contingency contracting force will be better equipped to ensure that the Marine Corps remains the Nation's Total Force in Readiness.

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