Distribution and Supply Chain Management: Educating the Army Officer

A Monograph

by

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Distribution and Supply Chain Management are key processes for military logistics in the future, however the Army and DoD has done little to educate officers in these concepts and processes. This monograph describes distribution and supply chain management, and introduces and discusses the essential skills and knowledge a logistics officer must have to function effectively in a supply chain and distribution management environment. It analyzes how officers should attain these skills using the three pillars of leader development in Department of the Army Pamphlet 600-3, *Commissioned Officer Development and Career Management*, as well as consider what level of learning officers should attain throughout a career by using Benjamin Bloom's *Taxonomy of Educational Objectives*. It discusses how the Army/DoD currently teaches supply chain and distribution management concepts in various programs, such as the Logistic Executive Development Course/Florida Institute of Technology (LEDC/FIT) cooperative program, civilian graduate schools programs, and the Naval Post Graduate School, as well as assignments during which officers may gain such experience, such as the Army's velocity Management team, Army Materiel Command's Logistics Support Agency, and Training with Industry programs. It also examines programs, professional organizations and certification programs (such as CPIM-Certified in Production and Inventory Management, and CFPIM-Certified Fellow in Production and Inventory Management) in supply chain management processes. The findings indicate the Army and DoD is progressing in incorporating distribution and supply chain management principles into its educational curriculum, and that logisticians continue to gain operational experience in distribution management operations. The paper recommends the level to which officers should be educated, and provides suggestions for educating and tracking officers with distribution management expertise.

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Abstract

Distribution and Supply Chain Management: Educating the Army Officer, by LTC Mark. E Solseth, U.S. Army, 56 Pages.

Distribution and Supply Chain Management are key processes for military logistics in the future, however the Army and DoD has done little to educate officers in these concepts and processes. This monograph describes distribution and supply chain management, and introduces and discusses the essential skills and knowledge a logistics officer must have to function effectively in a supply chain and distribution management environment. It analyzes how officers should attain these skills using the three pillars of leader development in Department of the Army Pamphlet 600-3, *Commissioned Officer Development and Career Management*, as well as consider what level of learning officers should attain throughout a career by using Benjamin Bloom's *Taxonomy of Educational Objectives*. It discusses how the Army/DoD currently teaches supply chain and distribution management concepts in various programs, such as the Logistic Executive Development Course/Florida Institute of Technology (LEDC/FIT) cooperative program, civilian graduate schools programs, and the Naval Post Graduate School, as well as assignments during which officers may gain such experience, such as the Army's velocity Management team, Army Materiel Command's Logistics Support Agency, and Training with Industry programs. It also examines programs, professional organizations and certification programs (such as CPIM-Certified in Production and Inventory Management, and CFPIM-Certified Fellow in Production and Inventory Management) in supply chain management processes. The findings indicate the Army and DoD is progressing in incorporating distribution and supply chain management principles into its educational curriculum, and that logisticians continue to gain operational experience in distribution management operations. The paper recommends the level to which officers should be educated, and provides suggestions for educating and tracking officers with distribution management expertise.

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CHAPTER ONE

INTRODUCTION

"Whether push or pull, our current logistics are reactive. At best, unless we embrace a new paradigm, we will be still depending on the war fighters to tell (the logisticians) what they need, then trying to supply it as fast as they can. This amounts to an industrial age vendor struggling to satisfy an information age customer. Reactive logistics-the old logistics-will never be able to keep up with warfare as we know it."

The Honorable Michael Wynne, Principal Deputy Under
Secretary of Defense (Acquisition, Technology and Logistics)[1]

Joint Total Asset Visibility (JTAV). Benchmarking. Radio Frequency Identification (RFID). Supply Chain Operational Reference (SCOR) model. Metrics. The Distribution Process Owner (DPO). Requisition Wait Time (RWT). Daunting terminology and acronyms? All are associated with distribution and supply chain management, key processes for military logistics in the future. This monograph originated out of a personal desire to learn more about these processes. Distribution management is mentioned extensively in current logistics literature, and there are numerous examples of how important distribution management was during recent operations, and how it is the concept with which the Army will be supported logistically in the future as it becomes based primarily in the continental United States and relies on a force projection strategy. Army support forces are changing to reflect this concept. Within the new modular Units of Action (UA), the brigade support battalion now contains a distribution company, rather than the separate supply and transportation companies found in previous organizations. It also includes a distribution management cell within the support battalion headquarters. The forward support company supporting a UA maneuver battalion contains a

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[1] The Honorable Michael Wynne, speaking at the AUSA Logistics Symposium in Richmond Virginia on 22 April 2003. Referenced in the "The New Paradigm: Bringing Army Logistics into the 21st Century," *Torchbearer National Security Report,* (April 2004), 2.

distribution platoon. As another example of the evolution towards implementing distribution

management processes, the Army G4 published the December 2003 Army Logistics White Paper

"Delivering Material Readiness to the Army"[2] which identified four interdependent areas within

logistics critical to the success of supporting the joint and expeditionary Army. Two of these

areas are related to distribution and supply chain management; "Modernizing Theater

Distribution" and "Integrating the Supply Chain."[3] These logistical focus areas were established

after Operations Iraqi and Enduring Freedom exposed logistical capability gaps in the Army's

current logistical system.[4] Commercial application of supply chain management also appears to

be relevant as commercial applications and "best business practices" are mentioned often in Army

and Department of Defense and related literature. A recent Association of the United States

Army Torchbearer National Security Report, entitled *The New Paradigm: Bringing Army

Logistics into the 21st Century* stated that "[The theater distribution system]...must evolve from

the outmoded logistics concepts of 'just in case' and just enough-just in time to the next

generation of distribution support, known as 'sense and respond.' This system must rival the best

examples of effective distribution found in commercial industry...."[5] To achieve this modern

distribution system, "the Army must first develop and implement a modern distribution doctrine

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[2] Available on the Army G4 web page at: http://www.hqda.army.mil/logweb/whitepaper.pdf

[3] For a full discussion of all four focus areas, see the Torchbearer National Security Report or the Army G4 web page.

[4] *On Point, The United States Army in Operation Iraqi Freedom* reported that "The CSS difficulties cross all aspects of Army operations-doctrine, organization, training, materiel, leader development, personnel, and facilities (DOTMLPF). From the recent shift to "just-in-time" logistics to the training and equipping of CSS soldiers and units, the CSS community and the Army must rethink how they conduct operations. The current system emphasizes efficiency over effectiveness-from parts and supply distribution to the physical equipping of CSS units. In combat, however, effectiveness is the only real measure of success..." xxviii.

[5] From the Torchbearer National Security Report, 9.

that captures the principles of industry leaders and applies those principles in the military environment."[6]

The aforementioned and many other documents made supply chain and distribution management seem like important, relevant topics for an Army logistician to understand. While researching in an attempt at self-education on these concepts, ample references were found relating to the topics. Certainly one would expect extensive use of supply chain management techniques in the commercial sector because efficiencies in these processes directly affect the bottom line, and this certainly turned out to be the case. There are professional organizations for experts in supply chain management, such as the Council of Supply Chain Management Professionals (CSCMP) and The Association for Operations Management (APICS),[7] as well as numerous periodicals dedicated entirely to the topic-in fact the CSCMP listed 38 periodicals on the Trade Publications Listing portion of its web site. In addition to the professional organizations, there are also a variety of educational programs, designed to assist in developing expertise in the topic. As this background information was reviewed, the problem statement of this monograph began to develop: given that one accepts that understanding supply chain and distribution management are important concepts for Army and Department of Defense logistics now and into the future, and the business sector recognizes the importance of understanding these principles to the extent that there are educational programs dedicated to them, then why are career logistics officers vaguely or unfamiliar with the concepts, and forced to educate themselves on the subjects? Generally, a topic deemed important in a profession is reinforced by education; this has certainly been the case throughout the military profession. An informal survey of logistic

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[6] Ibid., 10.
[7] APICS was originally formed as the American Production and Inventory Control Society.

officers at serving at Fort Leavenworth found that none of them had any formal training or education in supply chain or distribution management concepts or processes.

The research question of this monograph then, is; how does the Army educate officers in the concepts and processes of distribution and supply chain management to enable them to function effectively in those environments? At what point does or should an officer receive this education? To provide the requisite background and explore this topic, this paper is organized in five chapters. After this introductory chapter, the second chapter discusses distribution management and the broader topic of supply chain management, and describes the concepts and procedures of implementing such processes. It will also describe the development and implementation of the processes from a military and business perspective, as well as briefly introduce military organizations responsible for distribution management processes. The third chapter introduces and discusses the essential skills and knowledge a logistics officer must have to function effectively in a supply chain and distribution management environment. It will analyze how the officer should attain these skills using the three pillars of leader development in Department of the Army Pamphlet 600-3, *Commissioned Officer Development and Career Management*, as well as consider what level of learning officers should attain throughout a career by using Benjamin Bloom's *Taxonomy of Educational Objectives*. The fourth chapter will introduce military and civilian education programs to discuss methods to teach the processes. This chapter will introduce how the Army/DoD currently teaches supply chain and distribution management concepts in various programs, such as the Logistic Executive Development Course/Florida Institute of Technology (LEDC/FIT) cooperative program, civilian graduate schools programs, and the Naval Post Graduate School. It will also discuss assignments during which officers may gain such experience, such as the Army's velocity management team, Army Materiel Command's Logistics Support Agency, and Training with Industry programs. It will also examine programs, professional organizations and certification programs (such as CPIM-Certified in Production and Inventory Management, and CFPIM-Certified Fellow in Production

and Inventory Management) in supply chain management processes. The fifth chapter is the

conclusion, which will summarize the salient points in the previous chapters and will offer

recommendations based on the analysis provided. Three appendices are attached: Appendix A

provides a discussion of some of the technology and equipment used to implement distribution

management techniques; Appendix B provides the Army Supply Chain Management program

goals; and Appendix C provides survey questions sent to a sample of officers to gauge their

experiences and education in distribution management.

CHAPTER TWO

DISTRIBUTION AND SUPPLY CHAIN MANAGEMENT DESCRIBED

> Supply chain management is one of the key practices developed in the private sector over the past two decades. This concept, which involves significant process change, holds great promise for improving military logistics support. Making successful use of this concept requires the proper mix of commercial practices, modern technologies, and consideration of DoD's unique logistics characteristics.
>
> DoD Supply Chain Management
> Implementation Guide[8]

Background:

To provide the basis for understanding educational requirements for officers operating in a distribution and supply chain management environment, this chapter provides background on the Army's evolution to a distribution management environment, and then describes distribution and supply chain management from both a military and civilian perspective.

In the conduct of military operations, the United States Army historically has relied upon huge stockpiles of materiel. These "iron mountains" were required to avoid shortages and to provide flexibility for unforeseen requirements, changing missions, enemy interdiction and the unpredictability of war. Supplies were echeloned from theater to company level to shorten the length of time required to provide materiel when it is needed, and to create a "just-in-case" buffer to mitigate risk. This layered and redundant, mass-based logistics system suited the battlefields of World War II, Korea, Vietnam and the rest of the cold war, with fairly clearly defined frontlines and a known, somewhat predictable enemy. Desert Storm provides a more recent - and well-publicized - result of this system, as the troop and supply build-up took six months prior to

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[8] "DoD Supply Chain Management Implementation Guide," Logistics Management Institute, 2000, vii.

combat operations. A stunning operational success, Desert Storm also revealed the unreliability and inefficiency in this massive, expensive logistics system. After the completion of combat operations, there were over 27,000 unopened containers on the ground and more that two years of ammunition supplies stored in theater.[9] Many containers' contents were not known until they were opened and physically inventoried, an obviously resource intensive and inefficient process that illustrates that having a stockpile forward does not necessarily make the system responsive. A low level of confidence in the supply system contributed to these stockpiles as well, as customers frustrated by the inefficient and unreliable system or the lack of visibility of inbound supplies re-ordered items, or stocked them forward to compensate for the unresponsiveness of the system.

The Army recognized deficiencies in this huge, unreliable and expensive logistics system and that it needed a fundamental shift in the way it executed its logistics missions to become more efficient and effective. As the Army developed its post cold war "Revolution in Military Affairs" vision to shape itself for the future, Army logisticians developed a supporting vision of a "Revolution in Military Logistics."[10] Logisticians recognized that while the United States certainly has the capability to move and position huge amounts of materiel and supplies, that does not necessarily make it desirable. It is expensive, not necessarily more effective, and consumes resources required to move, manage and protect the stockpiles, and "mass-based logistics poses a tremendous cost to the warfighter in terms of footprint, risk and mobility."[11] The changes in military logistics envisioned a distribution based logistical system vice a supply-based system,

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[9] Joseph L. Walden, *The Forklifts have Nothing to Do!*, 17.

[10] Mark O'Konski, "Revolution in Military Logistics: An Overview," *Army Logistician* (January/February 1999), 10.

[11] John Dumond et al., *Velocity Management: The Business Paradigm That has Transformed U.S. Army Logisitics* (Rand, 2001 available at web site http://www.rand.org/publications/MR/MR1108/MR1108.pref.pdf), ix.

where "velocity offsets mass, as echelons of inventory are replaced by managed flows of materiel....The distribution pipeline effectively becomes the...warehouse."[12] Certainly one of the desired benefits of this system is a reduced logistics footprint in the theater, especially in non-contiguous environments where the enemy can target support forces and supplies. Therefore, the Army began shifting from a massed-based logistics system "to a more cost-effective, velocity-based logistics system that closely parallels the distribution system used in the commercial sector" to leverage techniques and technology being used in commercial industry.[13] The commercial world had moved away from a supply based logistics system with "just-in-case" inventory levels, to a transportation based "just-in-time" logistic system.

Velocity Management Program:

The Army made great strides in logistics efficiency through its "Velocity Management Program" which was started in 1995 after a study by the RAND Corporation on streamlining logistics.

> Velocity Management replaces the Army's traditional reliance on mass with the modern business concept of high-velocity processes tailored to meet evolving customer needs. VM views the logistics system as a set of interlinked processes—a supply chain—that delivers products and services (such as spare parts and equipment maintenance) to customers. System performance is assessed in terms of the agility and responsiveness of logistics processes. Under VM, these processes are becoming faster, better, and cheaper. [14]

The Velocity Management (VM) program initially focused on the order fulfillment process through Army wholesale supply sources, and it implemented the VM system by institutionalizing a three-step improvement method. The first step defines the process by

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[12] O'Konski, 11.
[13] Laurel K. Myers, "Eliminating the Iron Mountain," *Army Logistician* (July/August 2004), 40.
[14] *Velocity Management,* ix.

identifying customers of a process and the output they require from it. The second step measures how well a process is being done. "(M)etrics are developed to reflect what the customers of the process need and value."[15] The Velocity Management team's established new, more effective measures of the links in the supply chain. For example, the new measurement of customer wait time (CWT) was reported in terms of the number of days it takes to fill 50 percent, 75 percent and 95 percent of requisitions, which provided both typical (median) performance as well as capturing performance variability.[16] The third step of the VM program, improving the process, uses the information captured in the first two steps to set goals for improvement.

The Velocity Management program was such as success in improving the Army's order fulfillment process, it was soon expanded to include inventory management, repair cycle times and financial information management and processes.[17] By 1998, VM efforts produced a 50-percent reduction in order-ship times across the Army and reduced the time it takes to get repair parts to soldiers by more than 50 percent between 1996 and 2000[18] The Army's massive stockpiles were being replaced by a distribution-based system. This new system is described in Army Regulation 56-4, *Distribution and Distribution Platform Management,* working draft #8 (1 January 2005), which provides the fundamental principles of distribution-based logistics. They are "velocity over mass, centralized management, direct delivery, optimization of the distribution system, maximum throughput, minimum essential stocks, standard practices, predictable time definite delivery, and continuous two-way visibility and flow of information."[19] The Velocity

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[15] Ibid., x.
[16] Ibid., 22.
[17] Readers interested in additional information on these processes may see Rand's *Velocity Management: The Business Paradigm That has Transformed U.S. Army Logisitics.*
[18] from an Army News Service article, June 11, 1998, reprinted in Joseph L. Walden's book, *The Forklifts Have Nothing to Do!,* 107, and from the FY2000 DoD Logistics Strategic Plan, August 1999.
[19] Army Regulation 56-4, *Distribution and Distribution Platform Management*, working draft #8, 1 January 2005, 22. Received by the author via email from a CASCOM POC.

Management Program was instrumental in moving the Army towards a distribution-based approach to logistics, and it evolved into the Army Distribution Management Program (ADM) in January 2003, which institutionalized, broadened and continues to implement DM processes.[20]

Distribution Management:

The next section of this paper will define and describe distribution and distribution management, and introduce some of the organizations involved in its execution. Army Regulation 711-7 (Supply Chain Management) defines distribution management (DM) as "The broad range of activities concerned with effective and efficient movement of materiel from the source of supply to the point of use or consumption. DM activities include freight transportation, warehousing, materiel handling, packaging, inventory management, and attendant management information systems. Also include reverse logistics activities."[21] Distribution management is defined more broadly the *Dictionary of Military and Associated Terms*, Joint Publication 1-02, which defines theater distribution management as, "The function of optimizing the distribution networks to achieve the effective and efficient flow of personnel, equipment, and materiel to meet the combatant commander's requirements."[22] The distinction between the Army definition and as it is described in the JP 1-02 is noted because the concept of distribution management is evolving to include not just materiel, but the movement of forces as well. Forces and materiel compete for the same resources in the distribution pipeline, yet the "information systems used in planing, execution, and tracking of unit deployments and sustainment materiel have been completely

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[20]ALOG News, "Distribution Management picks up where Velocity Management Leaves off" *Army Logistician* (March/April 2003), 1.
[21] Army Regulation 711-7, *Supply Chain Management,* 19 November 2004, 17. Reverse logistics is the process by which a product is returned to some point in the distribution system for credit, reworking, recouping, restocking, or disposal. Examples are unwanted or defective items, and unserviceable items in need of rebuild or disposal.
[22] Joint Publication 1-02, *The Dictionary of Military and Associated Terms*, 12 April 2001, 535.

separate."[23] Current doctrine divides distribution management from a military perspective into strategic and theater segments, with the strategic portion of the chain encompassing distribution management activities that moves materiel to a combatant commander.[24] The theater segment is the portion of the distribution pipeline that "is the responsibility of the geographical Combatant Commander…and the forces assigned to the (area of responsibility) AOR."[25] This distribution system is complex, as a multitude of Department of Defense, other governmental, and civilian organizations procure, store and transport materiel in the Department of Defense's distribution system. Joint Publication 4-01.4, *Joint Tactics, Techniques and Procedures for Joint Theater Distribution* states that "the distribution pipeline represents the end-to-end flow of resources from supplier to point of consumption," and that "these resources pass through a complex framework of integrated national- and theater-level physical, resource, information, and communications networks that constitute the distribution system."[26] Some principal organizations involved in the process are introduced and briefly summarized below.

Within the Department of Defense, there are several key agencies critical to the DM effort. The Defense Logistics Agency (DLA) is the primary supply agency for the Department of Defense, providing worldwide logistics support for the missions of the Military Departments and the Unified Combatant Commands. It "is a is a $25 billion enterprise, managing more than 90 percent of the U.S. military's repair parts and 100 percent of its food, fuel, medical, clothing and

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[23] Mr Osborn's (Chief, Distribution Division, Force Projection and Distribution Directorate, Army G4) comments during the 12 January 2005 "Modernize Theater Distribution Integrated Process Team Meeting," retrieved from the Army Knowledge Online web site.

[24] AR 56-4, working draft #8, paragraphs 2-5 and 2-6.

[25] Joint Publication 4-01.4, *Joint Tactics, Techniques and Procedures for Joint Theater Distribution*, I-2.

[26] Ibid., I-1.

textile, and construction and barrier materiel."[27]   DLA uses a network of centers to purchase and

manage the supplies and services it provides.[28]

The United States Transportation Command (USTRANSCOM) provides air, land and sea

transportation for the Department of Defense in both peace and war. USTRANSCOM's three

component commands -- the Air Force's Air Mobility Command (AMC), Scott AFB, Ill.; the

Navy's Military Sealift Command (MSC), Washington, D.C.; and the Army's Military Surface

Deployment and Distribution Command (SDDC), Alexandria, Va. -- provide intermodal

transportation across the spectrum of military operations.[29] USTRANSCOM is also the

Department of Defense Distribution Process Owner, a topic that will be discussed further later in

this paper. Additionally, each service-the Army, Air Force, Navy and Marines-operates a

materiel or logistic command to support its respective service, or to act as a Department of

Defense executive agent for certain commodities.[30] The General Services Administration (GSA)

is an example of an other governmental agencies involved in the DoD supply chain. GSA

consists of the Federal Supply Service, the Federal Technology Service, the Public Buildings

Service, the Office of Governmentwide Policy, and various Staff Offices. GSA support includes

office space, equipment, supplies, telecommunications, and information technology. GSA also

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[27] Allan A. Banghart Director, Enterprise Transformation Defense Logistics Agency quoted on the the DLA website at http://www.dla.mil/focusondla/Transform.htm

[28] Four centers manage DLA's products: Defense Energy Support Center (DESC), Fort Belvoir, Va manages fuel, gas and electric power. Defense Supply Centers in Columbus (DSCC), Richmond (DSCR) and Philadlepia (DSCP) manage: maritime and land weapon systems support (DSCC); aviation support (DSCR); and food, clothing, medical, general and industrial supplies (DSCP). Services are managed by the Defense Distribution Center (DDC) in New Cumberland, Pa. which operates a worldwide network of 25 distribution centers that receive store and issue supplies; and the Defense Reutilization and Marketing Service, which handles property disposal; and the Defense National Stockpile Center (DNSC), responsible to stockpile strategic raw materiel. This information is from the DLA Brochure, available at http://www.dla.mil/library/DLA%20Brochure.pdf.

[29] From the USTRANSCOM website at http://www.transcom.mil/organization.cfm. SDDC was formerly known as Military Traffic Management Command (MTMC).

[30] For example, the Army's Materiel Command is the DoD executive agent for conventional ammunition and chemical weapons stockpile.

plays a key role in developing and implementing policies that affect many government

agencies.[31] Civilian organizations in the supply chain include weapon system support

contractors, transportation networks including contracted carriers, distributors and suppliers

including manufacturers, and commercial maintenance facilities.[32]

The discussion above is not provided to be an all encompassing discussion regarding

organizations in the distribution process, but to be illustrative of the fragmented distribution

system, with its "seams, bottlenecks, lack of synchronization, multiple processes and non-

interoperable information systems."[33] Loss of visibility of materiel occurs in the distribution

pipeline at the "seams," where supplies transition from one organization to the next, such as at a

transportation node. Changes are being made to improve the current system. The Army has

attempted to remedy this fragmentation at the operational and tactical level by creating cross-

functional distribution centers that combine supply and transportation managers and information

systems in one overall responsible center. In the Army's new modular structure, the Theater

Sustainment Command is designed to be the single logistics command and control element in a

theater, and the proponent for distribution. Its theater distribution capabilities include the ability

to establish and operate distribution hubs; receive, process, distribute, transload and configure

materiel and equipment; coordinate and conduct all mode inter and intra-theater distribution; and

manage distribution platforms.[34] As briefly mentioned earlier, the Department of Defense

appointed the Commander, U.S. Transportation Command as the Defense distribution Process

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[31] From the GSA website at
http://www.gsa.gov/Portal/gsa/ep/channelView.do?pageTypeId=8199&channelPage=/ep/channel/gsaOverv
iew.jsp&channelId=-13261
[32] Department of Defense 4140.1-R, *DoD Supply Chain Materiel Management Regulation*, May
23, 2003, 17.
[33] Sandra I. Erwin, "Debate Over Logistics Reform Intensifies," *National Defense*, July 2003, 13.
[34] CASCOM briefing on logistics transformation, received by the author via email from COL(R)
Walden on 7 February 2005.

Owner in an attempt to give one organization distribution responsibility across the strategic, operational and tactical levels. Consolidation of authority under one process owner should eliminate existing seams between current distribution processes; standardize the policies, vision and performance in DOD's supply chain; develop interoperable information technology solution and enhance total asset visibility to distribution customers; and streamline distribution accountability under a single combatant commander.[35] USTRANSCOM bridges the seam between the strategic and theater segments of the distribution system by deploying a Joint Deployment and Distribution Operations Center (JDDOC) a to a theater to: 1) execute combatant commander (COCOM) priorities and policies; 2) synchronize information technology systems; 3) create joint logisitics effects in theater; 4) synchronize inter/intra theater lift; and 5) provide a critical link to USTRANSCOM and National partners.[36]

One of the key aspects in monitoring how well a distribution management based logistics system is functioning is to measure the performance of the links within the system. Through these measurements, one can determine problems or inefficient links in the distribution system, and correct them. Army Materiel Command's Logistics Support Agency (LOGSA), located at Redstone Arsenal, Alabama, is the agency that provides this data and analysis for the Army to measure its systems. Major John Hall, wrote in a 2003 *Army Logistician* article that "LOGSA is the national data warehouse for tracking all Army maintenance, transportation, requisition, and supply activities. LOGSA's mission is to transform raw logistics data into useful information for

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[35] From the article "USTRANSCOM Named Defense Distribution Process Owner," in the ALOG News section of *Army Logistician*, (January/February 2004). 1, 49.
[36] USTRANSCOM briefing "Joint Theater Logistics-Distribution Organizational Constructs," given to the author during 31 May 2005 Advanced Operational Arts Studies Fellowship orientation visit to USTRANSCOM headquarters, slide 8.

Army customers throughout the world."[37] The current measurements (or metrics) used to measure supply chain performance are customer wait time (CWT) and requisition wait time (RWT). CWT is focused on the customer unit, and is "An Army Metric that seeks to express system response to unit level requirements in days the unit waits for satisfaction. It includes both retail time and wholesale time when a wholesale source is involved. Includes local source fills."[38] The current CONUS goal is 10 days, and the OCONUS goal is 15 days. RWT measures national distribution readiness, and is focused on the Supply Support Activity, measuring "wholesale response time to Supply Support Activity requisitions in days that the SSA waits for stock replenishment or to received dedicated unit requests. Includes both retail and wholesale time when a wholesale source is involved. Does not include local source fills."[39] RWT goals are 6 days in CONUS; the OCONUS goals are separated based on the transportation mode, with a 13 day goal for air shipments, and a 40 day surface goal.

The Department of Defense *Supply Chain Materiel Management Regulation*, DoD 4140.1-R, encourages services to measure logistics process performance at the 85th percentile.
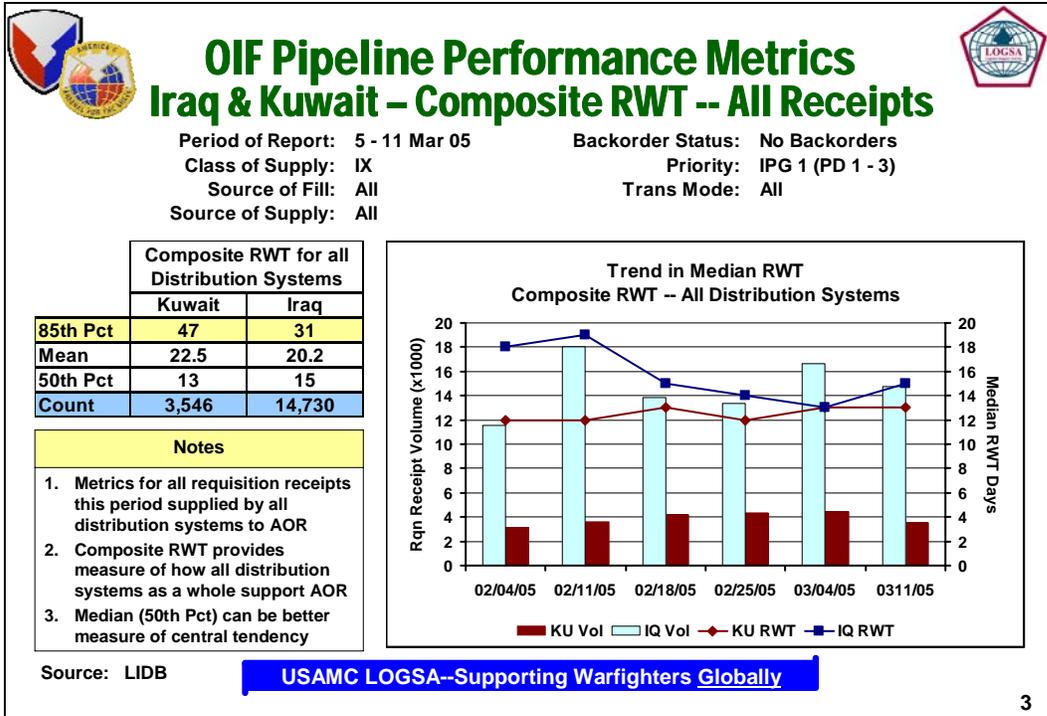
An example of a LOGSA produced chart used to track Operation Iraqi Freedom performance metrics is provided below.[40]

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[37] John Hall. "Afghan Supply Pipeline Performance," *Army Logistician*, (January/February 2003), 4. Major Hall is a reserve officer, who works as a support contractor for LOGSA in civilian life. He holds a Ph.D. in industrial engineering.

[38] From the ADM website at http://www.cascom.lee.army.mil/ADM/.

[39] Ibid.

[40] Provided via email by Dr. John D. Hall, a LOGSA Support Contractor.

OIF Pipeline Performance Metrics
Iraq & Kuwait – Composite RWT -- All Receipts

Period of Report: 5 - 11 Mar 05   Backorder Status: No Backorders
Class of Supply: IX   Priority: IPG 1 (PD 1 - 3)
Source of Fill: All   Trans Mode: All
Source of Supply: All

Composite RWT for all Distribution Systems		
	Kuwait	Iraq
85th Pct	47	31
Mean	22.5	20.2
50th Pct	13	15
Count	3,546	14,730

Notes

1. Metrics for all requisition receipts this period supplied by all distribution systems to AOR
2. Composite RWT provides measure of how all distribution systems as a whole support AOR
3. Median (50th Pct) can be better measure of central tendency

Source: LIDB

USAMC LOGSA--Supporting Warfighters Globally

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Distribution is a component within a supply chain framework, and it begins when a product is made available for shipment and ends when it is received at the warfighter or other designated end user location.[41] The next section of this paper will describe the broader topic of supply chain management.

Supply Chain Management:

Supply chain management will discussed briefly below, from both a commercial and military perspective.

Commercial:

Although Supply Chain Management implementation in the Army and DoD is relatively recent-the first Army Supply Chain Management Regulation, AR 711-7, was published 19

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[41] AR 711-7, 5.

November 2004, and the DoD Supply Chain Materiel Management Regulation was published 23 May 2003-supply chain management techniques have been utilized in the commercial sector for the past ten to fifteen years.[42] Factors such as customer service, cost reduction, and the development of new integrating technologies drove a renewed interest in logistics in the commercial sector in the late 1980s and early 1990s.[43] Logistic management was often handled in different departments or stovepipes, creating a hand off between functional areas, without concern about what happened in the rest of the chain. Supply chain management corrects this by breaking down the obstacles between functional areas by looking at all the links in the chain, from raw material suppliers through various levels of manufacturing to warehousing and distribution to the final consumer. Because all the links in the supply chain are considered, it allows development of a consistent supply and demand plan from the consumer to the suppliers.[44] An *Industrial Engineering* article stated that, "In other words, by taking a holistic view of the process from start to finish, a planner can devise a complete plan for the movement through the chain of a specific product, which includes where the raw materials for the product will come from, what their path through the manufacturing cycle will be, and how they will be warehoused and distributed."[45]

The Council of Supply Chain Management Professionals (CSCMP), an association for individuals involved in supply chain management, provides this definition of supply chain management: "Supply Chain Management encompasses the planning and management of all

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[42] The 23 May 2003 DoD 4140.1-R replaced the May 1998 regulation entitled *DoD Materiel Management Regulation*.

[43] Jerry R. Turner, "Integrated Supply Chain Management: What's Wrong With This Picture," *Industrial Engineering*, December 1993, v25 n12 p52(4). Since Turner's article was written December 1993, reviewing developments in logistics and supply chain management the previous five years, it allows an estimation of supply chain utilization to have begun primarily in the late 1980s and early 1990s.

[44] Ibid.

[45] Ibid.

activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies."[46] Supply chain management optimizes the flow of materials, services and information by considering factors such as facility location, transportation planning, and inventory placement and quantity as well as by integrating information which allows all concerned along the supply chain to see the information, rather than a segmented, sequential process. It keeps the customer informed, which eliminates the uncertainly that often lead to redundant orders being placed.

The Supply Chain Council, a non-profit, global corporation with membership interested in applying and advancing supply chain management systems and practices, has developed and endorsed the Supply Chain Operations Reference (SCOR) model as the cross-industry standard for supply chain management.[47] Not unlike the methodology used by the Velocity Management team, the SCOR model "isolates key supply-chain management processes and matches their process elements against industry-specific best practices, benchmarking performance data, and appropriate software applications, providing users with a framework for understanding where they need to make improvements."[48]

Huge commercial companies have become masters of highly efficient distribution management processes, and while a full discussion of civilian applications of supply chain management is beyond the scope of this paper, Wal-Mart and Caterpillar provide instructive

[46] from the Council of Supply Chain Management Professional's web site at http://www.cscmp.org/.

[47] The Supply Chain Council's website is located at http://www.supply-chain.org/public/home.asp.

[48] from the Permance Measurement Group website at http://www.pmgbenchmarking.com/resource/definition/framework.asp.

examples. Wal-Mart, the world' largest retailer, requires its top 100 suppliers to use radio-frequency identification tags on their shipments. The tags contain microchips, that when scanned, emit a unique identification signal.[49] Caterpillar is the world's leading manufacturer of construction and mining equipment, and its products and components are manufactured in all 50 states and in 23 other countries, and while building it extensive global infrastructure, it helped build the field of supply chain management .[50] Its Caterpillar Logistics Services subsidiary supply chain management expertise to other companies. Certainly the needs of the Department of Defense are different, with the uncertainties of combat and the need to operation austere environments, but there is certainly much from the commercial sector that is applicable.

Military:

The Department of Defense recognized the applicability of supply chain management principles to its operations, and relatively recently began implemented supply chain management techniques. There is now an Assistant Deputy Under Secretary of Defense (Logistics and Materiel Readiness) for Supply Chain Integration, responsible to "lead the implementation of a modern, integrated materiel supply chain process that fully supports military operational requirements. To promote customer confidence in the logistics process by building a responsive, cost-effective capacity to provide required products and services."[51] As mentioned previously, DoD and the Army published regulations regarding the subject in May 2003 and November 2004 respectively and the *Dictionary of Military and Associated Terms* now provides a definition of supply chain management, which is, "A cross-functional approach to procuring, producing, and

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[49] Harold Kennedy, "Services Need to Share Logistics Information," *National Defense,* July 2004, 20.

[50] From the Caterpillar website at http://www.cat.com.

[51] From the Assistant Deputy Under Secretary of Defense (Logistics and Materiel Readiness) Supply Chain Integration website at http://www.acq.osd.mil/log/sci/index.htm.

delivering products and services to customers. The broad management scope includes

subsuppliers, suppliers, internal information, and funds flow." [52] DoD regulation 4140.1-R

"establishes requirements and procedures for DoD managers and others who need to work within

or with the DoD supply system."[53] It provides logistics personnel a process-based view of

materiel management policy within a supply chain framework. The regulation directs that DoD

components use the supply chain operation reference process (SCOR), using SCOR "processes of

Plan, Source, Maintain/Make, Deliver and Return as a framework for developing, improving, and

conducting materiel management activities."[54] The regulation also directs DoD components to

use metrics to evaluate the performance and cost of supply chain operations.

The Army also provides a definition of SCM in Army Regulation 711-7, *Supply Chain*

Management, which defines it as "the management of all internal and external logistics processes,

information, and functions necessary to satisfy a customer's requirement. The management of the

interdependent logistics processes of customer response, inventory planning and management,

warehouse management, transportation, supply, maintenance and reverse logistics."[55] The

regulations also describes the many organizations in the Army's supply chain, consisting of

"weapons system support contractors; retail supply activities with distribution depots;

transportation channels, including contracted carriers; integrated materiel managers; weapon

system product support integrators; commercial distributors and suppliers, including

manufacturers; commercial and organic maintenance facilities; and other logistics activities (for

example, engineering support activities, testing facilities, and reutilization and marketing

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[52] JP 1-02, *The Dictionary of Military and Associated Terms*, 12 April 2001, as amended through 30 November 2004, 512.
[53] DoD 4140.1-R, 16.
[54] Ibid., 19.
[55] AR 711-7, 18.

offices)."[56] Two types of metrics are described in the regulation. Supply chain metrics are tools

to measure and analyze the entire supply chain by integrating its independent processes.

Logistics performance metrics measures a particular process in the supply chain.[57] Additionally,

the regulation contains the goals for the Army's SCM program; they are provided in appendix B

of this paper.

The discussion above is provided with two purposes in mind: first, to familiarize the

reader with distribution and supply chain management to provide context prior to discussing the

educational requirements required to operate in such an environment; and second, to highlight the

complexities of distribution and supply chain management-the various organizations, systems,

metrics and other processes required for it to function effectively. As the Army links and

integrates these systems and makes them more transparent, managers' perspectives must change

and broaden, to not only understand and manage the segment for which one is responsible well,

but to comprehend the impact local decisions have on the entire system. The trained distribution

manager must understand how to design and manage the entire system, including those assets that

must be forward stocked to provide a buffer for uncertainty. The next chapter will discuss the

skills and knowledge and officer must have to operate in such an environment, and the following

chapter will then explore how the Army Education System (AES), and other Department of

Defense programs, prepare officers to function in this large, complex and diverse environment.

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[56] Ibid:, 3.
[57] AR 711-7, 8. Logistics performance standards are found in AR 710-2, 750-1 and 700-138.

CHAPTER THREE

ESSENTIAL SKILLS, THEIR ATTAINMENT AND THE LEVEL OF COMPETENCE REQUIRED

The previous chapter described distribution and supply chain management, and provided

insight to their complexity as well as their importance for the Army and Department of Defense

in the future. This chapter posits essential skills and knowledge a logistics officer should have to

function effectively in a supply chain and distribution management environment. It will analyze

how the officer should attain these skills using the three pillars of leader development in

Department of the Army Pamphlet 600-3, *Commissioned Officer Development and Career*

Management. It will also offer a discussion on what level of learning officers should attain

throughout a career. It is recognized that discussing adult learning is extremely complex because

of adult variability, their motives for learning, experiences, learning styles, and emotions, and

while learning cannot be adequately explained by any single theory, Benjamin Bloom's

Taxonomy of Learning Objectives provides a useful construct with which to consider the issue.[58]

Essential Skills for the Distribution and Supply Chain Manager:

This section of the paper will propose essential skills and knowledge required for an

officer to function effectively in a supply chain and distribution management environment. The

focus is on those unique abilities required specifically for use in distribution and supply chain

management; it is not a broad-based analysis of all the professional skills required of an officer.

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[58] Huey B. Long, "Understanding Adult Learners," in *Adult Learning Methods: A Guide for Effective Instruction,* ed. Michael W. Galbraith (Malabar, Florida: Krieger Publishing Co, 1990), 25 and Dr. Benjamin S. Bloom, *Taxonomy of Educational Objectives*, Longman, New York 1956.

Three areas of competency are proposed to function effectively as a distribution and supply chain manager. These three areas are: technological competence; analytical competence; and a broad understanding of the supply chain. These three areas are explained further below.

Understandably, technology is used extensively throughput the distribution and supply chain management processes. Networked visibility of the assets, links, and tracking systems within the supply chain enables the processes, allowing decision makers to manage and redirect resources. Customers and suppliers communicate electronically using information technology. The technological area of competence includes the capability to use the software, hardware and web based technological tools that enable an effective and efficient distribution and supply chain management system. It includes some understanding of the communications requirements for a distribution system, which may include the bandwidth required to pass data that enables the system via various communications means, or the requirements of Automated Identification Technology (AIT), such as radio frequency identification tags. While it is beyond the scope of this paper to discuss all of the communications systems used , Joint Publication 4-01.4 highlights their importance; "The communications network links every facet of military operations....The capacity, reliability, and security of communications networks is vital, especially those that support the rapid transmission of theater distribution operations."[59] Networks are used extensively to connect the links within the system, and managers use technology to manage inventory, design models and use decision support tools to analyze proposed systems and to make decisions. Web based reports and sites are used to analyze reports to compare their unit's performance with supply chain segment standards.

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[59] JP 4-01.4, I-9.

An analytical or statistical background is useful to interpret metrics or performance measures of the system. Interpretation of data allows for adequate analysis of trends, problem areas and the development of models to design and evaluate systems. Joint Publication 4-01.4 states, "Combinations of U.S. military, (Host Nation) HN, multinational, and contractor organizations operate the nodes and modes of supply and transportation that distribute the forces and sustainment. These organizations collect and report data to a network of operational and logistic headquarters responsible for processing the data into information and issuing instructions to the node and mode operators."[60] Clearly the ability to comprehend and analyze the data collected and to transform it into information useful to make decisions requires analytical skills.

A holistic, end to end understanding of the entire supply chain includes understanding the nodes, modes and linkages, as decisions made in one area of the process can affect the entire chain. Understanding the supply chain includes inventory planning and management (including DCB), warehousing and distribution center expertise, as well as functional areas (supply, transportation, maintenance,) since they all have an effect on the chain. Mr. Fred Ballie, the executive director for business management in DLA's logistics operation division, emphasized this when he stated, "In the past, we tended to look at just our piece of a particular supply chain. If I was getting orders out of the warehouse in two days but it was still taking 60 days to get that order to the customer because the rest of the supply chain was falling down, that's not satisfactory from the user's perspective."[61] Joint Publication states that the "distribution system consists of a number of independent and mutually supporting networks. The effectiveness of the overall distribution system is diminished by the inefficiency of any of these supporting networks."[62] An

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[60] JP 4-01.4, I-1.
[61] Schwartz, Karen D. "Streamlining links in the Supply Chain," in *GOVEXEC.COM*, 1 March 2001, available at http://www.findarticles.com/p/articles/mi_hb3139/is_200103/ai_n7810344.
[62] JP 4-01.4, I-8.

understanding of the entire network of systems enables the manager to comprehend supply chain relationships in their entirety, and effectively identify and correct these inefficiencies. Dr. John Hall reinforces this point in his article "Afghan Supply Pipeline Performance" in the January/February 2003 issue of *Army Logistician,* stating "The supply pipeline is truly a system of component processes; therefore, as systems approach should be used to analyze and improve pipeline performance. Activities that focus on improving an individual segment without reference to the complete system may fail to improve overall materiel throughput or delivery time…"[63] Understanding joint organizations is also useful, as these will become more linked and interdependent in the DoD distribution system and supply chain as common user and cross service supply becomes more common in an effort to decrease the logistic footprint in theater. The informed distribution must understand the entire system well enough to balance efficiency versus effectiveness in supporting the warfighter.

Below, the pillars of Leader Development, from Department of the Army Pamphlet 600-3, will be introduced and used as the construct to consider how and when within an officer's career they should gain the areas of competency.

Pillars of Leader Development:

Department of the Army Pamphlet 600-3, *Commissioned Officer Development and Career Management* describes three pillars of leader development: institutional training, operational assignments, and self-development. Institutional training includes all of the schoolhouse training and education leaders receive, and it "provides the progressive, sequential education and training required to develop branch/functional area technical and tactical competencies…" Operational assignments provide the experience by which officers gain

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[63] Hall, 5.

additional skills, and "provides them the opportunity to use, hone and build upon what they learned through the formal education process." The third pillar is self-development, which is defined as "a planned, progressive and sequential program followed by leaders to enhance and sustain their military competencies. Self-development consists of individual study, research, professional reading, practice and self-assessment."[64]

Obviously, the point at which an officer is in his career affects the analysis of the three areas of competency introduced above. DA PAM 600-3 categorizes officers as "pre-branch qualified," which is from entry into the service to the eighth year of service; "Post-branch" officers (those company grade officers who have commanded a company and attended the career course), are generally in their eighth-12th year of service; Major's rank development generally occurs between 12-17th year of service; and Lieutenant Colonel (the highest level to be considered in this paper) development is during the 17th-22nd year of service.

Current pre-branch officers are developing the areas of competence required for distribution and supply chain management primarily through the experience pillar of the Army Leader development model, although efforts are underway in the Officer Education System to introduce more distribution and supply chain management curriculum into the basic and career course. Junior officers, operating in contemporary operations are "growing up" in a distribution management environment-they are still learning and gaining branch specific experience, but they will be operating in the new, multi-functional organizations in the transformed Army, such as the Distribution Company in a Brigade Combat Team's support battalion. Although the level of expertise varies, nearly all young officers are comfortable with computers and technology; one could surmise that they will primarily need some education in the specific applications used to

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[64] DA PAM 600-3, 3.

execute distribution and supply chain management operations. Analytical skills will vary widely based on officer's education and background. Some will gain exposure to this during their experience pillar dependent based on the organization and their position, but it the requirements should be introduced in the OES as well.

Post-branch qualified officers and Majors will be considered together. This group probably has some experience in the new environment, and most are certainly comfortable with technology. Analytical skills will continue to vary, although many have been exposed to the "metrics" used to measure performance within the distribution management environment. As officers progress through this stage of their careers, this population is the primary one in which the Army should select and send talented officers to advanced schooling in distribution and supply chain management, and then track them to put them in the right jobs to utilize their expertise.

Lieutenant Colonels and more senior officers gained their experience in the days of supply methodology, using static stockpiles rather than the dynamic materiel flow envisioned for the future, and they are generally past most OES schools. Few officers at this level are educated thoroughly on the principles and techniques of operating in or implementing an efficient distribution or supply chain management system. A sample of Quartermaster officers was asked how well prepared they felt they were to function in a DM environment, and if they felt well prepared to function in a DM environment, was it based on experience, or education. [65] Of the seven respondents, one felt adequately educated by the Army to perform well in the environment. The remaining two who were confinement in their distribution management abilities were self educated or had some experience with distribution management, at least at the tactical level. A

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[65] The author emailed a questionnaire to 14 QM officers; seven officers provided feedback. Questions asked are provided at appendix C.

number of officers at this grade gained experience by working on Velocity Management or Army Distribution Management teams, but it is a miniscule number as compared to the overall population of logistics officers. This category of officer must apparently rely primarily upon the self-education pillar of development. The Army has not introduced a program to "re-educate" this grade of officer in the changed environment in which many will now operate. The Army could direct a self-development educational program to prepare the more senior officers, rather than relying on the "school of hard knocks" for officers who find themselves operating with a new methodology or doctrine. Technological and analytical expertise will vary among these officers, so education should be focused on officers who are in a specific job or specialty that requires such expertise or officers should be selected based on their aptitude or educational background for positions requiring these skills.

The above discussion highlights the gap between new officers who are gaining the distribution and supply chain management experience, who generally have a higher level of technological expertise, and who will be educated in the concepts as courses adapt to reflect the new methodology. Mid-grade officers are also more likely being exposed to this environment during their operational assignments, and also can be selected and trained based on their performance and aptitude in advanced distribution and supply chain management principles, to include analytical skills required in the environment. In general, more senior officers have less exposure to education or operational assignments in this environment, and likely could use additional training. This could come in the form of elective self-education, or it could be "forced" self-education or a primer course that provides the skills to operate in the new environment. To introduce but not prepare officers for this environment risks an outcome somewhat similar to the Army's earlier efforts to introduce "just-in-time" logistics. The notion of "just-in-time" logistics is often disparaged in the Army, and it can certainly be argued that the Army may have gone too far to gain efficiencies, especially during the fiscally constrained 1990s. As the military downsized after Desert Storm and the end of the cold war, "politically motivated changes produced an

austere fiscal environment that limited the Army's ability to carry out the policies and

commitments mandated by the National Military Strategy. When the military operational

structure was reduced even as military commitments around the globe increased, Army supply

logistics became inadequate."[66] The Army took a number of steps to save money and become

more efficient, for example prescribed load list (PLL) policies were changed, greatly reducing or

eliminating PLL at the company level. Simultaneously, stock levels were reduced in authorized

stockage lists (ASL) across the Army. This created a lean supply chain without the benefit of

either an improved distribution system or enhanced information system capabilities.[67] The

example above highlights problems created primarily because of fiscal decisions; nonetheless it is

useful in highlighting that the Army should take positive steps to ensue the success of the

distribution and supply chain management environment by preparing its human capital.

Now that the methods by which officers gain this experience or education have been

discussed, the section below will consider the level at which one should understand the concepts,

using Bloom's Taxonomy as a construct.

Bloom's Taxonomy:

The next few pages briefly introduce Bloom's taxonomy. Dr. Benjamin Bloom, a

University of Chicago educator, along with a group of colleges developed a "taxonomy" of

educational objectives in an effort to provide a set of standard classifications for teachers.[68] This

taxonomy provides a useful construct with which to consider the educational goals of the Army's

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[66] Myers, "Eliminating the Iron Mountain," *Army Logistician* (July/August 2004), 40.

[67] From the Army G4 web site: http://www.hqda.army.mil/logweb/supplychain.html.

[68] Dr Bloom explains the selection of the word taxonomy on page 1 of his book , "Most readers have heard of the biological taxonomies which permit classification into such categories as phylum, class, order....Biologist have found their taxonomy markedly helpful as a means of insuring accuracy of communication about their science and as a means of understanding the organization and interrelation of the various parts of the animal and plant world. You are reading about an attempt to build a taxonomy of educational objectives."

effort to develop distribution and supply chain managers. Dr. Bloom's 1956 book entitled

Taxonomy of Educational Objectives provided a common set of terms for educators and

curriculum developers to use in specifying educational goals, and to help specify objectives so it

is easier to "plan learning experiences and prepare evaluation devices."[69] Theses categories or

"domains" as Bloom called them, are the cognitive, affective and psychomotor domains. The

cognitive domain "includes those objectives which deal with the recall or recognition of

knowledge and the development of intellectual abilities and skills."[70] The affective domain

describes learning in emotional areas, and "includes objectives which describe changes in

interest, attitudes, and values, and the development of appreciations and adequate adjustment."[71]

The psychomotor domain is for physical skills. Dr. Bloom's book defines the cognitive domain,

which is provides the relevant concept with which to consider the topic in this paper. Bloom and

his colleges developed their taxonomy and organized it into six major classes, from simple to

complex. The six classes are knowledge, comprehension, application, analysis, synthesis and

evaluation. These classes will be described below, along with question cues for each class to aid

in comprehending the level of understanding required for the category.[72]

      Knowledge is the first and simplest level of competence, and is demonstrated by

exhibiting the following skills: observation and recall of information; knowledge of dates, events

and places; knowledge of major ideas. Question cues for knowledge are list, define, tell,

describe, identify, show, label, collect, examine, tabulate, quote and name. The second level of

competence is comprehension, which is: understanding information; grasping its meaning;

translating knowledge into new context; interpreting facts, comparing and contrasting; order,

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[69] Dr. Benjamin S. Bloom, *Taxonomy of Educational Objectives*, 2.
[70] Ibid., 7.
[71] Ibid.
[72] from "Bloom's Taxonomy" on the University of Victoria's Counseling Services Learning Skills Program internet website at: http://www.coun.uvic.ca/learn/program/hndouts/bloom.html.

grouping and inferring causes; and predicting consequences. Question cues are summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, and differentiate. The third level is Application, and it is: the ability to use information; to use methods, concepts and theories in new situations; and to solve problems using required skills or knowledge. Questions cues are apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment and discover. The fourth level in Bloom's taxonomy is analysis. Analysis is: the ability to see patterns and the organization of parts; to recognize hidden meanings; and to identify components. Question cues are analyze, separate, order, explain, connect, classify, arrange, divide, compare, select and infer. Synthesis is next, and it is: the ability to use old ideas to create new ones; to generalize from given facts; to relate knowledge from several areas, and to predict and draw conclusions. Question cues are combine, integrate, modify, rearrange, substitute, plan, create, design, invent, compose, formulate, prepare, generalize and rewrite. The sixth and final level is evaluation. Evaluation is the ability to: compare and discriminate between ideas; assess value of theories and presentations; make choices based on reasoned argument; to verify the value of evidence; and to recognize subjectivity. Question cues are assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, and summarize. Now that Bloom's taxonomy has been introduced, the levels of learning desired will be considered using this taxonomy.

The Army's goal should be to design education curriculums for its distribution managers to the level of application as a baseline requirement. Distribution managers must be able to apply the techniques of distribution management, since that is the environment in which they will be operating. It is not sufficient to be at the level of knowledge ("the remembering, either by recognition or recall, of ideas, material, or phenomena") or comprehension (which is "when students are confronted with a communication, they are expected to know what is being communicated and to be able to make some use of the material or ideas contained in it"). Bloom's taxonomy is hierarchical, so the levels build upon one another, so "each classification

within it demands the skills and abilities which are lower in the classification order."[73]

Application is most appropriate baseline level of learning for distribution managers, as it provides the level at which an individual can apply the principles learned. Bloom describes the distinction between comprehension and application below:

> A problem in the comprehension category requires the student to know an abstraction well enough that he can correctly demonstrate its use when specifically asked to do so. "Application," however, requires a step beyond this. Given a problem new to the student, he will apply the appropriate abstraction without having to be prompted as to which abstraction is correct or without having to be shown how to use it in that situation. A demonstration of "Comprehension" shows that the student <u>can</u> use the abstraction when its use is specified. A demonstration of "Application" shows that he <u>will</u> use it correctly, given an appropriate situation in which no mode of solution is specified.[74]

With the minimum requirement for learning as application level for those designing curriculum to educate distribution managers, the level appropriate for the positions requiring more expertise will now be considered. The levels above application are analysis, synthesis and evaluation. While certainly the goal for an educational program developing expertise in a topic should be to move the student as far up the hierarchy as possible, the minimum requirement for the expert distribution manager should be the ability to synthesize the information. The synthesis level of learning enables the student to put together "elements and parts so as to for a whole." Distribution and supply chain management requires a holistic view of the chains, and the level of synthesis involves "a recombination of parts of previous experience with new material, reconstructed into a new and more or less well-integrated whole." [75]

After considering above the level at which programs should be designed to instruct student developing distribution and supply chain management skills, programs in institutional

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[73] Bloom, 62, 89 and 120.
[74] Ibid., 120.
[75] Ibid., 162.

training, operational assignments in which this experience may be gained, and self-development

resources will be examined.

DISTRIBUTION AND SUPPLY CHAIN MANAGEMENT: EDUCATION AND EXPERIENCE

The previous chapter discusses the skills and knowledge a distribution or supply chain manager should have, along with considering the level of learning required. This chapter will consider ongoing efforts to educate and provide experience to officers in these skills, and will also provide other educational efforts or resources available. The institutional training, operational Assignments, and self-education pillars previously introduced will be used to frame the discussion.

Institutional Training:

Thomas A. Reichert, director of the Defense Distribution Management Course, Army Logistics Management College (ALMC), Fort Lee, Virginia stated distribution management curriculum is included to varying degrees in several educational courses provided by the ALMC.[76] The most significant content is included in the Logistics Executive Development Course (LEDC), covering both physical distribution and transpiration management. The captains' and warrant officer advanced courses, as well as the warrant officer basic course include a lecture on physical distribution management. The college has also begun developing a weeklong supply chain management course scheduled to begin August 2005.[77] At this point, these courses appear to either provide a brief overview of the topic of distribution management, or they focus on a particular segment in the distribution management chain. To use Bloom's taxonomy, they probably get to the knowledge or perhaps the comprehension level, but they do not provide the

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[76] Thomas Reichert provided this information, and much more, in a series of email and phone conversations with the author.
[77] Ibid.

thorough, across the segment education one would expect an expert distribution manager requires to apply the principles or techniques. In a *Quartermaster Professional Bulletin* article written jointly by the Deputy Commander of the U.S. Army Quartermaster School and the Director or the Logistics Training Department, the authors acknowledge that the current training system teaches the technology used to execute distribution management systems, but does not "assimilate the technologies into distribution management."[78] Additionally, Brigadier General Scott West, the Quartermaster General, stated, "We have been preaching DM for 15 years but no one teaches it (at least not a meaningful POI). We lack a formal program of instruction to train leaders how to do this very profound and critically essential function."[79]

BG West was asked how well prepared most officers are for a distribution management environment. He stated, "Not very well prepared, unless they have had a similar experience on a previous operation. Imagine a young Captain being assigned to the DM cell of a TSC and nothing he/she has ever done in their career has prepared them for success in that environment. That is what we are doing here at the QMC&S. We have a short POI inserted in the advance courses (ANCOC, WOAC and CLC3 phase II) to give them a hands-on experience with DM."[80] To correct this deficiency, the Quartermaster Center and School is also establishing a Distribution Management Training Facility at Fort Lee, Virginia. Christine Myers, a Certified Professional Logistician serving as a Logistics Management Specialist at U.S. Combined Arms Support Command, stated in an article in the *Quartermaster Professional Bulletin*, "The establishment of a facility solely geared to training distribution management marks the beginning of a new era for

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[78] Scott G. West and Brent R. Nase, "Training Distribution Management," *The Quartermaster Professional Bulletin*, Spring 2003, 4.
[79] Email exchange between the Quartermaster General and the author, 18 January 2005.
[80] Ibid.

the Quartermaster Corps in transforming institutional training to meet the challenges of a future distribution based logistics system."[81]

Advanced degree programs are also available, but appear to be utilized to varying levels. Mr. Reichert stated the most significant content is included in the Logistics Executive Development Course (LEDC); a recent graduate of the LEDC program acknowledged that he had training in distribution management at both LEDC and in the advanced course, saying it was, "Not a lot, but enough to understand the fundamentals."[82]

The Naval Post Graduate School offers a Master of Business Administration in supply chain management; however of the 290 attendees in the last ten years, only eight were Army officers.[83] Additionally, despite the availability of both Training with Industry and civilian educational opportunities, few develop expertise in supply chain and distribution management. Most Quartermaster TWI programs are focused the Petroleum, Oil and Lubricants field.[84]

However, positive steps are being taken by organizations to rectify the educational deficiencies. For example, the United States Transportation Command, in its role as the Distribution process Owner for the Department of Defense, recently held a "DPO Educator's Day."[85] The day was designed to bring together various DoD educational institutions who could educationally support the DPO mission. Additionally, to further support USTRANSCOM's DPO

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[81] Myers, Christine J. "The Quartermaster Corps-Embracing Logistics Transformation," *Quartermaster Professional Bulletin,* Spring 2003, 45.

[82] Email exchange with the Tank and Automotive Command (TACOM) Commander's aide, a 2004 graduate of LEDC-FIT.

[83] Information provided by Gary Dent, Director, Education Analysis Office of Academic administration, Naval Postgraduate School in a February 11, 2005 email.

[84] Information provided by the Quartermaster Branch chief via email on 21 January 2005.

[85] Announced in *The DPO Update,* 13 January 2005, a USTRANSCOM produced, single-page, biweekly publication sent to Distribution Process Owner (DPO) stakeholders to inform and enhance awareness of initiatives and activities within the DPO community. It is designed to provide an executive overview and to facilitate information sharing through various web links. Email subscription is available by sending a blank e-mail to join-dpoupdate@mercury.afnews.af.mil.

mission, the Defense Logistics Agency's Human Resources Directorate Training Center produced the first Supply Chain Management Training Catalog. This outstanding catalog is a "comprehensive catalog of educational and training resources for supply, distribution, transportation and end-to-end supply chain management." The 230 page catalog contains "college and universities, military service schools and war colleges, commercial training vendors, and trade and professional organizations that are recognized leaders for supply chain management education and training." The catalog provides information on 23 universities that provide education related to supply chain management, as well as service and defense agency training resources. Universities in the catalog offer various programs in supply chain certification, bachelor, masters, and doctoral programs, as well as executive courses.[86] Although this catalog was published just recently, and extensive participation by Army logisticians in the programs it details is not yet occurring, identification of the resources available constitutes an important step towards providing the requisite skills required. The Army also recognizes the importance of providing education and training in new logistical skills. The major revision of Army Regulation 710-2, *Supply Policy Below the National Level*, published 25 February 2004, "adds the requirement for U.S. Army Training and Doctrine Command to add emerging logistics technology and trends to logistics training in military occupational specialty producing and professional development schools and programs."[87]

Although institutional training may be lagging somewhat, clearly the importance of incorporating distribution and supply chain management is recognized as important, and is being

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[86] The catalog was announced in the USTRANSCOM news service article "Team Compiles first Supply Management Training Catalog," 9 November 2004, available at http://www.transcom.mil/pa/body.cfm?relnumber=041109-1. A USTRANSCOM POC emailed a copy of the catalog of the author on 28 Jan 2005.

[87] Army Regulation 710-2, *Supply Policy Below the National Level*, 25 February 2004, page 2 in the "Summary of Change" section.

incorporated into various programs. The section below will consider operational assignments as a method by which distribution and supply chain management experience is gained.

Operational Assignments:

To this point, the Army has largely relied on experience, usually gained by the officer "on the job" once assigned to a position requiring distribution and supply chain management expertise. The author asked the Quartermaster General how well prepared he was to function in a distribution management environment as the Combined Joint Force Land Component Command (CJFLCC) C-4 for Operation Iraqi Freedom; he responded, "I think I was fairly well prepared for this task, but my prep was based on field experience. I had never had a course of instruction and learned in the "School of Hard Knocks". Every major unit (Corps, Division, Task Force) is engaged in DM, they all have TTP that works for them, but day one in the hot seat and you are forced to learn under pressure."[88]

As discussed previously in chapter three, the opportunity to gain experience in operational assignments will increase as the Army and DoD implements these processes, and reorganizes units to fulfill the requirements. Officers will have the opportunity to serve in distribution platoons in the Forward Support Companies support maneuver battalions in brigade combat teams; distribution companies in the brigade support battalions; and sustainment brigades and theater sustainment commands executing distribution operations. As supply chain management becomes prevalent, officers will assuredly gain experience in it as well.

This new environment is in contrast to the way officers previously gained this experience, which was usually in "niche" jobs on the Velocity Management Team (now the Army Distribution Management office), in AMC's Logistical Support Agency, select positions within

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[88] 18 January 2005 email between the author and the Quartermaster General, BG West.

the Defense Logistics agency, and more recently, with USTRANSCOM while working

Distribution Process Owner implementation.

Self-education:

For officers interested in self-education, there are ample opportunities. For example, the University of Maryland's Robert H. Smith School of Business supply chain on-line seminars, an interactive program available at no cost on at the Officer of the Deputy under Secretary of Defense (Logistics and Materiel Readiness) web site.[89] Several universities, such as Arizona State, Howard, Michigan State, Northwestern, and Pennsylvania State offer online executive or certification programs.[90]

Professional organizations also provide an avenue for self-education. In addition to the professional resources the organizations provide, they also award professional certifications to recognize supply chain expertise. The Association for Operations Management (APICS) offers a supply chain professional certification, called the Certified Supply Chain Professional (CSCP). The Council of Supply Chain Management Professionals (CSCMP) offers educational resources on its website, including access to courses, classes, and on-line education. The Institute for Supply Management (ISM) offers two professional certifications; the Certified Purchasing Manager (C.P.M.)-globally the most recognized designation for supply management professionals-and the Accredited Purchasing Practitioner (A.P.P.).[91] The International Society of Logistics (SOLE), a "non-profit international professional society composed of individuals

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[89] Located at http://www.acq.osd.mil/log/sci/.
[90] From the Defense Logistics Agency's Human Resources Directorate Training Center's *Supply Chain Management Training Catalog.*
[91] From the ISM webstie, at http://www.ism.ws/AboutISM/index.cfm.

organized to enhance the art and science of logistics technology, education and management"[92] awards the Certified Professional Logistician (C.P.L.). Additionally, there are civilian numerous books, journals, and articles available, as well as military regulations and articles that provide information on the topic.

An article in the business periodical Bobbin entitled "Logistics managers: The new movers and shakers"[93] profiles eleven logistics executives. The article relates that logistics management has changed from a fragmented function to one that is much more integrated, not unlike that which we have seen in the military aspects of logistics management. Although the logistics experts profiled in the article have varied backgrounds and experience, the article states that "It is evident in these examples that education is important in this field. Based on other potential candidates' backgrounds that Seitchik Corwin and Seitchik has reviewed, it's apparent that an individual does not become a senior vice president of logistics through the "school of hard knocks." It takes formal training."[94] The discussion above shows that the Army, and more broadly, the Department of Defense, recognizes that education is important, and that there currently is an educational deficiency.

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[92] From the SOLE website at http://www.sole.org/about.asp.
[93] J Blade Corwin, "Logistics managers: The new movers and shakers," *Bobbin,* May 2000, 80.
[94] Corwin, 84. Seitchik Corwin and Seitchik is an executive search firm specializing in recruiting professional management personnel for the apparel, textile, footwear, accessories and home fashion industries, both wholesale and retail.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

This paper described the Army's transition from a mass-based logistical system to a distribution-based system. It also discussed supply chain management from both a military and commercial perspective. The third chapter proposes the skills and attributes required to operate in a distribution and supply chain environment, and offers a discussion of the level of learning required using Bloom's Taxonomy. The fourth chapter describes Army and DOD programs to educate and provide experience to officers in these concepts. This final portion of the paper offers recommendations for the Army to consider as it continues its transformation to a distribution and supply chain management based logistical environment.

It is recognized that officers are not the only ones in the logistics community who will operate in this new environment. Little would occur without the noncommissioned officers and enlisted soldiers who execute daily operations, and incredible expertise resides in Department of the Army civilians and contractors who support the Army's efforts. However, this expertise is also important for and should reside in the officer logisticians. A couple examples will emphasize this point.

Thus far, the effectiveness of the Army's efforts to implement distribution management concepts and reduce the huge stockpiles of supplies, and the requisite resources required to manage these stockpiles, has received mixed reviews thus far. In the April 2004 AUSA Torchbearer National Security Report, it states, "Army Logistics has worked to reduce the "iron mountains" of materiel through better business practices and enhanced supply and distribution

automation efforts. To a large extent, these efforts have paid off."[95] However, *On Point*, the study of the United States Army in Operation Iraqi Freedom disagrees with this assessment. It states that "concepts such as "just-in-time logistics" briefed better than they performed."[96] Although these mixed reviews certainly cannot be attributed to officer educational alone, one would surmise that providing a well-educated experienced officer corps to execute these new principles upon which logistics will be executed for the Army and DoD would only be helpful. An example of the Army using such officer expertise occurred during Operation Iraqi Freedom, when it was recognized a theater distribution center must be established. Colonel Joseph Walden, a self-educated expert in distribution management who had recently been selected as one of the "Top 20 Logistics Executives in America," was tasked to deploy to Kuwait and run the operation. Colonel Walden was a brigade commander at the National Training Center at the time, and that a brigade commander was tasked away from his command to perform the operation is evidence that one, such expertise is required, and two, that perhaps not enough expertise is resident in the Army. Colonel Walden gained his expertise through experience, as chief of the Army Velocity Management Program, and through self-development when, after developing an interest in the discipline, he educated himself, becoming a Certified Fellow in Production and Inventory Management (CFPIM).

The trend appears to be in the right direction, as logisticians gain operational experience in distribution management operations, and as Army education continues to incorporate distribution and supply chain management principles into its curriculum. The Army's Deputy Chief of Staff, G-4 Supply Chain Integration Management office published the capstone

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[95] "The New Paradigm: Bringing Army Logistics into the 21st Century," *Torchbearer National Security Report,* (April 2004), 19.
[96] *On Point,* xxvii.

regulation AR 711-7 (Supply Chain Management) which establishes policies, responsibilities and principles for the supply chain management program; it includes educational directives as well. It directs the CG, U.S. Army Training and Doctrine Command (TRADOC) to "Incorporate SCM policies, doctrine, and procedures into TRADOC school instruction and training publications" and that the CG, U.S. Army Combined Arms Support Command (CASCOM), "As directed by TRADOC, incorporate SCM policies, doctrine, and procedures into CASCOM school instruction and training publications."[97] One of the guiding principles in AR 711-7 is to "provide timely, up-to-date training and supporting technology to logistics organizations and personnel."[98]

As discussed earlier in this paper, the level of understanding these principles can vary. A foundational level of understand should be developed by all logistics managers. A higher level of expertise is required for logisticians in key positions who influence the design of such systems, and who mesh the processes, particularly between the wholesale and retail levels. Certainly a thorough understanding of distribution and supply chain management and the requisite education required given the complexity of the topic must be balanced with other educational and training requirements of the officer. The ample civilian educational resources available were explored briefly in this paper, and, although they are appropriate for some, the military schools must continue to implement training programs specific to the needs of the services. The Quartermaster General, BG West, shared this opinion, stating, "First, I think the DM training and certification done by commercial enterprises is superb to meet their needs. The Grainger Corporation, as well as many others, offer great training, but it is focused on civilian applications. In the military construct strategic distribution (National level provider to operational level provider) might be a good fit, however, battlefield distribution (operational level provider to combat forces, the "Last

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[97] AR 711-7, *Supply Chain Management*, 19 November 2004, 2.
[98] Ibid., 3.

Tactical Mile") is considerably different, more complex, dynamic and challenging. In the commercial world money drives priorities and solutions. In our world prosecution of combat operations, enemy forces and lives drive the train. While I think there is goodness in training our military and civilian personnel in the commercial programs, I firmly believe the institutional training of battlefield distribution must be done in a military construct with (subject matter experts) SMEs that have had considerable experience."[99] Obviously the level of expertise required and the training methodologies can vary based upon one's duty position. It is critical to provide the right experience and education consummate with duties required, and then track personnel with distribution and supply chain management expertise to ensure they are placed in the correct jobs or are available for key planning tasks. An Additional Skill Identifier (ASI), or a designated functional area may be a way to accomplish this. The functional area approach is one advocated by the Quartermaster General, who stated in an email exchange with the author that, "...in my opinion, we should develop distribution managers as a functional (perhaps multifunctional) discipline. I can envision a non-accession MOS for senior NCOs, warrant officers and officers. Perhaps an MOS 90D which draws from MOSs in QM, TC, OD, MSC, a similar WO MOS and an officer specialty, perhaps FA90D. I am not in favor of ASIs as a management tool. I think we need specialties that have a leader development model and career map to SGM, CW5 and COL."[100]

Given the current operational conditions and competing educational and operational requirements, it is probably not realistic to thoroughly educate all logistics officers in distribution management to the degree civilian managers are, nor is it necessarily required. A cadre of

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[99] 18 January 2005 email between the author and the Quartermaster General, BG West.
[100] Ibid.

expertly trained and experienced distribution managers who are tracked for specific assignments or an education program that prepares logisticians for such an environment is sufficient.

Joint Publication 4-01.4 states that, "The goal of distribution managers is to make the distribution system efficient and effective."[101] While distribution and supply chain management are not panaceas that will solve all logistical problems, the Army must educate and develop logisticians who are skilled at designing, implementing and managing such systems-those who can balance effectiveness with efficiency, and understand the reasonable trade off between stockpiling the right supplies forward and moving them forward quickly with visibility in the pipeline to support the warfighters.

APPENDIX A - AUTOMATIC IDENTIFICATION TECHNOLOGY

This appendix provides information on Automatic Identification Technology and other resources used to aid asset visibility for distribution and supply chain management.[102] One of the most important capabilities required for distribution and supply chain management is the ability see where an item is in the system, whether it's at the factory, depot, supply activity or other organization, or in transit via the various transportation modes. Automatic Identification Technology (AIT) provides the means to collect the data that is then passed to information systems that receive, store, transmit, and display the data. AIT provides this data as its name implies, automatically with minimal human intervention, which is faster and more accurate when compared to human manual entry processes. Examples of AIT devices include bar codes,, magnetic circuit cards, optical memory cards and radio frequency identification tags. AIT also

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[101] JP 4-01.4, I-6.
[102] Information extracted from the Department of Defense Joint Total Asset Visibility Strategic Plan, January 1999 available at http://www.acq.osd.mil/log/jtav/stratplan/cover.htm

includes the hardware and software used to read information on storage devices, as well as satellites to track and redirect shipments.

Bar codes are familiar to most everyone, as they are used virtually on every retail product. The array of black and white spaces represent a data element that serves as a point of reference in a central database.

Optical Memory Cards (OMC) are about the size of a credit card and use optical technology such as that used on audio compact disks. Information can be written to the card incrementally. An example of the use of an OMC is on the outside of a multi-pack box, which fits on a standard wooden pallet. A multi pack box may contain hundreds of items; as these items are loaded, the contents are captured on the OMC, which can then be processed by the receiving customer through the use of an OMC reader.

Radio Frequency Identification consists of transponders and interrogators. Information about the item or its contents is loaded in the Transponder, which is then placed on the item (463L pallet, 20 foot container, vehicle) being shipped. The transponder uses radio waves to communicate the location of the item and its contents as it passes an interrogator, which are placed at every major node transfer point in the chain. Hand held interrogators are also available for field sites or temporary locations.

Satellite Tracking Systems provide the ability to track the exact location of a transceiver because its location is transmitted via satellite to a ground station. This technology is the same as that used in "Blue Force tracker" and is used extensively in the commercial motor carrier industry.

APPENDIX B - ARMY SUPPLY CHAIN MANAGEMENT PROGRAM GOALS

Goals listed in AR 711-7, *Supply Chain Management*, are listed as follows:

- Structure materiel to provide responsive, consistent and reliable support to the warfighter during war and peacetime.

- Size secondary item inventories to minimize the Army's investment while providing the inventory needed to support war and peacetime requirements.

- Consider all costs associated with materiel management, including acquisition, transportation, storage and maintenance in making best-value logistics materiel and service provider decisions central to total life cycle systems management.

- Implement materiel management functions with commercial off-the-shelf systems of DOD standard data systems. This goal encompasses the implementation of continuous SCM capabilities, within an integrated knowledge environment, to accomplish the end-to-end distribution of required materials and related services from point of acquisition to point of delivery to the end user.

- Maintain materiel control and visibility of secondary inventory down to and including retail inventories. This involves the incorporation of commercial and Government best business practices to continuously improve Army supply chain processes and instill user confidence in the materiel management system.

- Continuously identify, isolate, and implement solution for sub-optimized processes through the development of supply chain strategies, performance metrics, and programs.

APPENDIX C – QUESTIONS USED TO SURVEY OFFICERS

1. How well prepared are you to function in a Distribution Management (DM) environment?

2. If you feel well prepared to function in a DM environment, is it based on your experience, or education? Describe your DM experience or education.

3. There are civilian master's degree programs in logistics and supply chain management, as well as professional certifications. Do you think you would benefit or could better perform your duties if you had such education or certifications?

4. Should officers with the experience or education be tracked specifically for use in jobs where distribution management expertise is required?

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