ARMY BUSINESS TRANSFORMATION: THE UTILITY OF USING CORPORATE
BUSINESS MODELS WITHIN THE INSTITUTIONAL ARMY

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This thesis investigates the utility of transforming the Institutional Army through the use of corporate business models. Through a survey of the literature of published corporate business plans and models, military reports, Army depot case studies, and comparative analysis of emerging computer software technology, factors fundamental for successful transformation within the Institutional Army are identified.

This study finds that working corporate models, such as Lean Six Sigma (LSS), are available which are already enabling the transformation of a very specific aspect within the institutional Army. However, the study has also discovered that this model does not possess the capability to serve as an all-encompassing model facilitating the total transformation within the institutional Army, implying that the application of several models in conjunction with LSS is a better use of resources.

The research has also shown that other civilian models can be applied to the Institutional Army as well. They include enterprise resource planning systems (ERP) and information networks (IN). Clearly, each one of these civilian models brings different capabilities to the Institutional Army.

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The opinions and conclusions expressed herein are those of the student author and do not
necessarily represent the views of the U.S. Army Command and General Staff College or
any other governmental agency. (References to this study should include the foregoing
statement.)

ABSTRACT

ARMY BUSINESS TRANSFORMATION: THE UTILITY OF USING CORPORATE BUSINESS MODELS WITHIN THE INSTITUTIONAL ARMY, by MAJ John J. Bailer Jr., 71 pages.

This thesis investigates the utility of transforming the Institutional Army through the use of corporate business models. Through a survey of the literature of published corporate business plans and models, military reports, Army depot case studies, and comparative analysis of emerging computer software technology, factors fundamental for successful transformation within the Institutional Army are identified.

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ACKNOWLEDGMENTS

To my wife Pervin and to my parents Alice and John J. Bailer Sr.

A perfection of means, and confusion of aims, seems to be our main problem.

Albert Einstein

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ACRONYMS

AA   Associate of Arts

BRAC   Base Realignment and Closure

BS   Bachelor of Science

CRM   Customer Relationship Management

DBMS   Database Management system

DoD   Department of Defense

DOL   Directorate of Logistics

ERP   Enterprise Resources Planning Systems

HW   Hardware

HRM   Human Resource Management

IBM   International Business Machines

IN   Information Networks

IT   Information Technology

LSS   Lean Six Sigma

MMAS   Masters Military Art and Science

OODA   Observe, Orient, Decide Asses

RFID   Radio Frequency Identification

ROIC   Return on Investment Capital

SCM   Supply Chain Management

SW   Software

USA   Unites States Army

US   United States

VLSI   Very Large Scale Integration

ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

The thesis questions are, Do corporate business models exist that have solved problems similar to those facing the Institutional Army today? And is it possible to tailor these business models such that they can be applied in selected venues as part of the Army Business transformation program?

The primary and secondary questions to be answered are: (1) Are business models, such as lean six sigma (LSS), enterprise resource planning systems (ERP), and information networks (IN), designed to allow corporations to become more efficient and effective? And (2) are there similarities between the Institutional Army and corporations that would enable the Institutional Army to implement the business models and thereby to become more efficient and effective?

In an attempt to answer these questions and to gain an understanding as to ascertaining the purpose behind this study, it is important to understand the context of the research in addition to obtaining a sense as to the study's historical background and significance.

Currently, budgetary constraints within the Army are becoming increasingly prevalent and focused, thereby driving the need for the Institutional Army (business side) to transform in order to become more efficient and effective. As a result, Army business transformation requires more efficient, effective and successful business models.

The Institutional Army has a real need to become more efficient and effective in the way it is currently doing business. BRAC (Base Realignment and Closure) provides a singular opportunity to reshape the Army's institutional infrastructure in order to

optimize military readiness, which is become more efficient and effective. The process assists in finding creative and innovative ways to consolidate, realign, or find alternative uses for current facilities in order to ensure that the U.S. continues to field the best-prepared and best-equipped military in the world. BRAC is a congressionally authorized and approved process that DoD has previously used to reorganize the organization's base structure to more efficiently and effectively support the United States Armed Forces, in order to increase operational readiness and to facilitate new ways of doing business.[1] BRAC also enables the US military to better match facilities to forces, meet the threats and challenges of a new century, and make the wisest use of limited defense dollars. As budgetary constraints within the Army become increasingly prevalent and focused, the need for the Army to transform in order to become more efficient and effective continues to play an increasingly important role.

As a result, the Army has a critical need to improve the noncombat or institutional infrastructure to make it more efficient and cost effective. How can the Army solve its problem of making the Army's institutional infrastructure more efficient and cost-effective?

In order to become more efficient and effective, a successful organization, military or civilian, must observe, orient, decide, and then assess (OODA) the current situation in a continuous loop,[2] in order to stay afloat.

As an example of this type of decision cycle is a fighter pilot being scrambled to shoot down an enemy aircraft. Before the enemy airplane is even within visual contact range, the pilot will consider any available information about the likely identity of the attacker: his nationality, level of training, and cultural traditions that may come into play.

When the enemy aircraft comes into radar contact, more direct information about the speed, size, and maneuverability of the enemy plane becomes available, unfolding circumstances take priority over radio chatter. A first decision is made based on the available information so far: the pilot **decides** to "get into the sun" above his opponent, and applies control inputs to climb. The pilot then **observes** whether the attacker begins reacting to the change of altitude? He then **orients** to see if the enemy is reacting characteristically or perhaps acting like a noncombatant? As the dogfight begins, little time is devoted to orienting unless some new information pertaining to the actual identity or intent of the attacker comes into play. Information then (1) cascades in real time, and the pilot does not have time to (2) process it consciously; the (3) pilot then reacts as he is trained to, and (4) conscious thought is directed to supervising the flow of action and reaction, continuously repeating the OODA cycle. Simultaneously, the opponent is going through the same cycle.

It is interesting to note the observed information within the OODA loop needs to be processed in order to orient the decision maker. The second O, orientation as the repository of genetic heritage, cultural tradition, and previous experiences is the most important part of the OODA loop since it shapes the way the decision maker observes, decides, and acts. As stated by COL John Boyd, there is much filtering of the information through culture, genetics, ability to analyze and synthesize, and previous experience. Since the OODA Loop was designed to describe a single decision maker, the situation is usually much worse than shown as most business and technical decisions have a team of people observing and orienting, each bringing their own cultural traditions, genetics, experience and other information. Such activity will make the decision maker appear

ambiguous and unpredictable thereby generate confusion and disorder among his

adversaries since the adversaries will be unable to generate mental images or pictures that

agree with the menacing as well as faster transient rhythm or patterns they are competing
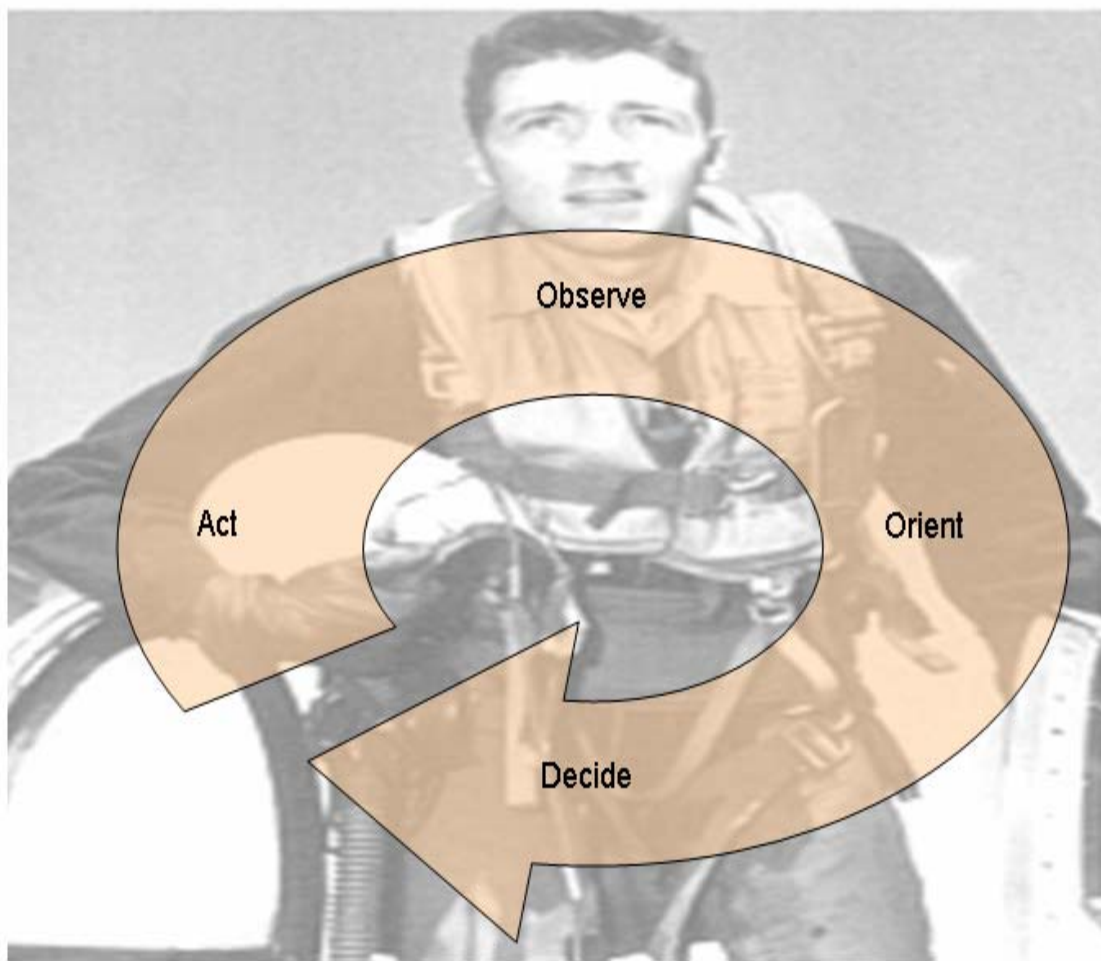
against.

Figure 1.   OODA Loop: Depiction of COL John Boyd's OODA Loop Continual
Process

How does the pilot combat his opponent's OODA cycle? As presented in figure 1, one of John Boyd's primary insights in fighter combat was that it is vital to change speed and direction faster than the opponent. This is not necessarily a function of the plane's ability to maneuver, rather the pilot must think and act faster than the opponent can think and act. The pilot must begin by getting "inside" the cycle in order to short-circuit the opponent's thinking processes which will produce opportunities for the opponent to react inappropriately.

The same cycle operates over a longer timescale in a competitive business landscape, and the same logic applies. Decision makers gather information (**observe**), form hypotheses about customer activity and the intentions of competitors (**orient**), make **decisions**, and **act** on them. The cycle is repeated continuously. The aggressive and conscious application of the process gives a business advantage over a competitor who is merely reacting to conditions as they occur, or has poor awareness of the situation. The approach favors agility over raw power in dealing with human opponents in any endeavor.

As in the case of the OODA loop, successful corporations and the Institutional Army must adapt quickly and apply several different combinations of models as appropriate to their current situations. Likewise, in order for any combination of models to work effectively there must be logical linkages between models in order to obtain the desired solution and results. In this situation, the LSS model will not work well by itself and will only work effectively if there is a strong functionality linkage between LSS, ERP, and IN and that of the corporations and the Institutional Army; the stronger the link

the better the model and the organization, the better the models will work together, and the more efficient and effective the organization will be.

Through the process of observing the corporate world through newspapers, articles, books, and published business plans, the business community seems to have the same concerns as with the Institutional Army with regards to an ineffective and inefficient repetitive functionality program. The readings seem to suggest some of solutions to the corporate problem were the implementation of certain business models designed to combat the repetitive functionality with systems intended to streamline the work load ratio. The corporate use of the LSS business models to combat inefficient repetitive functionality within the work place personifies the work load ratio managerial challenge. The LSS model helped corporations solve the work load ratio challenge, in some respects, by eliminating idle time within the work place thereby becoming more efficient and effective. Likewise, in order for the Institutional Army to solve some of the same characteristics shared by the corporate world, LSS model could be made to solve the same repetitive functionality characteristics shared by the corporate world.

The challenges faced by the corporate world are many in terms work load ratio efficiency. The idea of a repetitive functionality shared by both the corporate world and the Institutional Army is just one of the many issues concerning efficiency and effectiveness within the work place. The LSS model, identified within the corporate world and used within the Institutional Army is just one aspect facing the Army's institutional cost-effective infrastructure challenge. There are other challenges facing the corporate world and the Institutional Army that are not directly linked to the repetitive functionality and that therefore limit the use of the same LSS corporate model for solving

different corporate and Institutional Army problems. For example, the corporate world and the Institutional Army not only share the same repetitive characteristics but they also share nonrepetitive characteristics as well, such as human resources, budgeting, financial management, warehousing, distributions, and the purchasing and acquisition process. These nonrepetitive characteristics are dynamic in nature signifying that a nonrepetitive type of model could be use in solving efficiency issues linked to the Institutional Army and corporations alike.

Moreover, if by adapting and implementing several successful and dynamic corporate business models into the Institutional Army as a part of the Army's overall business transformation, would the result show a much more efficient and effective organization for support of our combat troops?

Corporations transform in order to survive; changes in market conditions and corporate responses to those changes dictate sales revenue. Transformation must occur in business in order to meet customer's needs and wants or the company goes out of business. Although the Army will never go out of business, the Army must also continue to transform their Institutional business processes, systems and capabilities in order to control costs and meet desired schedules more efficient and effectively.

The Institutional Army has identified a need to improve its capability by way of utilizing corporate business models in order to solve certain aspects within the business side of the Army. Within the corporate world there are certain business models associated with solving repetitive functionalities coupled with manufacturing, warehousing, inventory, and distribution that have the similar characteristics as within the Institutional Army, such as warehousing, distribution, disassembly, repair either or replace, cleaning

and painting, assembly, and testing. As a consequence, these characteristics are binding, linking the two organizations in a way in which both problem sets could be solved by applying one set of business application, such as LSS. However, when a business transforms due to market conditions, then the business begins the process of applying a known set of business solutions, LSS, to solve a certain problem set, repetitive functionality, transforms as well. Consequently, the application of applying one set of business solution to a know problem may not work, because the problem has changed and so must the application of solving the new problem.

Generally speaking, the Army conducts business transformation very well. The Army adapts to changing business practices on a recurring basis and implements significant changes only when something drastic happens that results in inefficiency and ineffective outcomes requiring a need to make the business side of the Army a better process. How can this process be improved? If the Army looked for business organizations (centered on manufacturing, distribution, warehousing, human resource and transportation operations) that require change in order to stay afloat, would that help the Army become a better organization by transforming institutional business applications to meet current and future requirements more efficiently and effectively? Can business models be used as agents of change? Can successful business models point the way for future Army business transformation and thereby make the business transformation process more successful?

The author suggests that the key criterion for applying successful commercial business models to the Institutional Army is a similarity of the business processes in both the commercial and military organization. The author suggests that applying successful

business models to the Institutional Army is an effective way to accelerate the Army's Business Transformation Program.

Within the process of transforming a particular aspect of the Army's business practice to that of a corporation, by way of meeting current and future requirements, the Army is able to leverage certain combinations of business models as agents of change. As a consequence of employing a specific combination of business models to the Institutional Army, the Army's business side becomes more nimble and agile and thereby increases the Institutional Army's ability to improve itself. Accordingly, the process of utilizing the combination of business models in an effort to become more efficient and effective reinforces the idea of the business Army's ability to control the business transformation, and therefore allow the business transformation to become an easier process.

A preliminary examination of the corporate market place, through an extensive research on articles, publications, internet search, and corporate business plans, identified several efficient and successful business models, suggest that corporate business models exist that can effect Army business transformation. Successful business models that can significantly improve the efficiency and cost-effectiveness of business processes are in demand, considering the current budgetary restraints. By identifying these and other successful (efficient and effective) business models and then applying them to Army business transformation to help solve certain budgetary constraints, a link between corporate business models and Army business transformation is forged. So, what are the needs of the Army business world that are similar to that of the corporate business world? In terms of strategy and the current threat, the Global War on Terrorism is a continuing

effort that may last for a very long time. As a result, the business or institutional side of the Army must transform to meet the fiscal challenges brought forth by the Global War on Terrorism and future high-intensity conflicts. Implying that the Army's user end items, such as military equipment, engaged in a prolonged conflict will require the Institutional Army to conduct repairs, scheduled and unscheduled upgrades, services, and maintenance, in order to improve the military equipment within a timely manner. This process must be efficient and effective in order to fight and win our nations wars.

Additionally, the next war or strategic crisis that requires military intervention still looms out there, requiring the Institutional Army to meet the challenge. Will the Institutional Army be ready? What business models will the Army use in order to transform the Institutional Army to meet future requirements? Will the study of past successful business models help the Army's business side transforms and help enable the Army to better predict current or future outcomes or problems?

Advancing the premise, the research showed that there are several similarities between the needs of the Institutional Army and the needs of corporations. This assumption is grounded by the fact that both the Institutional Army and corporations have the same or similar functionalities in terms of, for example, manufacturing, distribution, warehouse operations, human resource procedures as well as transportation issues. Both organizations conduct distribution and warehouse operations for their respective customers and both organizations have a process or a model for making this happen. Unfortunately, the Institutional Army's version of this process is sometimes lacking; conversely, certain corporations have an excellent process for making this happen efficiently and effectively. As a result, the author assumes both organizations are similar

in functionality (distribution and warehousing operations) and if an organization, for example, Wal-Mart, has a good idea as to how to make their process more efficient and effective, then the other organization (Institutional Army) should be able to use Wal-Mart's good idea model and thereby make the Institutional Army more efficient and effective because of their common functionality associated with a certain model or process.

In terms of scope, this study focuses on the assessment of whether a comparison of the success or failure of past and current corporate business models that involve functions similar to those that are used in the Institutional Army can be useful in selecting business models to adapt to the Army's business transformation program. Specifically, this study focuses on a number of corporate business models from which to select those most applicable to Institutional Army processes. Three business models have already been selected for evaluation. These are: LSS, ERP, and IN. The study will determine their effectiveness in the corporate world as well as their potential effectiveness in the military world.

In terms of scope, this study will cover current and historical business models relating to operations in the Institutional Army, such as, manufacturing either or reconditioning processes in Army depots, distribution and warehousing operations for logistical support of combat troops, and similar support processes in the Institutional Army, to include but not limited to LSS, ERP, IN, Radio Frequency Identification (RFI) tags, and Industrialization of Services.

In terms of limitations this study will not cover the effects of military transformation pertaining to the Air Force (except in the case of ERP systems), Marine

Corps, Navy or the Coast Guard, or the Defense and Military Transformation. Additionally, this study will not cover the quadrennial defense review or the national defense strategy. Additionally, this study will not cover in-depth strategic theories of Barnet, Kaplan, and Friedman, as they require advanced study and would detract from the point of this research project. And lastly, the study will not cover budgetary or acquisition processes as they relate to the strategic environment.

In addition, this study must define various terms used, some of which are closely associated with the military while others are primarily associated with the civilian corporate sector. A case in point is the requirement that the term "transformation" take on the meaning of "requiring more than high-tech weapons it requires creativity, ingenuity, and a willingness to try new things. All the advanced technology in the world will not transform our military if we do not transform our thinking."[3] The term "model" is defined according to the free dictionary definition as "a schematic description of a system, theory, or phenomenon that accounts for the known or inferred properties and may be used for further study." The term "inefficient" is defined to mean unable to effect or achieve the desired result with reasonable economy of means.

The term "Lean Six Sigma" (LSS) is a system of practices originally developed by Motorola to systematically improve processes by eliminating defects. Defects are defined as units that are not members of the intended population. Since it was originally developed, it has become an element of many Total Quality Management initiatives.[4]

At the model's core, Lean Six Sigma revolves around a two key concepts.

1. One of the key concepts is defined as "lean" suggests the model focus on maximizing process velocity as well as provide for tools in order to analyze the process

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flow and delay times at each activity in a process. Additionally, the model should also center on the separation of "value-added" from "nonvalue added" work with tools to eliminate the root causes of nonvalued activities and their associated cost. Moreover, the eight types of waste either or nonvalue added works are:

    a. Wasted human talent – Damage to people

    b. Defects –Stuff that is not right and needs fixing

    c. Inventory - Stuff waiting to be worked

    d. Overproduction –Stuff too much either or too early

    e. Waiting Time – People waiting for stuff to arrive

    f. Motion – Unnecessary human movement

    g. Transportation – Moving people and stuff

    h. Processing Waste – Stuff that is done that does not add value to the product or service that is supposed to be producing

    2. Another key concept is Six Sigma implying an emphasis on the need to recognize opportunities and eliminate defects as defined by customers. This aspect recognizes that variation hinders the ability to reliably deliver high-quality services. 5 It requires data driven decisions and incorporates a comprehensive set of quality tools under a powerful framework for effective problem solving. It provides a highly prescriptive cultural infrastructure effective in obtaining sustainable results and it provides a means for quantifying and eliminating the cost of complexity.

    The two methodologies interact and reinforce one another; such that percentage gains in Return on Investment Capital (ROIC percent) are much faster if lean and six sigma are implemented together.

In short, what sets LSS apart from its individual components is the recognition that one cannot do "just quality" or "just speed," one needs a balanced process that can help an organization focus on improving service quality, as defined by the customer within a set time limit.[6]

The term "industrialization of services" is a business model used in the strategic management and service marketing business sector that treats service specification as an industrial process that is subject to industrial optimization procedures. It originated in the early 1970s at a time when various quality control techniques were being successfully implemented on the production assembly lines in order to combat repetitive functionality characteristics.

Theodore Levitt argued that the reason the service sector suffered from inefficiency and wide variations in quality was because it was not based on a repetitive production line model.[7] Each service encounter was performed as if it was an isolated event. He felt that this erratic approach could be systematized through the use of planning, optimal processes, consistency, and capital intensive investments. This model was the foundation of the success of McDonalds and many other mass service providers in the 1970s, 1980s, and 1990s.

Unfortunately, the application of assembly line techniques to service provision had several undesirable consequences. Employees found working under these conditions disempowering, resulting in low morale, high staff turnover, and reduced service quality. One of the most difficult aspects of this model for employees to deal with was the "smile incentives." Employees were instructed to put a smile on their face during the service encounter. This manufacturing and commercialization of apparent happiness has been

criticized by many commentators. By the early 1990s most service providers turned their

attention back to the human element and personalized their services. Employees were

empowered to customize the service encounter to the individual characteristics of

customers.

The term <u>Enterprise Resource Planning systems (ERP)</u> refers to the ability of

corporations to integrate all data and processes of an organization into a unified system.

ERP uses multiple components of software and hardware computer systems to achieve

the level of desired integration. This type of hardware either or software combination

uses a unified database to store data for the various system modules. The system

completely links and automates customer services and deliverables thereby cutting back

on costly overhead.

Although the acronym ERP originated in the manufacturing environment within

the corporate world, today's use of the term has a much broader scope in terms of

covering all basic functions of an organization, regardless of the organization's business

or charter.

Additionally, in order to be considered an ERP system, the software package

generally would provide functionality within a single package that would normally be

covered by two or more systems. Technically, a software package that provides order

processing, raw material procurement, manufacturing planning, production control,

inventory management, payroll and accounting functions (such as QuickBooks) would be

considered an ERP software package.

However, ERP is typically reserved for larger, more broadly based applications,

such as those that include order processing, raw material procurement, manufacturing

planning, production control, inventory management, shipping, billing, accounts

receivable, accounts payable and financial reporting. The introduction of an ERP system

to replace two or more independent applications eliminates the need for external

interfaces previously required between systems, and provides additional benefits that

range from standardization and lower maintenance (one system instead of two or more)

to providing improved reporting capabilities with reduced resources (as all data is

typically kept in one database). Examples of modules in an ERP that formerly would

have been stand-alone applications include: Manufacturing, Supply Chain, Financials,

Customer Relationship Management (CRM), Human Resources, and Warehouse

Management.

Informational Networks (IN). The term means utilizing information in versatile

human and technical networks to enhance knowledge, business or social aims. IN refer to

utilizing the contemporary networking technologies, such as Internet and wireless

communication for distributing and sharing information among these different technical

networks that can benefit any human network. Essentially, an information network is

used to exchange information between interest groups within and between human

institutions, such as, companies. One excellent benefit of this is that individuals within a

company can have shared awareness of the various situations within the company such

that everyone now is able to "pull in the same direction."

Radio Frequency Identification (RFID) Tags. The term is an automatic

identification method, relying on storing and remotely retrieving data using devices

called transponders. An RFID tag is an object that can be attached to or incorporated into

a product, animal, or person for the purpose of identification using radio waves. Chip-

based RFID tags contain silicon chips and antennas. Passive tags require no internal power source, whereas active tags require a power source. Passive RFID tags have no internal power supply, implying there is a minute electrical current induced in the antenna by the incoming radio frequency signal provides just enough power to transmit a response. Most passive tags signal by "backscattering" the carrier signal from the reader. This means that the antenna is designed to both collect the power from the incoming signal and also to transmit the outbound backscatter signal. The lack of an onboard power supply means that the device can be quite small. There are commercially available low frequency produce exist that can be embedded in a sticker, or under the skin. Passive tags, which are the standard chosen by Wal-Mart, have practical application in terms of read distances ranging from about 10 centimeters (4 inches) up to a few meters depending on the chosen radio frequency and antenna design either or size, and are cost efficient at a price of 5 cents each.

Unlike passive RFID tags, the active RFID tags have their own internal power source which is used to power any integrated circuits that generate the outgoing signal. Active tags are typically much more reliable (e.g. fewer errors) than passive tags due to the ability for active tags to conduct a "session" with a reader. Active tags, due to their onboard power supply, also transmit at higher power levels than passive tags, allowing them to be more effective in "RF challenged" environments like water (including humans either or cattle), metal (shipping containers, vehicles), or at longer distances. Many active tags have practical ranges of hundreds of meters, and a battery life of up to ten years. Some active RFID tags include sensors, such as, temperature logging which have been used in concrete maturity monitoring or to monitor the temperature of perishable goods.

Other sensors that have been married with active RFID include humidity, shock either or vibration, light, radiation, temperature, and atmospherics like ethylene. Active tags typically have much longer range (approximately either one-hundred meters or three-hundred feet) and larger memories than passive tags, as well as the ability to store additional information sent by the transceiver. The United States Department Defense Directorate of Logistics (DOL), [8] Fort Wainwright, has successfully used active RFID technology to help move equipment and reduce logistics costs and improve supply chain visibility for more than fifteen years. At present, the smallest active tags are about the size of a cold capsule and sell for a few dollars. Passive tags now sell for a few cents, less than ten cents on the dollar.

Some of the anticipated challenges associated with this study revolve around information management in terms of scope of the project. There are simply too many business organizations within the world that fit the criteria of efficiency and effectiveness as it applies to manufacturing, distribution, warehouse operations, human resource procedures, as well as transportation concerns within the Intuitional Army. One possible solution is to limit the number of organizations considered to only those which have similar business processes to those of the Institutional Army. By narrowing scope, the author has the flexibility to focus his effort and to thereby add value to the objectives of Army business transformation.

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[1]U.S. Department of Defense, *Base Realignment and Closure, 2005*. (Washington DC: Government Printing Office, 7 May 2007); [on-line]; available from http://www.dod.mil/brac/ faqs001.html; Internet; accessed 2 April 2007. The original legislation actually states that the title of the process is Base Closure and Realignment. The process began with a threat assessment of the future national security environment, followed by the development of a force structure plan and basing requirements to meet

these threats. DoD then applied legally mandated selection criteria to determine which installations to recommend for realignment and closure. The Secretary of Defense will publish a report containing his realignment and closure recommendations, forwarding supporting documentation to the independent commission.

[2]COL John R. Boyd, US Air Force, "Destruction and Creation," OODA loop essay, 23 March 1976.

[3]President George W. Bush, *DoD Transformation* (Washington DC: Government Printing Office, 30 November 2005).

[4]Donald J. Wheeler, PhD, *The Lean Six Sigma Practitioner's Guide to Data Analysis,* p307, http://www.spcpress.com; Betsy Morris (2006-07-11). Lean Six Sigma is a registered service mark and trademark of Motorola, Inc. Motorola has reported over US $17 billion in savings from lean six sigma as of 2006. In addition to Motorola, companies which also adopted lean six sigma methodologies early-on and continue to practice it today include Bank of America, Caterpillar, Honeywell International (previously known as Allied Signal), Raytheon and General Electric (introduced by Jack Welch). Recently Six Sigma has been integrated with the TRIZ methodology for problem solving and product design. The process was pioneered by Bill Smith at Motorola in 1986 and was originally defined as a metric for measuring defects and improving quality, and a methodology to reduce defect levels below 3.4 Defects Per (one) Million Opportunities (DPMO).

[5]Key aspect of LSS success is its ability to improve on repetitive functions as future explained in the analysis section of this study.

[6]Army Business Transformation Knowledge Center, *Lean Six Sigma*, (Washington DC: Government Printing Office), [on-line]; available from http://www.army.mil/ArmyBTKC/focus/cpi/tools3.htm; Internet; accessed 14 April 2007.

[7]Theodore Levitt was an American economist and professor at Harvard Business School. He was also editor of the *Harvard Business Review* and an editor who was especially noted for increasing the Review's circulation and for coining the term globalization. He is a four-time winner of the McKinsey Awards competitions for best annual article in the Harvard Business Review; winner of Academy of Management Award for the outstanding business books of 1962 for Innovation in Marketing; winner of John Hancock Award for Excellence in Business Journalism in 1969; recipient of the Charles Coolidge Parlin Award as "Marketing Man of the Year," 1970; recipient of the George Gallup Award for Marketing Excellence, 1976; recipient of the 1978 Paul D. Converse Award of the American Marketing Association for major contributions to marketing and recipient of the 1989 William M. McFeely Award of the International Management Council for major contributions to management.

[8]Fort Wainwright Director of Logistics website, *Radio Frequency Automatic Identification Technology Tag (RF/AIT Tag)*, Washington DC: Government Printing Office, [on-line]; available from http://www.wainwright.army.mil/dol/MCT.htm; Internet; accessed 7 April 2007.

CHAPTER 2

REVIEW OF THE LITERATURE

Problems associated with conducting and coordinating Institutional Army transformation in conjunction with political and military objectives have been characterized as opaque at best. Numerous writers have contributed greatly to the dialogue of business transformation: the volume of writings has been especially great in the past few years; however, the numbers of writers contributing to the role of business transformation with regard to corporate business strategies are not as great.

To deal effectively with the literature of conducting and coordinating business transformation as it relates to business models, this chapter focuses on the works which have best developed the themes relevant to business transformation. It is not a comprehensive but rather a representative review of the literature.

The author selectively identified and compiled a list of references directly linking Army business transformation to current and or previous corporate business models. They include, for example: the case study *Letterkenny Case Army Depot: The Army Teaches Business a Lesson in Lean Six Sigma* by Dr. Roger K. Harvey,[1] Department of Defense *Army Force Transformation*, Dr. James A. Tompkins' books on *Logistics and Manufacturing Outsourcing: Harness Your Core Competencies*, *Supply Chain Hand*

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[1] Dr. Harvey taught corporate finance, hospital financial management, and information technology at the undergraduate, graduate, and executive program level at the Ohio State University for over thirty years. Dr. Harvey co-founded two companies: one to provide benchmarking information and consulting to the distribution industry, the other to provide benchmarking reports to hospital and healthcare industry. Dr. Harvey holds a D.B.A, Indiana University, Bloomington, IN (Finance, Economics, Statistics, and Quantitative Business Analysis), M.B.A Indiana University, Bloomington, IN (Finance emphasis) and a B.B.A., University of Notre Dame (Accounting).

Book, and *No Boundaries*,[2] and *Technology Trends in VLSI Manufacturing* by Dr. Robert

N. Castellano,[3] *Essentials of Economics* by Damodar Gujarati, *New Product*

Management by Merle Crawford and Anthony Di Benedetto, *Seeing What's Next* by

Clayton M. Christensen, and *The General Theory of Employment, Interest and Money,* by

John Maynard Kenyans, that are connected through the use of business models, both in

government and the business world.

The idea behind the collection of these specific reference materials was to gain an

understanding as to how the civilian corporate world adapts to their changing

environment. Like wise, a similar concept was developed in order to gain a consistent

understanding as to how the institutional Army adapts to their changing environment.

The challenge is to find references that link the corporate word to the business side of the

Army, and take away any lessons learned as to what not to do or how to make things

better.

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[2] Dr. Robert N. Castellano, President of The Information Network, received a
Ph.D. degree in solid state chemistry from Oxford University (England). He has had ten
years experience in the field of wafer fabrication at AT&T Bell Laboratories and
Stanford University. He has authored numerous reports for other publishing companies
before founding The Information Network. His book Technology Trends in VLSI
Manufacturing was published by Gordon and Breach in January 1993.

[3]About Research showed: Dr. Niraj Goyal has 25 years of rich and varied working
experience in multinationals in various operating roles, among them Operations Director,
Cadbury India Limited, where he was exposed to and was among the leading
implementers of the TQM movement. A few years back he set up his own consultancy,
Cynergy Creators Private Limited. Mr. Goyal consults in India and US with a diversity of
industries - training them and facilitating the implementation of the techniques of TQM
and Six Sigma until the culture of continuous change is internalized.
http://www.isixsigma.com/library/content/c020225a.asp

By narrowing the scope of references to business success stories and relevant case studies the literature provided the missing link between the corporate world and the institutional Army. Additionally, it is important to understand the economics behind the corporate reality and to ascertain the reasons why corporations and the institutional Army make the decisions they make. Furthermore, it is more important to choose the type of literature that notes the distinction and or similarity as to motivation between the corporate world and the business side of the Army.

In terms of ERP systems*, DoD's Army Force Transformation* can be viewed as a driver or a motivating factor with regards to Dr. James A. Tompkins' books on *Logistics and Manufacturing Outsourcing: Harness Your Core Competencies*, *Supply Chain Hand book,* and *No Boundaries*. These reference materials help identify the driving force behind both organizations by examining their economic decision making models.

Additionally, Dr. Robert N. Castellano's book on *Technology Trends in VLSI Manufacturing* looks at information network. Dr. Roger K. Harvey's Letterkenny Case Study is a fine example of how the Institutional Army successfully utilizes a business model (LSS), to improve operational performance and to include metrics in evaluating performance. It is important to note the value of a metric system when evaluating progress. Practically every piece of literature demonstrated the quintessential value of a metrics system when evaluating effectiveness. Additionally, Henk de Koring's article on LSS entitled *Lean Six Sigma in Healthcare* suggests producing systematic innovation efforts in healthcare. Other references, such as the *Essentials of Economics* by Damodar Gujarati, *New Product Management* by Merle Crawford and Anthony Di Benedetto, *Seeing What's next* by Clayton M. Christensen, and *The Economic Consequences of the*

Peace, The General Theory of Employment, Interest provide as an economic business theory back drop attempting to explain how corporations make money.

      The Essentials of Economics acknowledges that the law of supply and demand is a good model for understanding the determination of the price of a given quantity of a good sold on the market. The explanation works by looking at two different groups--buyers and sellers--and asking how they interact. Clayton M. Christensen's book *Seeing what's Next*, attempts to predict market conditions in a way that corporations adapt in order to increase positive cash flow. The application of innovation into a corporation's charter allows for prediction and capitalization. *Product Management* identifies corporate charters in an attempt to organize a structure that allows for efficiency within the market place. These books are all related in the fact that each has a predictive quality to them.

      The predictive characteristic within the literature establishes the metric type system that validates the theory of relating the corporate world to the institutional Army. The use of metrics within the literature links the theory of connecting the corporate world to the institutional Army. The use metrics within the research and is the binding glue that holds the theory together.

CHAPTER 3

METHODOLOGY

The fundamental problem in examining the application of commercial business models to the transformation of the Institutional Army, or Army business transformation, is to develop a methodology which is both comprehensive enough to provide valid generalizations and sufficiently specific to afford guidance below the level of national strategy. As a result, the methodology developed in this chapter has been designed to meet this challenge.

This chapter addresses the methodology problem in four sections. First a rational decision-making model, linking the institutional aspect of the Army to corporate business models, is presented. This idea directs attention to critical areas in examining business models when conducting and coordinating transformation. Next, the hypothesis and some key definitions are delineated to focus the research. The third section discusses the details of the methodology or the process of collecting and comparing data of actual business models in relation to transformation. Finally, some of the limitations of the research methodology are discussed.

The best approach in determining the validity of comparing the capabilities of several business models to the needs of the Institutional Army, with regards to identifying a rational decision-making model, is to present the findings with respect to researching successful and unsuccessful business models.

The criteria for determining the best business models are models that are efficient, effective, and successful and that have functionalities that are repetitive in nature and that

are similar to those within the institutional Army. The repetitive functionality is the common thread between the institutional Army and that of the business world.

As a result, through the process of observing the corporate world through newspapers, articles, books, and published business plans, the business community seems to have the same concerns as the Institutional Army with regards to the ineffective and inefficient repetitive functionality program. Some of the corporate world's solutions to this problem were the implementation of certain business models designed to combat the repetitive functionality with systems intended to streamline the work load ratio. The corporate use of the LSS business models to combat inefficient repetitive functionality within the work place personifies the work load ratio managerial challenge. The LSS model helps corporations solve the work load ratio challenge, in some respects, by eliminating idle time within the work place thereby becoming more efficient and effective. Since the Institutional Army has some or similar problems shared with the corporate world, the LSS model could be considered as a good candidate for implementation as part of Army Business Transformation.

The challenges faced by the corporate world are many in terms of work load ratio efficiency. The repetitive functionality shared by both the corporate world and the Institutional Army is just one of the many issues concerning efficiency and effectiveness within the work place. The LSS model, identified within the corporate world and used within the Institutional Army is just one aspect facing the Army's institutional cost-effective infrastructure challenge. There are other challenges facing the corporate world and the Institutional Army that are not directly linked to the repetitive functionality and that therefore call in to question the possibility of utilizing the same LSS corporate model

in order to solve these dissimilar corporate and Institutional Army challenges. For example, the corporate world and the Institutional Army share the same type Nonrepetitive characteristics, such as, human resources, budgeting, financial management, and purchasing and acquisition process that are dynamic in nature. Dynamic characteristics imply the use of a Nonrepetitive model when solving efficiency issues. Since repetitive solutions are not applicable to dynamitic problems. The process of identifying a specific problem set and using a known and proven set of solutions is a logical and a straightforward leap, however, it is counterintuitive to believe one set of solutions will solve all types of problem sets.

If a known problem, "X," were to exist and a known solution to the problem, "Y," has been proven to solve problem "X," then it is easy to say that the known solution to a problem will always work unless the parameters to the problem change. That is to say, that given a certain parameter, the solution to a problem will not change unless the characteristics that defined the problem change, because it has a proven history of working, and the parameters to the problem have not changed. Additionally, if problem "X looks very similar to another problem, "Z," then it is safe to automatically assume the solution to problem, "Y," will work to solve both problem "X" and "Z" assuming there is a legitimate link to both problem sets. However, if the parameters that defined both problem sets are not similar, then it is not safe to assume the solution to the similar problem is the same. In fact, in order to solve both problem sets there needs to be two different solutions to solve both problems. As a case in point, the LSS model will not solve all business related problems just because it has solved one type of business problem (repetitive functionality). There are other models, such as, ERP and IN, that are

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designed specifically to solve nonrepetitive functionalities within the business community. Furthermore, by adapting, combining and implementing these type of dynamic and successful corporate business models, such as LSS, ERP, and IN into the Institutional Army as a part of the Army's overall business transformation, the result may show a much more efficient and effective organization for support of our combat troops.

Within the various business environments there are certain business functionalities that were repetitive in nature, such as manufacturing, distribution, warehousing, purchasing either or acquisitions, human resources, and transportation. Of these specific segments within the business world, research showed several corporations whose business models were similar to those of the Institutional Army and therefore would be candidates for use in Army business transformation.

The research plan is to first query and then gather a list of references and articles to determine the criteria for successful business models to conduct Army business transformation. Successful business models are then measured against industries with requirements similar to those within the Institutional Army and therefore candidates for use in Army business transformation.

Of the several businesses whose models were similar to Army business transformation, to include Motorola, American Express, Wal-Mart, PeopleSoft, QuickBooks, and Oracle only a few business models fit the successful, efficient and effective criteria because their business processes relied heavily on both a repetitive and dynamic functionality. These business models include: LSS, IN, and ERP. Within these business models that were successful in these initial corporations, each had potential for application to Army business transformation more specifically; their repetitive and

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dynamic nature was the underlying factor. Additionally, research showed several business models were found to have been successful with regards to efficiency and effectiveness.

In terms of criteria of success, the method of achieving significant results within this study is based on proven historical case studies. Successful research is defined as identifying historical or present-day examples of applicable business models that can be adapted to the Institutional Army in a way that promotes efficiency and effectiveness within the business side of the Army.

In terms of method of effectiveness, the phases and approximate deadlines with respect to finishing each aspect of the study are defined by ascertaining, analyzing and examining pertinent case studies with the expectation of recognizing valuable linkages and similarities. Moreover, by reviewing and evaluating relevant historical and existing references and documents, the research showed that there are better ways of doing business through the use of emerging technologies as enablers in ensuring effectiveness and efficiency within the Institutional Army.

When answering the questions as to how the Institutional Army can better utilize commercial business models as a tool in becoming more efficient and effective, the research indicated there are good examples of existing historical case studies denoting a linkage between the corporate business world and that of the Institutional Army. Specifically, research showed several historical case studies, such as, the "Six Sigma Case Study: Converting Paper to Electronic Documents[1]" by Dr. Niraj Goyal, that provided for a rational decision-making model, thereby linking Army business transformation to corporate business models. The case presented suggests a relationship

or linkage between corporate business models and that of the Institutional Army by way of a repetitive functionality. The proposal set forth indicates that corporate business models will work in conjunction with the Institutional side of the Army. This work was carried out in a large company based in the US and India in the business of converting printed paper from customers into electronic copies.

In addition to the LSS model, the ERP integrates all data and processes of an organization into a unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the integration. A key ingredient of most ERP systems is the use of a unified database to store data for the various system modules. The term ERP originally implied systems designed to plan the use of enterprise-wide resources. Although the acronym ERP originated in the manufacturing environment, today's use of the term ERP systems has much broader scope. ERP systems typically attempt to cover all basic functions of an organization, regardless of the organization's business or charter. Business, non-profit organizations, non governmental organizations, governments, and other large entities utilize ERP systems.

Additionally, it may be noted that to be considered an ERP system, a software package generally would only need to provide functionality in a single package that would normally be covered by two or more systems. Technically, a software package that provides both payroll and accounting functions (QuickBooks) would be considered an ERP software package.

However, the term is typically reserved for larger, more broadly based applications. The introduction of an ERP system to replace two or more independent applications eliminates the need for external interfaces previously required between

systems, and provides additional benefits that range from standardization and lower maintenance (that is one system instead of two or more) to easier and either or greater reporting capabilities, as all data is typically kept in one database. Examples of modules in an ERP which formerly would have been stand-alone applications include: Manufacturing, Supply Chain, Financials, Customer Relationship Management (CRM), Human Resources, and Warehouse Management.

Information Network, a market research consulting company, is a leading provider of the Next Generation Financial Software Solutions for e-business. Their software products and services allow lending institutions to leverage internet commerce potential, regardless of the technological knowledge and experience with other information systems. Information Network has combined decades of credit, real estate and information systems experience with the newest technologies to develop proprietary software products, such as WM Decision™, WinMerge.net™, and e-folder™.[2] Many companies nationwide have relied on Information Network's superior service and software products to provide for a competitive edge within a growing competitive marketplace.

It is important to review the hypothesis behind this research in order to understand some of the key definitions that are delineated in this thesis. The Army as a business organization utilizes manufacturing, distribution, warehousing, human resources, purchasing either or acquisition, transportation and financial management operations that may require a combination of several business applications in order to maximize efficiency. In terms of methodology, the utilization of one business application (LSS) proved invaluable in solving similar multiple functionality problems as found in the

Letterkenny case study. Suggesting the Letterkenny case study brought to the surface the repetitive functionality described in both the corporate world and the Institutional world. This repetitive functionality is the key in applying corporate business models to the Institutional, or business side of the Army.

However, with the business side of the Army, a single application may not be sufficiently effective or efficient to enable the Institutional Army to become a better organization. One single business application may not be able to meet all of the Institutional Army's current and future requirements efficiently and effectively.

The hypothesis of the research described in this thesis indicates that the methodology used to retrieve data revolves around the idea of a repetitive functionality within each of the business entities to include the Institutional Army. This idea is centered on a sliding scale between a completely repetitive disposition on the left hand side of the scale and that of the voice of the customer on the right. As with the Letterkenny case, the Lean Six Sigma model demonstrated a link, between (1) a business model that requires a repetitive functionality, that is doing the same thing over and over with little regard to changing product requirements, and (2) a business model that takes into account the unpredictable and changing requirements presented by the voice of the customer. Somewhere in the middle is the answer as to how to make the Institutional Army more efficient and effective. As stated earlier, the link between the corporate business models and the Institutional business models is the repetitive functionality, but as the scale shows, there must be a "right mix" between repetitive functionality and the voice of the customer or the corporation either or Institutional Army business models will not be effective or efficient.
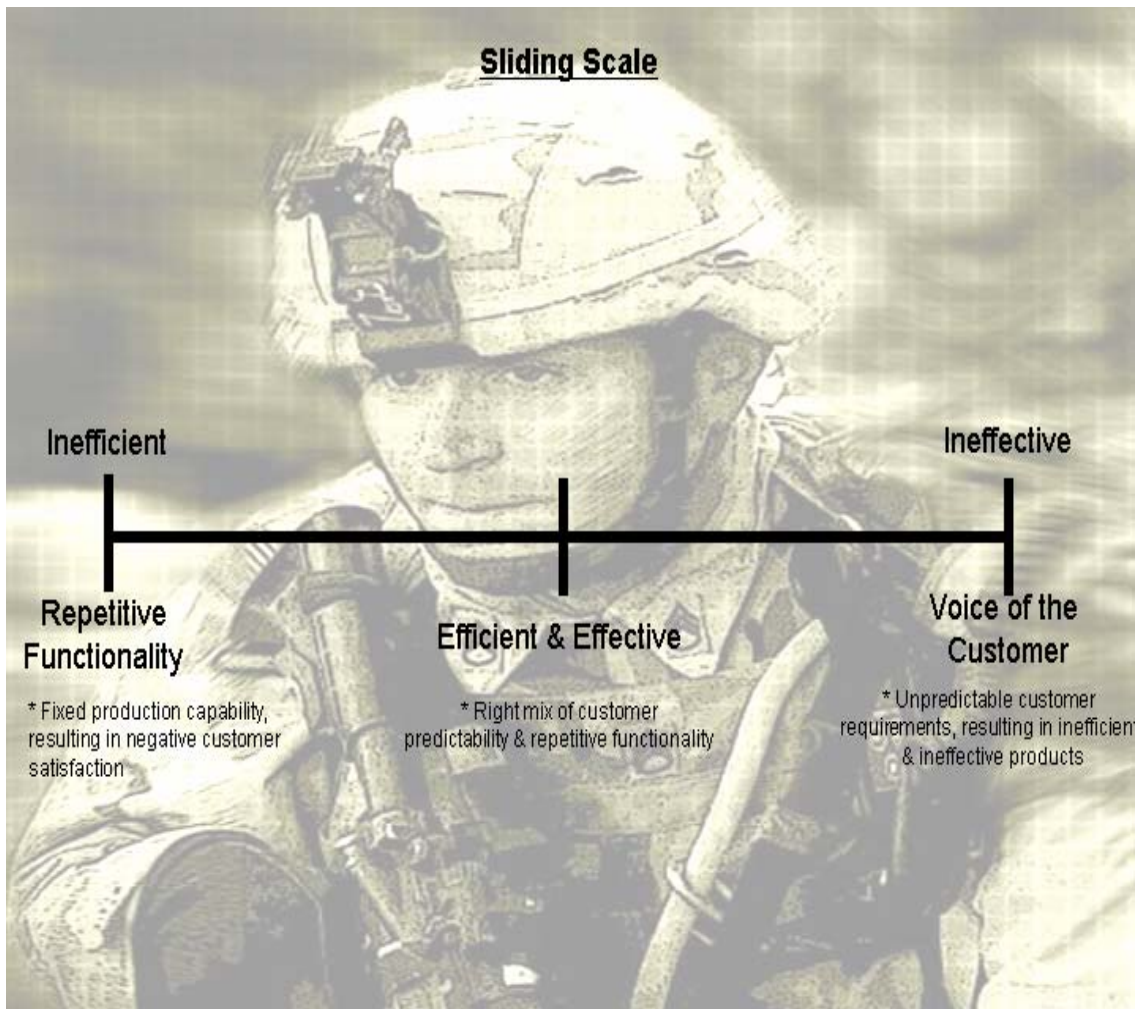
Figure 2. Sliding Scale: Weighing Scale Between Repetitive Functionality and the Voice of the Customer

As demonstrated in figure 2, identifying the "right mix" within the efficient and effective equation is the key to understanding the larger process. This is because, within the grand scheme of things, it will not matter if the product is shipped, stored or billed correctly, because if the customer does not get what the customer wants (the correct

product) in a timely manner (when the customer wants it), then the customer will go somewhere else to get what he wants. It is then a waste of time and money on the part of both parties if the business were to produce the wrong product for the customer, or send the correct product to the customer too late; the customer will go somewhere else to get what he wants, resulting in a possible going out of business sale for a business, or a lack of timely support to the troops for the Institutional side of the Army.

In attempt to solve the problem of identifying the customer's wants and needs research suggests leveraging certain combinations of business models, such as, LSS, ERP, and IN in-conjunction with any combination of manufacturing, distribution, warehousing, human resources, and transportation functionalities in order to provide for a more efficient and effective organization.

In short, the theory suggests that the simpler the Institutional model (implying a repetitive business practice), the less the need to use multiple business applications.[3] Conversely, the more complex the businesses model the more the need to use several business applications in order to meet the complex business requirements.

Applying specific combinations of business models to the Institutional Army enhances their use of manufacturing, distribution, warehousing, human resources, and transportation within its organization resulting in the Army's business side becoming more nimble and agile, thereby increasing the Institutional Army's ability to improve itself.

For that reason, the process of utilizing the combination of business models in an effort to become more efficient and effective reinforces the idea of the Institutional

Army's ability to maximize the benefits of business transformation, and therefore allows

the business transformation to become a more valuable process.

Comparison of Key Processes

Institutional Army Repetitive Functionalities	Corporate Repetitive Functionalities	Corporations	Business Models
• Warehousing • Distribution • Repair / Replace	• Warehousing / Inventory • Distribution • Manufacturing	• Siemens • American Express • Wal-Mart	• Lean or Lean Six Sigma • Industrialization of services • Production Line

"Hardware"

• ▶

Software

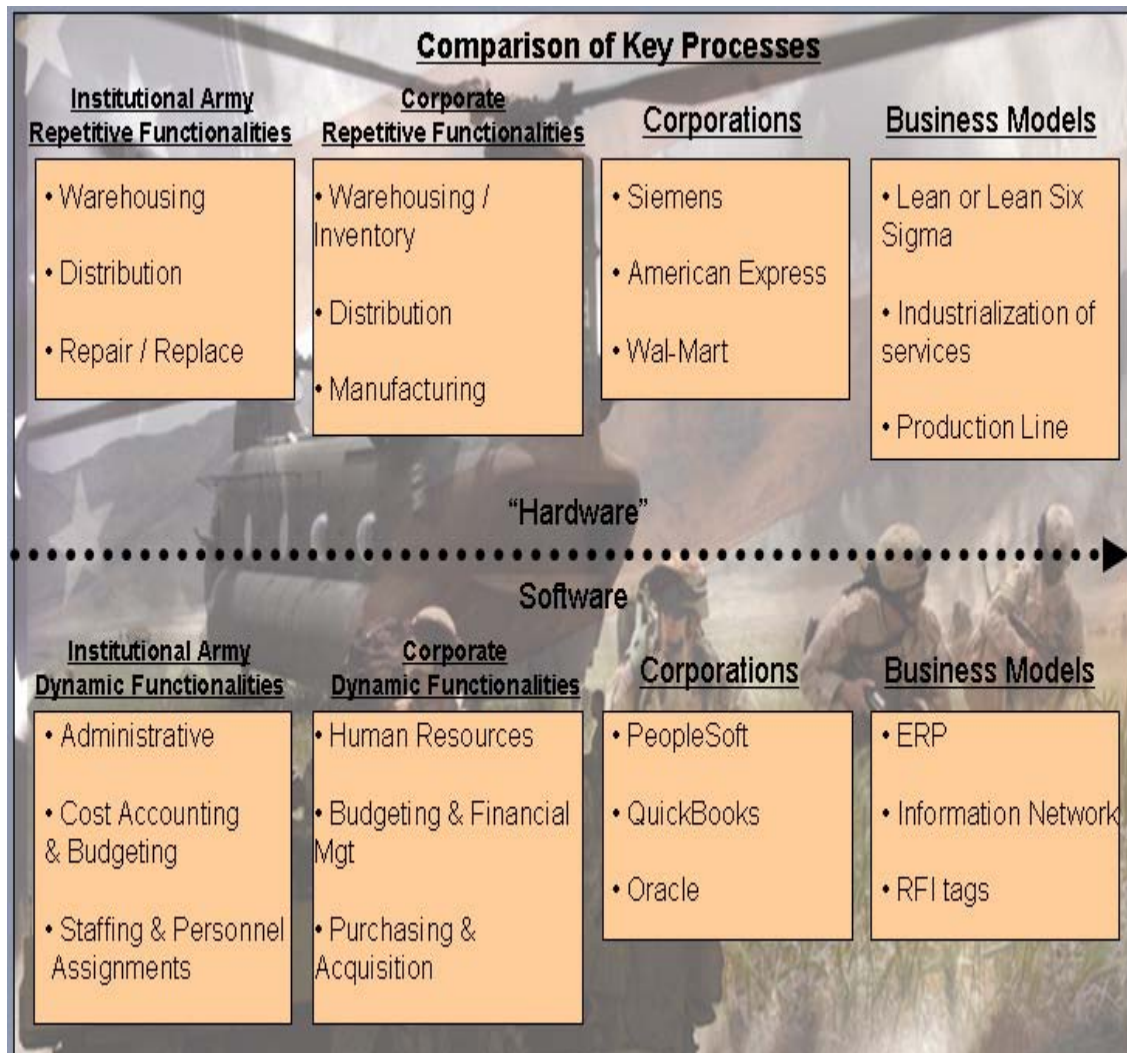| Institutional Army Dynamic Functionalities	Corporate Dynamic Functionalities	Corporations	Business Models
• Administrative • Cost Accounting & Budgeting • Staffing & Personnel Assignments	• Human Resources • Budgeting & Financial Mgt • Purchasing & Acquisition	• PeopleSoft • QuickBooks • Oracle	• ERP • Information Network • RFI tags

Figure 3. Comparison of Key Transformational Processes in Army and Corporate
Business Models

As shown in figure 3, the particular methodology to be used for collecting and

comparing data of actual business models in relation to transformation are: (1) look at

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what has been successful in the commercial world for certain types of processes, (2) look

for application in the Institutional Army that utilizes similar processes, (3) list ones that

are similar and (4) list the ones that are the best business models for the Army. The

review of case studies and Institutional Army Transformation initiatives be included in

this methodology. The criterion for determining the best business models is critical for a

successful analysis application of corporate business models to the Army process.

Research showed several corporations whose business processes were similar to those of

the Institutional Army and that therefore might have business models that would be

candidates for use in Army business transformation.

Within each of these business models that were successful within their own

corporations, each had similarities to Army business transformation, including

improvements in repetitive functionalities. Of the business models that were found to be

successful, one of the business models had a history of proven success in the sense that it

not only worked within the corporate world but it also worked in the Institutional world

as well, thus proving to be efficient and effective. This model was Lean Six Sigma (LSS).

LSS is a key business model that has been proven directly in the Institutional Army as

shown in the Letterkenny case study dated 15 September 2006.

Within the framework of this study, the research looked at several other models

whose breadth and scope encompassed several aspects of the repetitive and dynamic

functionalities of both corporations as well as the Institutional Army. Of the several

business models, to include industrialization of services, production line, and RFI tags,

that will further enable the LSS model, only two business applications, IN and ERP

systems, act as enablers to LSS or as stand-alone models for enhancing the Institutional

Army's repetitive functionality. In the Letterkenny Case Study, the criteria for determining the two enabling business applications was to break apart the LSS model into its respective components in order to determine its repetitive functionality and observe each aspect holistically. Observing the "Lean" within the LSS model whose focus is centered on the efficiency of producing the product and fusing it together with the "voice of the customer" in "Six Sigma" whose focus is centered on the quality of the product, formed a more perfect union. This is because, as noted in figure 2, the "voice of the customer" did not deviate significantly and was repetitive in form. Additionally, the customer's requirements were consistent and did not require adaptation or change. The Lean functionality relies solely on the consistent nature of the customer in order for it to work efficiently and effectively.

In terms of enabling the LSS repetitive model, an informal query and correspondence was conducted with the QuickBooks Corporation in order to ascertain a specific software application linking account information to business spending practices that typifies IN. The intent was to discover business practices that enable a typical repetitive type business organization, such as a warehousing, distribution or manufacturing type of business that uses an LSS type of model in order to perform their specific function.

The American Express service business plan enables the QuickBooks software to eliminate wasted time needed for manually typing in the American Express Business Card account information into QuickBooks software. The software provides updated or real time information to the customer by simply performing a QuickBooks download function. This functionality allows the business card holder to transfer current account

information quickly and easily. By downloading the American Express Business Card account information into the QuickBooks software program the customer can keep track of cash flow and monitor employee spending. This functionality allows the customer to manage their business better by monitoring their information anytime allowing the customer to become more efficient and effective.

With an eye toward improving the LSS model, an informal query was conducted with the PeopleSoft Corporation as to attain a specific software application linking human resource management (HRM), and budgeting and financial management to business practices that personifies ERP. PeopleSoft, Inc. is a software company that provides Human Resources Management (HRM) systems and student administration software solutions to large corporations, governments, and organizations. This type of application is considered an ERP system when modularized into specific components, such as : HRM (including payroll, human resources, benefits, etcetera), budgeting and financials (including Accounts Payable, Accounts Receivable, General Ledger, Asset Management, etcetera.), manufacturing (including inventory, purchasing, billing, order management, production management, cost management), student administration. PeopleSoft is well known for its ability to be easily customized or tailor-made, to fit the specific business needs of each client, while still being generic enough to meet corporate and governmental tracking requirements.

In terms of enabling the LSS repetitive model, an informal query was conducted with the Oracle Corporation to determine a specific software application for linking database management systems (DBMS), tools for database development, middle-tier software, ERP, CRM, and supply chain management (SCM) software.

Finally, some limitations of the research methodology are discussed. Within the scope of this study there were several business models that did not accurately portray the specific guidelines set out by the charter of this thesis. For example, the IBM business model does not apply to the scope of this research because IBM is expanding in the high-value emerging markets centered on IT-intensive business consulting and business transformation services. Although their business performance is centered on transformation services their focus is on emerging sectors that require software and consulting services not enabling repetitive functionality.

In summary, the corporate world has numerous business processes and models for managing those processes. Identifying those corporate processes and models that are successful in the corporate world that would also be valuable additions in the Institutional Army is the primary objective of this thesis. This chapter has described the research methodology that is being used to select the most promising of these business models.

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[1]About Research showed: Dr. Niraj Goyal has 25 years of rich and varied working experience in multinationals in various operating roles, among them Operations Director, Cadbury India Limited, where he was exposed to and was among the leading implementers of the TQM movement. A few years back he set up his own consultancy, Cynergy Creators Private Limited. Mr. Goyal consults in India and US with a diversity of industries - training them and facilitating the implementation of the techniques of TQM and Six Sigma until the culture of continuous change is internalized. http://www.isixsigma.com/library/content/c020225a.asp

[2]A software application that provide users the ability to process credit and decisions on a single platform. Additionally, it provides lenders national access to credit reporting, utilizing an internet application with the highest security standards and has been approved by Experian, Equifax, Trans Union and ICSA.net as a secure site.

[3]Repetitive functionality entails a systematic process whereby the more the repetitive the action the better one becomes. Conversely, dynamic functionality implies unpredictable or fluid causality brought on by the human dimension.

CHAPTER 4

SUMMARIES AND ANALYSIS

Do corporate business models exist that have solved problems similar to those facing the Institutional Army today? Are business models, such as, LSS, ERP, and IN, designed to allow corporations to become more efficient and effective? Are there similarities between the Institutional Army and corporations that would enable the Institutional Army to implement the business models and thereby to become more efficient and effective?

The answer to all of these questions is a resounding yes! It is not only possible to combine several different applications and business models to a common business solution, but the research shows there is a requirement to do so. This is because that one business solution is not all encompassing with regards to solving all business-related problems. The research shows there is a tendency for organizations to rely solely on one business solution to solve any number of similar business problems. The challenge and key to efficient and effective problem solving, is to correctly identify the problem, through proper analysis, critical thinking and reasoning in order to look for other ways to solve similar problems and not to rely on only one application to solve all needs.

Furthermore, auxiliary research showed enabling models, such as IN and ERP worked as a conduit and or a stop gap between resources demands, such as limited personnel conducting multitask operations. The enabling models worked well with LSS in terms of filling the gaps. The enabling models added value to the product by providing the same top quality causing increased sales within the organization. It filled in the gaps as to the quality of life inside the work place as well. This suggests that corporations

utilize this type of software in conjunction with the LSS type of "hardware" or system upgrades enables them to work more effectively and efficiently, and to work smarter not harder.

As discussed in earlier chapters, the research showed that the Army has a critical need to improve the institutional infrastructure to make it a more efficient and cost-effective organization. How can the Army solve its problem of making its institutional infrastructure more efficient and cost effective? Through the process of observing the corporate world and the Institutional Army through newspapers, articles, books, and published business plans, the business community as well as the business side of the Army seems to have the same concerns with regards to the inefficient and ineffective repetitive and dynamic functionality.

The challenges faced by the corporate world and the Institutional Army are many in terms of workload ratio efficiency, which is defined as the efficient use of employee time in terms of tasks assigned. The repetitive functionality shared by both the corporate world and the Institutional Army is just one of the many issues concerning efficiency and effectiveness within the workplace. The LSS model, identified within the corporate world and used within the Institutional Army is just one aspect being used to solve the Army's institutional cost-effective infrastructure challenge. The dynamic functionality, which is defined as possessing contrary properties of a repetitive functionality, is not directly linked to the repetitive characteristic shared by corporations and the Institutional Army, and therefore cannot be solved by using a repetitive model, such as LSS.

As explained earlier, some of the corporate world's solutions to this problem were the implementation of the LSS business model designed to combat the repetitive

functionality with systems intended to streamline the work load ratio. The corporate use

of the LSS business models to combat inefficient repetitive functionality within the work

place embodies the work load ratio managerial challenge. The LSS model helps

corporations solve the work load ratio challenge by reducing wasted time within the work

place. This enables corporations that produce products repetitively to become better at it.

Likewise, in order for the Institutional Army to solve some of the same problems shared

with the corporate world, the LSS model has been implemented in multiple Army

Depots. The linkage between the corporate world and the Institutional Army is the

repetitive characteristic shared by each organization; the obvious solution is to implement

a historical common model, LSS, to solve both problems. The other aspect of the

problem is the dynamic characteristic that is also shared by both organizations; the easy

answer suggests adapting the historic common model, LSS, to solve both aspects of the

problem.

However, as the research has shown, there is a difference between the repetitive

and dynamic functionality that precludes utilizing a common model, such as LSS, in

solving the effective and efficient problems within an organization. Additionally, the

research suggested the process of identifying a problem within the Institutional Army and

finding the solutions to that problem within the corporate world is straight forward and

relativity simple. The assumption is made that the problems with the Institutional Army

and that of the corporate world are relatively the same and so applying the same solution

to both entities is intuitive and logical.

The research shows that the corporate world and the Institutional Army share the

same type of nonrepetitive or dynamic characteristics, such as, human resources,

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budgeting, financial management, and purchasing and acquisition processes. These characteristics require different models, such as, ERP and IN than the LSS model in order to solve the organizations problems. This is because the ERP and IN models are designed specifically to solve dynamic problems , such as human resources, budgeting, financial management, and purchasing and acquisition processes, that the repetitive model LSS is not designed to do. The research suggests that by adapting and implementing several successful corporate business models, such as, LSS, ERP, and IN, into the business community and the Institutional Army as a part of the overall transformation process, the results would show a much more efficient and effective organization.

In the process of researching the LSS reference material, the Letterkenny Case Study and several articles on LSS agreed that using LSS worked well because it is designed to fix a certain category of repetitive functionality problems. This is because it is easy to predict the required repetitive outcome if the organization knows what the customer wants. By working on producing the same product, due to demand requirements of the customers, the repetitive functionality associated producing the same product frequently increases the organization's efficiency and effectiveness of producing that product to the customer. This is also taking into account that the requirements of the customer does not change dramatically and is consistent. When the requirements change dramatically and inconsistently, the process of providing the customer what he wants has changed dramatically. This is to say that a dynamic change within the structure of providing a quality product in a timely manner has transformed, and so as a consequence the structure of providing that product must transform or the organization will fail. This is because within in a lean environment, "pull" is the operative principle and goods are not

purchased or produced until there is demand for a product. Conversely, a traditional ERP system operates on the "push" principle where goods are produced to meet a forecasted demand. These opposing approaches have been described as "just-in-time" versus "just-in-case" manufacturing.

In response to the difficulty of having lean and information technology working together seamlessly, some ERP vendors released "flow-enabled" versions of their ERP software commonly referred to as "flow manufacturing" applications to combat the opposing approaches. These packages are designed to support manufacturers' requirements to produce customized products with short lead times at production costs that reflect the efficiencies typical of mass production operations. Supporters of flow manufacturing have coined the phrase "mass customization" to describe this seemingly contradictory objective.

An ERP application, like any other software or piece of office equipment or machine on the shop floor, is just a management tool, albeit a very sophisticated one, to support the management and operation of a manufacturing plant. To successfully implement a flow software package in a manufacturing environment, the organization must first establish the principles and methodologies of lean as the underlying foundation upon which the ERP system is overlaid. Once this is in place, the organization can introduce an ERP package to identify and eliminate non value-adding activities and streamline other activities. It should be noted that the ERP package is not designed to replace the capability of an LSS model, to eliminate waste and produce a quality product. The ERP system merely augments LSS by automating the implementation of processes, which may be lean or not lean. The power of ERP systems stem from their ability to

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handle large amounts of data and complex calculations and to electronically

communicate changes and demand simultaneously to multiple and remote locations. ERP

vendors also introduced enablers to adapt their applications for flow or lean. These

enablers include a variety of new modules, toolsets, and modifications to add new

functionality to existing software. Some features include:

Support for Just-in-Time Procurement: Functionality to extend the pull concept up

through the supply chain to suppliers and achieve the inventory reductions associated

with lean manufacturing. Support for just-in-time procurement provides for frequent,

flexible, small-lot deliveries of parts and materials without the need for traditional

purchase orders.

Electronic Work Method Sheets: Graphical online instructions, lists of parts and

tools required and the quality criteria for each specific operation.

Flow Production Planning Tools: Daily production planning tools to determine

whether the proposed production can be achieved based on available resources and

material. Scheduling is used to address production capacity constraints by slotting

production into the most appropriate time slot. Sequencing tools help ensure that line

balance is maintained. Demand smoothing tools to accumulate forecast and customer

demand to provide a graphical analysis of daily production, including graphical time

fence analysis and daily resource planning;

Backflush Capabilities: Routine transactions for material issues, activity reporting

and inventory level updates are replaced by the performance of all inventory transactions

upon completion of a single unit.

Facilities to Manage Engineering Change Orders: Workflow or other similar technology to communicate engineering changes to the production line immediately since these often impact the work process as much as the bill-of materials.

Daily and Periodic Flow line Performance Reporting: Including backflush reporting, kanban shortages, material use variances, resource utilization, daily planned production, and actual versus planned supplier delivery frequency.

Simplified Product Costing: New costing methodology that eliminates the cumbersome procedure of costing each work-in-process component.

As this thesis research has shown, manufacturers can produce both high volume goods with steady demand and low volume goods with fluctuating demand, and their product mix may include engineer-to-order, make-to-order and stock items. However, these tools are designed to help the organization become more efficient and more effective. The ERP tools are designed to help make the organization run smoothly by adding software within the areas of an organization that require human repetitive interaction. The addition of computer software into an organization that requires human interaction reduces the probability of human error. Also, having less human interaction or error within an organization reduces the amount of waste within the organization and helps the organization become more efficient and effective. More importantly, when there is a change of the requirements from the base voice of the customer, the computer software can be designed to adapt through coding or with the flick of a button, whereas human interaction can be more costly.

Nevertheless, the implementation of an ERP system is not an overnight event. The threat of an employee losing his job to a computer, in which the computer does not

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require sick days, health insurance, or rest, is a serious one. The organizational employee "buy in" can take years depending on the size of the organization, in addition to the amount of money it will require to re-train the employees to become proficient in computer software management and operational use. In the interim, the implementation of this type of application to the work environment will make it necessary to run a mixed-mode operation for an extended period of time. The key to successfully operating in this mixed-model environment is to take advantage of the strengths of the employees in each software application and assign them where best suited.

Research also suggested using the traditional ERP systems for material requirements planning for long lead-time items and nonreplenishable items, or one-of-a-kind production, products that have long production cycles, and long-term budgeting and planning requirements.

It is difficult to identify benefits and gains directly attributable to the implementation of ERP as distinct from those that result from lean initiatives, but the overall results to date have been impressive. For example, the corporation Siemens, Cerberus Division,[1] implemented lean techniques and ERP software manufacturing application mix to achieve significant increases in both flexibility and productivity. Before the implementation of the software either or hardware mix, the organization produced a product every fifteen to thirty days. With the implementation of the mix, multiple products come off the production line every twenty days. Productivity increased by as much as 15 to 20 percent, floor space has been reduced 25 to 30 percent, finished goods inventory has been reduced by 50 percent, all while sales volumes increased by 35 percent.[2]

In summary, any manufacturer confronted by the need to increase productivity, reduce operating costs, improve quality and shorten production lead times may want to give serious consideration to lean and flow-enabled ERP software applications. Additionally, bringing the two concepts together delivers faster results by establishing baseline performance levels and focusing the use of statistical tools where they will have the most impact. Research showed companies using both methodologies began by applying basic lean-manufacturing techniques, then standardized the work load ratio and eliminated waste. Moreover, as the companies reduced their unneeded inventory they discovered a need for even more advanced methods of software, such as IN, when uncovering the root cause of the additional abnormalities. This suggests that the lean application was not enough in solving the problems corporations encountered, and that additional applications, such as, ERP are required to solve the dynamic aspect of a changing organization.

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[1]Siemens is a New Jersey-based manufacturer of commercial fire detection systems

[2]Supply Chain Management E-Business Solutions, *Reach Peak Production Efficiency with Logility's Next Supply Chain Power (*Thousand Oaks, CA: SAGE Publications), Vol. 13, No. 2, 269-271, 1995; [American Software web site]; available from http://www.amsoftware.com/marketing/; Internet; accessed 16 April 2007.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The findings of the research indicated that business models exist in civilian corporations that can be successfully implemented in the Institutional Army. Examples include the use of LSS in Army Depots and other organizations which utilize repetitive processes to accomplish their missions. This is documented in multiple case studies including the classic case study by Dr. Roger Harvey and Chester S. Labedz Jr. on the turnaround at Letterkenny Army Depot.

The research has also shown that other civilian models may be applied to the Institutional Army as well. These include Enterprise Resource Planning (ERP) systems and Information Networks (IN). Clearly, each one of these civilian models brings different capabilities to the Institutional Army. Each one can be implemented independently to achieve the best that each model brings. However, the use of two or more of these models further improves the performance of the organization as a part of the Army Business Transformation Program.

This conclusion is based on the research and suggests that LSS works well, but that it does not solve every problem within the business community or Institutional Army by itself. One model will not work for every situation successfully.

Furthermore, enabling models, such as IN and ERP, perform as an intermediary tool with regards to resource demands by decreasing the amount of worker burnout as well as increasing competition in terms of outsourcing cheap labor. The enabling models add value to corporations and the Institutional Army by working smarter not harder,

thereby leveraging current dynamitic technology. Furthermore, utilizing LSS, ERP and

IN for all Army business transformation, specifically within the budgetary and

acquisition process, may prove successful provided a strong linkage is found between the

models and the organization.

<div align="center">Recommendations</div>

It is clear from the work in this thesis that models and systems validated in

civilian industries can impact the performance of the Institutional Army in organizations

where similar processes are involved.

Examples of these successful civilian-to-military model applications were

provided in the conclusion above. The follow-on question becomes, What other models

either or systems should the Army evaluate for similar performance improvements?

Other potential candidates include information tracking systems, such as, RFID

tags as they possess the capability to increase situational awareness and lend to

situational understanding by allowing positive management of the work environment and

resulting in a significant positive impact on risk taking. Additionally, the QuickBooks

application used by American Express to track financial transactions automatically

instead of manually entering prescribed data into spreadsheet-type software is another

possible contender with possible linkage to the Institutional Army.

Moreover, another possible contender is the use of a direct distribution process.[1]

The conventional distribution model has three levels: the producer, the wholesaler and

the retailer. The conventional distribution models, however, call for all parties in the

process to protect their own best interests. Thus, retailers are pitted against wholesalers,

and wholesalers are in competition with producers. This web of conflicting interests

sometimes works to the detriment of the entire system. For instance, a producer may try to bypass the wholesaler and go straight to retailers, prompting the wholesaler to retaliate by dropping the producer's products.

Therefore, the primary alternative distribution channel is the direct distribution process. This model was utilized by Dell, Avon, and many other successful companies that required the producer of the product to sell and deliver directly using its own salespeople and warehouses to the customer. Going direct can cut significant costs from the system because a profit is not required for intermediaries, such as, wholesalers and retailers. But slicing two steps from the traditional distribution channel tends to alienate wholesalers and retailers.

Additionally, in terms of direct distribution the use of the internet and search engines is an excellent opportunity to distribute technology (patches, updates, instruction, and general information) without the high overhead of shipping, packaging, and storing. In terms of storage, the information is either pushed or pulled, depended on the amount of space required, to the customer or within the organization.

Knowledge, training, experience and functional perspective are the essential elements of how information is used. However, situational awareness does not reduce the need for coordination in order to optimize the synchronization process within an organization.

The end result suggests that although IN and ERP are incredible enhancers to the LSS work place, their software application does not replace the need for effective communication skills between the anticipated requirements of the customer and the associated expectations of the business organization.

[1]Entrepreneur.com; *Distribution Models*, Irvine, CA: Entrepreneur Media Inc, [on-line]; available from http://www.entrepreneur.com.html; Internet; accessed 2 April 2007.

GLOSSARY

Active RFI Tags. Is a battery-powered communicator that can either transmit constantly or be activated by a signal from a RFI reader.

Assesses. Is the process of determining, usually in measurable terms, knowledge, skills, attitudes and beliefs.

Business Plans. A formal statement of a set of business goals, and the reasons why they are believed attainable, and the plan for reaching those goals. It may also contain background information about the organization or team attempting to reach those goals.

Buy-in. Signifies the commitment of interested or affected parties to a decision to agree to give it support, often by having been involved in its formulation.

Database. A structured collection of records or data that is stored in a computer so that a program can consult it to answer queries.

Cost Effectiveness. Compares the relative expenditure (costs) and outcomes (effects) of two or more courses of action.

Decide. To pronounce a judgment; announce a verdict.

Dynamic characteristics. Characterized by continuous change, activity, or progress.

Effective. Producing a strong impression or response.

Efficient. Acting or producing effectively with a minimum of waste, expense, or unnecessary effort.

Enterprise Resource Planning Systems (ERP). An Information Technology term referring to a hardware or software system that serves all departments within an enterprise

Engineer to Order. Is a production approach products are built after a confirmed order is received for it.

Industrialization of Services. A business model used in strategic management and services marketing that treats service provision as an industrial process, subject to industrial optimization procedures.

Informational Networks. Information networks refer to corporation utilizing the contemporary networking technologies, such as, Internet and wireless communication for distributing and sharing information among different technical networks that any human network can benefit of.

Institutional Army. Relating to the principles or institutes within the business side of the Army

Just-in-Time Manufacturing. An inventory strategy that reduces in-process inventory.

Just-in-Case Manufacturing. Manufacturers that need to maintain large inventories of supplies, parts, warehousing resources, and extra workers to meet production contingencies.

Just-in-Time Procurement. It is an automated ordering system designed to allow the end user either or requester to place an order for commercial, off-the-shelf, low-dollar items.

Radio Frequency Identification Tags. Is an automatic identification method relying on storing and remotely retrieving data using transponders.

Repetitive. Seemingly without interruption; chiefly restricted to what recurs regularly or frequently in a prolonged and closely

Maneuver. To manipulate into a desired position or toward a predetermined goal.

Mass customization. The use of flexible computer-aided manufacturing systems to produce custom output

Nonrepetitive Functionalities. Seemingly with interruption; inconsistent

Observe. To be or become aware of, especially through careful and directed attention; notice

Orient. To align or position with respect to a point or system of reference

Passive RFI Tags. Has a very short range, are not powered, and must be "woken up" by a reader that is only a few feet away.

Total Quality Management. A strategy aimed at embedding awareness of quality in all organizational processes.

Transformation. A marked change, as in appearance or character, usually for the better

Troop to Task. Efficient use of soldier time in terms of tasks assigned

Work Load Ratio. A comparison between the amounts of people to the amount of work required; exhibiting a high ratio of output to input.

Quadrennial Defense Review. A report by the United States Department of Defense that analyzes strategic objectives and potential military threats. It is the main public document describing the United States' military doctrine.

Voice of the Customer. Is a term used in business to describe the process of capturing a
      customer's requirements.

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