"STUDY ON ESTABLISHMENT OF
MANAGEMENT INFORMATION SYSTEMS (MIS)
in Distribution Centers"

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Supervised by: Brid Lane

I declare that this dissertation is the result of my own independent investigation and that all sources are duly acknowledged in the Reference and Bibliography.

This is to certify that, except where specific reference is made, the work described within this project is the result of the investigation carried out by myself, and that neither this project nor any part of it, has been submitted in candidature for any other award other than this being presently studied.

Any material taken from published texts or computerised sources have been fully referenced, and I fully realise the consequences of plagiarising any of these sources.

Daming Zhang
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Abstract

This dissertation outlines the Information Systems (IS) revolution and the strategic role of Information Systems, organizations, and the evaluation of Management Information Systems (MIS) from their conception to present day.

Today, online web site are already available in different types of business sectors such banking, insurance, stocks, auctions and airline industries and so on. So, using E-commerce and E-business for organizations and individual people is getting more and more important

This dissertation outlines the Supply Chain Management (SCM) is a unifying concept incorporating both E-procurement and sales, coordination of all supply chain activities from suppliers and delivery of products to customers, source of competitive advantage via integration and possibility for enhancement through buy-side electronic-commerce, internal facilitations and sell-side electronic commerce, and emphasis on inter-party relationships and flow of information.

This dissertation outlines the tool of storagement and warehousing in today’s modern Distribution Centers by using the effective Management Information System (MIS) in order to obtain the competitive business environment. It is discussed in some relevant materials and cases.

And this dissertation also analyzes the characteristics and content of Management Information System (MIS) in Distribution Centers, discusses the platform constitution of information management system
and the network topology structure thereof and puts forward the guiding principles for constructing such a system currently.

**Some Keywords:**

- Information Systems (IS)
- Management Information Systems (MIS)
- Supply Chain and Supply Chain Management (SCM)
- Storgement
- Warehousing
- Distribution Centers

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Research Methodology

The objective of this dissertation is to analyse the Management Information Systems (MIS) using for Distribution Centres. The following brief outlines the objectives of this research dissertation and the methodology used to investigate this topic.

In order to achieve the above objectives a combination of primary and secondary research was applied.

Primary Research

The primary objective of this research dissertation is to investigate the evolution of Distribution Centres by using Management Information Systems (MIS), to analyse Value Chain, Supply Chain and Demand and outline the new and advanced Information Technologies in storagement and warehousing in today’s Distribution Centres and also dynamic business environment, and to provide a combination of conclusions and recommendations.

In total, interviews were held in person and conducted over the phone. From the interviews conducted a valuable insight was gained into the practicalities of the purpose of this dissertation.

Also the questionnaire was used during the primary research, sent about 100 questions’ forms to the different group of individual people and organisation. Then collected and analysed the results. (Details in Appendices)
Secondary Research

There were many sources of information used in this category. Newspaper articles, Journal articles, Reports, Government publications, Internet articles and books offered plenty of reference material to draw upon. In general it was found that newspaper and journal articles offered the best form of information. This is due to the up to the minute fact available which are difficult to obtain when referring to books or reports.

In compiling reference material the following libraries have been used:

- Central Statistics Office Library, Rathmines
- D.I.T Library, Kevin Street and Bolton Street
- Enfo. Library, St. Andrews Street
- The Ilac centre Library
- Portobello College Library

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**Table of Contents**

Declaration .................................................. I
Acknowledgement ............................................. II
Abstract ..................................................... III
Research Methodology ....................................... V
Table of Contents ........................................... VII
List of Figures and Table .................................... X
Introduction ................................................XI

1. **Information Systems** .................................. 1

1.1 What is an Information System?
1.1.1 A business Perspective on Information Systems
1.1.2 Contemporary Approaches to Information Systems
1.2 The Network Revolution and the Internet
1.3 Internet Commerce – A New Paradigm for Business
1.3.1 Internet-commerce
1.4 Why Information Systems?
1.4.1 The Competitive Business Environment
1.5 "Value Chain" Concept

2. **Supply Chain Management explained** ............... 10

2.1 Supply Chain
2.2 Supply Chain Management (SCM)
2.3 How is the Supply Chain works?
2.4 The future of Supply Chain Management (SCM)

3. **Distribution Centers** .................................. 13

3.1 Defense Distribution Center (DDC)
3.2 Distribution Functions
3.3 Distribution Standard System (DSS)
3.4 Concept of Operations
3.5 Joint Total Asset Visibility (JTAV)

4. **Warehousing** ........................................... 22

4.1 Introduction
4.2 Keep track on profitable activities
4.3 Cross-docking
4.4 Specifications
5. **Management Information Systems (MIS) in Distribution Centers**

5.1 World-Wide Express (WWX)
5.2 Commercial Air Lines of Communication (COMALOC)
5.3 Medical Express (MedEx)
5.4 Radio Frequency Tagging (RFTag)
5.5 Automated Manifest System (AMS)
5.6 Dedicated Truck Deliveries
5.7 Call Centers
5.8 Performance Oriented Packaging (POP)
5.9 Business Systems Modernization
5.10 UPS Competes Globally with Information Technology (case)

6. **Content of the Management Information in a Distribution Center**

6.1 Analysis on the Layers of Information Management in a Distribution Center
6.2 Basic Work Flow of Information Management in a Distribution Center

7. **Configuration and Construction of the Information Management System Platform in a Distribution Center**

7.1 Structure of the Information Management System Platform in a Distribution Center
7.2 Network Configuration of the Management Information System in a Distribution Center

8. **Guideline for Construction of the Management Information Systems in a Distribution Center**

9. **Conclusion**

References
List of Figures and Table

Figure 1.1  (An Information System)
Figure 1.1.1  (A Business Perspective on Information Systems)
Figure 1.1.2  (Contemporary Approaches)
Figure 1.5  (Information in the Value Chain)
Figure 6.1  (Information Management Layers in a Distribution Center)
Figure 7.1  (Framework of the Information Management Platform of the Distribution Center)

Table 1.2.1  (The Changing Contemporary Business Environment)
Introduction

Globalization of the world's industrial economies greatly enhances the value of information to the firm and offers new opportunities to businesses. Today, information systems provide the communication and analytic power that firms need for conducting trade and managing business on a global scale. Controlling the far-flung global corporation – communicating with distributors and suppliers, operating 24 hours a day in different national environments, serving local and international reporting needs – is a major business challenge that requires powerful information system responses.

Globalization of trade, the emergence of information economies, and the growth of the Internet and other global communications networks have recast the role of information systems in business and management. The Internet is becoming the foundation for new business models, new business processes, and new ways of distributing knowledge. Companies can use the Internet and networking technology to conduct more of their work electronically, seamlessly linking factories, offices, and sales forces around the globe.

The Internet has created a universal platform for buying and selling goods. It provides powerful capabilities for driving important business processes inside the company and for linking such processes electronically to those of other organizations.

Today's supply chain management (SCM) relies on the chain being a giant loop, with data feedback from the points of sale informing all of the elements back along the chain. The IT systems available to this modern
SCM integrate the traditional processes of specification, ordering, stocks and so on with logistics and fulfilment and also with the market front end. Every item sold or ordered feeds back into the information flow, potentially triggering replenishment manufacture at the other side of the chain loop.

Warehousing is a solution designed to deliver an optimum between customer satisfaction and efficient warehouse management. The warehousing function includes the physical storing of materiel, as well as selecting that materiel and preparing it for shipment. Warehousing also includes maintaining the stock locator system, controlling all Materiel Release Orders (MROs), keeping the storage plans current, and preparing space utilization reports. By ensuring that the operation in the warehouse follows the optimum based on the available capacity. The customers’ requirements are taken into account during the whole process. Each activity is part of the total warehouse process whilst at the same time Service Level Agreements are monitored and constantly checked.

Generally, a distribution center is located at the traffic center of the city. As the center of centralized commodity processing in circulation for the city and chain enterprises, it covers all or most links of commodity distribution including transporting for distribution, storing, packaging, processing in circulation and information processing. In general, therefore, a distribution center has multiple business functions and a huge throughput with the characteristics of high frequency and small batches in operation links. Thus the information is wide-ranging and extensive in volume, causing complexity and diversity of the business management. Information needs to be transmitted and processed dynamically and timely in many cases to meet the requirements of rapid responding, exact
processing and cost saving. Therefore, construction of the information management system for a distribution center is very significant not only for improving the routine operation efficiency of the distribution center but also building up its service ability.
1. **Information Systems**

1.1 **What is an Information System?**

An information system can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization. In addition to supporting decision making, coordination, and control, information systems may also help managers and workers analyze problems, visualize complex subjects, and create new products.

Information systems contain information about significant people, places, and things within the organization or in the environment surrounding it (Figure 1.1). By information we mean data that have been shaped into a form that is meaningful and useful to human beings. Data, in contrast, are streams of raw facts representing events occurring in organizations or the physical environment before they have been organized and arranged into a form that people can understand and use.

![Figure 1.1](image-url)
Three activities in an information system produce the information that organizations need for making decisions. These activities are **input**, **processing**, and **output**. Input captures or collects raw input into a more meaningful form. Output transfers the processed information to the people who will use it or to the activities for which it will be used. Information systems also required feedback, which is output that is returned to appropriate members of the organization to help them evaluate or correct the input stage.

Informal information systems (such as office gossip networks) rely, by contrast, on unstated rules of behavior. There is no agreement on what is information, or on how it will be stored and processed.

Formal information systems can be either computer-based or manual. Manual systems use paper-and-pencil technology. These manual systems serve important needs. Computer-based information systems, in contrast, rely on computer hardware and software technology to process and disseminate information. The “Window on Technology” describes some of the typical technologies used in computer-based information systems today.

### 1.1.1 A business Perspective on Information Systems

From a business perspective, an information system is an organizational and management solution, based on information technology, to a challenge posed by the environment. Examine this definition closely because it emphasizes the organizational and management nature of information systems: To understand information systems – to be information systems literate as opposed to computer literate – a manager must understand the broader organization, management, and information technology dimensions of systems (see Figure 1.1.1) and their power to provide solutions to changes and problems in the business environment.
Figure 1.1.1

1.1.2 Contemporary Approaches to Information Systems

Multiple perspectives on information systems show that the study of information systems is a multidisciplinary field; no single theory or perspective dominates. Figure 1.1.2 illustrates the major disciplines that contribute problems, issues, and solutions in the study of information systems. In general, the field can be divided into technical and behavioral approaches. Information systems are socio-technical systems. Through they are composed of machines, devices, and “hard” physical technology; they require substantial social, organizational and intellectual investments to make them work properly.
1.2 The Network Revolution and the Internet

One reason that information systems play such a large role in organizations and affect so many people is the soaring power and declining cost of computer technology. Computing power which has been doubling every 18 months, has improved the performance of microprocessors 25,000 times since their invention more than 25 years ago. With powerful, easy-to-use software, the computer can crunch numbers analyze vast pools of data, or simulate complex physical and logical processes with animated drawings, sounds, and even tactile feedback.

The soaring power of computer technology has spawned powerful communication networks that organizations can use to access vast storehouses of information from around the world and to coordinate activities across space and time. These networks are transforming the shape and form of business enterprises and even our society.

The world’s largest and most widely used network is the internet. The Internet is an international network of networks that are both commercial and publicly owned.
The Internet connects hundreds of thousands of different networks from over 200 countries around the world. More than 150 million people working in science, education, government, and business use the Internet to exchange information or perform business transactions with other organizations around the globe. The number of Internet users is expected to surpass 300 million by the year 2000.

The Internet is extremely elastic. If networks are added or removed or failures occur in parts of the system, the rest of the Internet continues to operate. Through special communication and technology standards, any computer can communicate with virtually any other computer linked to the Internet to exchange business transactions, text messages, graphic images, and even video and sound. Whether they are located next door or on the other side of the globe.

1.3 Internet Commerce – A New Paradigm for Business

Prior to 1994 the Internet was a network of computers used by the academic and military communities. It has paved the way for the Internet to emerge as a tool to advance commercial and leisure activities. New terminology has entered the business and academic communities at a rapid rate. Terms such as, Internet commerce, electronic commerce, cyberspace, cybermediaries, market space and the virtual organization are just a few that have been used in relation to the Internet in recent years. Whilst these terms seemingly offer new opportunities for business, in an era often referred to as the information age or society, they also engender much confusion, particularly for those people who are attempting to evaluate the potential benefits and pitfalls from Internet commerce. At the present time, Internet commerce remains very much at the developmental or experimental stages, and business managers have very little experience from which to draw in distinguishing hype from practical reality (Lymer et al., 1997)
1.3.1 Internet-commerce

What is the Internet? The question is tremendously difficult to answer because the Internet is so many things to so many people. Generally, it is:

- A global computer network connecting millions of computers.
- Originated from US defense funded Advanced Research Projects Agency (ARPA) in 1969.
- It has over 100 million users in 170 countries is growing at 10% per month 50% every 54 days in the UK, a new network is added every 30 minutes.

As with every new technological artifact – from the mainframe computer to the personal computer (PC) – a great deal of optimism and hype surround the Internet and its potential to change the way businesses are managed, co-ordinated, costed and controlled. Certainly, the widespread use of the PC in industrialized countries has revolutionized the world of work, as jobs have been simultaneously eliminated and created, thus contributing to the turbulent labour market in the last two decades. The same may be true of the Internet, following its launch in the business community from 1994 onwards (Kalakota and Whinston, 1996).

1.4 Why Information Systems?

Until recently, information itself was not considered an important asset for a firm. The management process was considered a face-to-face, personal art and not a far-flung, global coordination process. Today it is widely recognized that understanding information systems is essential for managers because most organizations need information systems to survive and proper.

1.4.1 The Competitive Business Environment

Three powerful world wide changes have altered the environment of business. The
first change is the emergence and strengthening of the global economy. The second change is the transformation of industrial economies and societies into knowledge and information-based service economies. The third is the transformation of the business enterprise. These changes in the business environment and climate, summarized in table 1.2.1, pose a number of new challenges to business firms and their management.

<table>
<thead>
<tr>
<th>Globalization</th>
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<tr>
<td>Management and control in a global marketplace</td>
</tr>
<tr>
<td>Competition in world markets</td>
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<tr>
<td>Global work groups</td>
</tr>
<tr>
<td>Global delivery systems</td>
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</tbody>
</table>

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<tr>
<th>Transformation of Industrial Economies</th>
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<tr>
<td>Knowledge – and information – based economies</td>
</tr>
<tr>
<td>Productivity</td>
</tr>
<tr>
<td>New products and services</td>
</tr>
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<td>Knowledge: a central productive and strategic asset</td>
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<td>Time – based competition</td>
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<tr>
<td>Shorter product life</td>
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<td>Turbulent environment</td>
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<td>Limited employee knowledge base</td>
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<th>Transformation of the Enterprise</th>
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<td>Decentralization</td>
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<td>Flexibility</td>
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<td>Location independence</td>
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<td>Low transaction and coordination costs</td>
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<td>Empowerment</td>
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<td>Collaborative work and teamwork</td>
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Table 1.2.1 (The Changing Contemporary Business Environment)

1.5 “Value Chain” concept

Information technology is changing the way companies operate. It is affecting the
entire process by which companies create their products. Furthermore, it is reshaping the product itself: the entire package of physical goods, services, and information companies provide to create value for their buyers.

An important concept that highlights the role of information technology in competition is the "value chain." (Figure 1.5) This concept divides a company’s activities into the technologically and economically distinct activities it performs to do business. These are called: "value activities." The value a company creates is measured by the amount that buyers are willing to pay for a product or service. A business is profitable if the value it creates exceeds the costs of performing the value activities. To gain competitive advantage over its rivals, a company must either perform these activities at a lower cost or perform them in a way that leads to differentiation and a premium price (more value).

Information in the Value Chain
(adapted from Porter & Millar, 1985)

Figure 1.5 (Information in the Value Chain)

A company’s value chain is a system of interdependent activities, which are connected by linkages. Linkages exist when the way in which one activity is performed affects the cost or effectiveness of other activities. Linkages often create
trade-offs in performing different activities that should be optimized. Linkages also require activities to be coordinated. On-time delivery requires that operations, outbound logistics, and service activities should function smoothly together. Linkages not only connect value activities inside a company but also create interdependencies between its value chain and those of its suppliers and channels.

The value chain for a company in a particular industry is embedded in a larger stream of activities that we term the “value system”. The value system includes the value chains of suppliers, who provide inputs (such as raw materials, components, and purchased services) to the company’s value chain. The company’s product often passes through its channel’s value chains on its way to the ultimate buyer. Finally, the product becomes a purchased input to the value chains of its buyers, who use it to perform one or more buyer activities.
2. **Supply Chain Management explained**

2.1 **Supply Chain**

The supply chain is a handy phrase that has been around in the management textbooks for a long time, referring to the links between the manufacturing and distribution functions in a classic enterprise. Its span was from raw materials and components to the logistics of getting the finished products from the manufacturer to the reseller, distributor or importer.

2.2 **Supply Chain Management (SCM)**

Clearly, the entire process depends on automated communications between all of the systems involved, in all of the businesses in the supply chain. The traditional communication links were electronic data interchange (EDI) together with leased line or dial-up computer-to-computer file exchange. But, the impact of the internet has been enormous in this whole area, bringing speed and ease of communication and also allowing the smaller suppliers in the chain for the first time to be integrated into the heavyweight systems of their customers. The grocery multiples are a very good example of a sector where this is all advancing rapidly.

Supply and demand are the fundamentals of all forecasting and all strategic planning, whether yours is a micro-business or a multinational, in manufacturing or finance, high technology or transportation. Integrated SCM promises to do for productivity and efficiency in this decade what just-in-time did for inventory control and responsiveness in the Eighties and Nineties.

The company can simultaneously improve customer service and reduce inventories. The concept stretches even further for manufacturers - if you integrate supply chain concepts into your product development and design plans early on, you will gain economic and competitive advantage throughout the entire product life cycle.
Sophisticated SCM uses the best of today's IT to set up automated data sharing to an ever-growing network of factories, suppliers of raw material or components, distribution centers, retail outlets even delivery vehicles. The aim is for each player in the supply chain to conduct business with the latest and best information from everyone else in the chain increasingly via the internet, so guiding supply and demand into a more perfect balance. The purpose is to move product from the point-of-origin to that of consumption in the least amount of time and at the lowest cost.

2.3 How is the Supply Chain works?

SCM works across functions and several management disciplines contribute to supply-chain optimization efforts, including forecasting, distribution management, production planning and transportation planning.

SCM software also enables its user companies to model complex supply chains and rapidly generate integrated solutions to problems such as production bottlenecks, supply interruptions and customer order changes. These capabilities enable companies to make better informed decisions in order to improve operating efficiency, customer satisfaction and return on assets.

All of this is undoubtedly wonderful. But it will be apparent at this stage that supply chain management is like enterprise resource planning or today's darling, Customer Relationship Management (CRM) in that it is really all-embracing. So it is necessarily more of a strategic business planning approach or philosophy than a straightforward system or set of systems. One consultant puts it neatly: "It's a bit of a Rubik's cube - each element may be perfect, but that does not mean that the whole is perfectly organized."
While SCM has, in the past, been the exclusive territory of the large organization, right at the other end of any scale, small businesses can apply elements of SCM cost-effectively and relatively speedily. In fact you could say that chain email is the simplest form of SCM. If I am a small craft cheese maker in West Cork, a straightforward email order from my distributor or one of the big multiples is perfectly fine. The complexities of the system that produced that order are none of my concern.

2.4 The future of Supply Chain Management (SCM)

SCM is principally concerned with the day-to-day efficiency of businesses working together around the supply chain and maximizing the benefits from sharing - almost pooling - their management information resources. An enquiry about the status of an order, for example, will often involve an automatic and invisible connection (yet another benefit of 'always on' internet connection) that lets the enquirer look directly into the supplier's information system.

E-commerce is also emphasizing an element which has been present for many years anyway. The customer may order my product from my company on the web but it will actually be delivered by a distributor or agent, by a logistics company from a warehouse hub, or increasingly from the sub-manufacturer which actually makes the entire finished item. Cisco, for example, no longer physically makes any of its products yet continues to be a technology world leader. Outsourcing at that total level takes SCM of a supreme order. The internet, however, is offering the likes of our Cork cheese supplier a chance to use more modest forms of SCM.
3. Distribution Centers

The distribution operation responsibilities include receipt, storage, issue, packing, preservation, worldwide transportation, in transit visibility and redirecting en-route, when required, of all items placed under its accountability.

3.1 Defense Distribution Center (DDC)

The example is that the Defense Distribution Center (DDC) is headquarters to the 22 Defense Logistics Agency (DLA) Distribution Centers located throughout the United States, Europe, Japan, and Hawaii. The 22 sites hold over 3.6 million stock numbers in 325 million cubic feet of storage space and process over 24 million transactions annually. Clothing and textiles, electronics, industrial, general and construction supplies, subsistence, medical material and the military services’ principle end items are among the commodities for which the distribution function and personnel are responsible. This unit will cover the overall wholesale distribution operation of a DLA Distribution Center.

3.2 Distribution Functions

In the past, ‘distribution’ was about depots, the storage of material and responding
to basic customer needs. This narrow view of distribution as a minor link in the supply chain has changed. The depots are now distribution centers – a robust operation to support the business and organizations anywhere, anytime for logistics and transportation support. Sometimes, many of the commodities and types of equipment have no commercial use, warehousing will remain an important and fundamental aspect of our business.

All Distribution Centers perform similar functions to service and maintain stock, but their missions can be identified in one of three distinct categories:

1. **Strategic Distribution Platforms (SDPs)** are large facilities that serve as the primary source for the majority of material shipped to customers within their areas of responsibility.

2. **Collocated Distribution Centers (CDCs)** provide local support to the Services maintenance missions located at or very near each Center. These Distribution Centers may also serve as the primary center for the storage, maintenance and issue of a specific commodity, e.g. Ozone Depleting Substances that require unique facilities or handling procedures.

3. **Theater Distribution Platforms (TDPs)** provide in theater supply support for high demand or critical stock that is needed in their assigned area of responsibility. By placing stock close to the overseas customers, it can provide faster delivery to customers at a lower overall cost. These TDPs increase the Theater Readiness of all services.

In addition to the above facilities, Distribution Center also manages a contractor operated Premium Service Facility. This unique facility provides for the storage and shipment of high dollar value, low stock level and exceptionally critical stocks for customers. The contractor stores these critical items and ships upon demand directly into the commercial overnight delivery system.
Many factors have influenced distribution centers over the past ten years, including DMRD 902, base realignments and closures and commercial activities’ reviews conducted under the auspices of the Office of Management and Budget’s Circular A 76. This means that all of distribution centers are being studied to determine which is more cost effective, to maintain distribution functions as Government operated or to turn operations over to private contractors who have bid against a statement of work to provide distribution services. To date, nine studies have been completed with the centers at Columbus, Richmond, and Albany remaining government operations. Contractors are now operating six distribution centers: Barstow, Warner Robins, Jacksonville, Cherry Point, Hill and San Diego.

At many Centers, the workforce is flexible, spending parts of each day in two or more of the different functions. The major functions of the Center are:

1. **Command and Administration** – Each Center will have a Commander or Director and an administrative support staff responsible for monitoring Center performance, managing AISs, and other administrative and security functions.

2. **Receiving** – The Receiving function includes offloading of freight, receipt to include proper handling, processing and routing of classified, controlled and hazardous material, inspection classification, and reclassification (using Kind, Count Condition procedures) of all incoming materiel and the routing of that materiel to storage. They also check packaging MIL 2073-IC and markings MIL-129 and use research data systems such as Fedlog and FLIS. The function also includes maintaining documentation, reporting discrepancies, and identifying items requiring inspection or testing by Quality Assurance personnel.
Study on Establishment of Management Information Systems (MIS) in Distribution Centers

3. **Warehousing** – “Stock control, is to manage motion” *(details in chapter 4)*

4. **Inventory Integrity** – Workers in Inventory Integrity conduct physical inventories, location surveys, denial and causative research, shelf-life inspections, and surveillance inspections. They conduct denial and causative research. They execute inventory adjustments and maintain the accountable inventory records. The Accountable Officer is a Command Staff position to oversee the Inventory program. Shelf-life inspections, surveillance inspections and other stock readiness functions are performed in this area or within Warehousing.

5. **Transportation and Shipping** – The transportation and shipping function includes developing, implementing, and administering shipment planning and traffic management. Transportation and Shipping operates the freight terminal, dispatching shipments through all modes and carriers.
3.3 Distribution Standard System (DSS)

DoD's Material Management and Distribution Board issued an Interim Systems and Executive Agent Selection report. This report recognized the inefficiency of maintaining multiple systems to support the DoD material distribution function. The board directed the selection of a single interim standard distribution system to support DoD and the military services' distribution requirements. A comprehensive functional and technical evaluation of the existing DoD distribution systems was undertaken. The Army's AOD/MOD with SDS shell was chosen as the migration system and renamed the Distribution Standard System (DSS).

DSS integrates all the basic center functions of receiving, storage, shipping, inventory, and transportation. DSS also incorporates space planning, production control and performance reporting. DSS even controls the use of Materiel Handling Equipment (MHE), throughout the centers.

3.4 Concept of Operations

The concept of operations for DSS includes the following generic business rules:

- Support service unique requirements
- Meet readiness goals
- Improve processes
Study on Establishment of Management Information Systems (MIS) in Distribution Centers

- Reduce costs

The DSS incorporates the above rules into a multitude of core functions within the DSS baseline. The core functions will be described in additional detail within the paragraphs below:

- Workload Planning
- COSIS/Shelf-life Management
- Receiving/PPP&M
- Picking
- Storage
- Packing
- Rewarehousing
- Shipment Processing
- Inventory / Item data
- Out loading
- ECS
- RF Technology

The workload planning module validates the Materiel Release Order (MRO) and builds all DSS history records. This module incorporates automatic downgrade priority logic, accomplishes preliminary shipping mode assignment. This module also has the capability to process emergency MRO/issue and free-flow capabilities. The DSS also has production planning capabilities, to include issue banking, special release/hold capabilities, and on-line/real time work-in-process visibility through inquiry screens and on-line reports.

DSS receiving module provides the end-user with seven different Receipt Induction Detail Requirements (RIDR) processes. These processes lead the distribution center operator through the correct processing of various receipt types, such as wholesale new procurement, local new procurement, retail, and various turn-INS. DSS also allows for single or multi-station processing for flexible operation decisions. DSS provides for automatic access of Pre-positioned Material Receipt Data (PMRD), by document number or NIIN, on-line validation of receipt data input, auto access to unique materiel storage exclusion files and optional overrides.
for various storage induction options. DSS accomplishes automatic Issue from Receiving (IFR) and generation of auto-RODs for participating services/legacy systems.

PPP&M modules can be invoked directly from receiving, or materiel can be ‘flagged’ in storage locations for processing later. DSS allows for MRO issue from PPP&M temporary storage locations, automated work order processing, and has on-line interfaces with several services packaging data.

DSS storage modules accommodate up-to 16-position location field. DSS has rack and bin pantograph capabilities, quantity-by-location (QBL), and a full-range of RF capabilities for real-time, bin-face, updates. DSS allows for storage segregation logic for Hazmat, lot number, shelf-life, and DMISA items. Stow/put away processes have real-time discrepancy capabilities and the ability to select or request alternate locations. A full range of storage management and production reports is available. Several pick options are available for the distribution centers including, RF pick with paper, RF pick without paper, or CRT with paper. Centers may utilize combinations of all options within their facilities. DSS allows and documents over-under picks and reports discrepancies on-line, real-time. Various pick sequence options are available for automated facilities. RF allows for exception data visibility at bin face. DSS provides for both manual and automatic/systemic processing of rewarehousing functions.

DSS has a fully regulatory, automated COSIS shelf-life program that includes cyclic and special inspection scheduling. Full RF programming is available. DSS automatically allocates the appropriate shelf-life items from segregated storage by type and expiration/manufacturer dates.

Packing modules offer flexibility by handling two basic types of pack: Continuous
pack processes allow for free-flow issue for dedicated customers to a designated consolidation area. Discrete pack offers maximum shipment consolidation for specific items for less-than volume customers. Pack programs encompass and finalize the full-range of DoD marking and labeling requirements. These include bar-coded military shipping labels (MSLs), container IDs, Automated Manifest System (AMS) cards, and packing lists. DSS performs automatic re-mode on actual weight identification and real-time address-check via global address DB. Packing also includes manifests for local-delivery customers and interfaces with other legacy systems for local delivery confirmation and accounting.

DSS Inventory includes physical and special inventories required. Numerous tools, reports, and inquiries are available to the end-user to perform required research. Daily/weekly/monthly reconciliations are accomplished to ensure internal and external balance conformity. RF processing is available to complete on-line, real-time updates. DSS is a fully compliant AMCL8-A system.

DSS provides for several out loading load capabilities including RF direct load for volume, dedicated customers/routes and freight release programs to accomplish LTL processing for non-volume customers. The freight documentation modules include automatic processing of all shipping documents including GBLs, CBLs, TCMDs, HAZMAT documents, and REPShips. DSS also partners with commercial businesses through electronic data interchange (EDI) transactions to the Bank, a program called Power Track, and Federal Express, by Power ship which exchanges tracking numbers.

- DSS also has modules to process the following applications:
  - Truck control
  - Recycle Control Point Processing
  - Consolidation and Containerization Point processing
Study on Establishment of Management Information Systems (MIS) in Distribution Centers

- Small Arms Serialization Program
- Total Package Fielding (TPF)
- DEPMEDS / set assembly

The above functional processes incorporate distribution responsibilities. DSS provides a streamlined, fully automated and comprehensive tool for end-users to document and control the receipt, storage, care, issue, package, and shipment of material to our customers worldwide on a daily basis.

This interactive system is available at a nominal cost, on a daily, near 24-hour basis, with comprehensive end-user interfaces. It provides complete management and operational information, through reports, on-line inquiries, and special query capabilities.

3.5 Joint Total Asset Visibility (JTAV)

JTAV is the capability to provide users with timely and accurate information on the location, movement, status, and identity of units, personnel, equipment, and supplies. It provides the capability to act upon that information to improve overall performance of logistics practices.

**In-Storage.** Assets in-storage at retail consumer sites, at retail intermediate storage sites, at disposal activities, or in wholesale inventories, to include ashore and afloat pre-positioned assets.

**In-Process.** The status of requisitions for organizations.

**In-Transit.** The status of assets moving though the transportation system.
4. Warehousing

4.1 Introduction

Warehousing is a solution designed to deliver an optimum between customer satisfaction and efficient warehouse management.

The warehousing function includes the physical storing of materiel, as well as selecting that materiel and preparing it for shipment. Warehousing also includes maintaining the stock locator system, controlling all Materiel Release Orders (MROs), keeping the storage plans current, and preparing space utilization reports.

By ensuring that the operation in the warehouse follows the optimum based on the available capacity. The customers’ requirements are taken into account during the whole process. Each activity is part of the total warehouse process whilst at the same time Service Level Agreements are monitored and constantly checked by Chainware® alert monitor.

Warehousing combines 3 worlds which makes it the solution for a public warehouse environment with short order cycle times.

4.2 Keep track on profitable activities

Warehousing determines the activities that have to be performed and the partners that have to be involved. The confirmation of services executed by the subcontracting partners is reported back into Chainware® including a billing forecast. Here, it is forwarded to billing and inventory management and the original order is updated. Automated costs & charge calculations make the profitability of all activities, even when outsourced, visible.
4.3 Cross-docking

In the process of cross-docking materials, materials are processed directly from the goods receipt area to the point of use or goods issue area without first being put away in the warehouse.

Warehousing enables a cross-location supply chain-oriented processing of cross-docking. Cross-docking enables a quick distribution of materials without processing many steps or even put away in the distribution centers. Therefore, fulfillment coordination has to provide timely information for the distribution centers or other locations involved in the process. The inbound shipments have to be identified, and processes concerning the contained packages or handling units have to be prepared in order to avoid time-consuming repackaging. Warehousing controls the communication between the central distribution centers, and creates the order saying which handling units have to be handled and how. The actual execution is fulfilled by site or warehouse management. Cross-docking also includes handling of packages at trans-shipment points or terminal hubs without warehouse management functions. Finally, the confirmation of services executed is reported back to Chainware® and forwarded to billing and inventory management.

4.4 Specifications

**Inbound order processing**
- Pre-notifications
- Dock & Yard Management
- Receipt
- Blocking & Quarantine
- Stock allocation
- Cross-docking
- Final intake
Internal Processing
- Cross-docking
- Cycle counting
- Relocation
- Re-packaging
- Value added logistics
- Return Goods

Outbound order processing
- Reservations
- Property modification
- Expire date control
- Order collection
- Replenishment
- Shipment building

Warehouse management
- Stock control
- Multi-side planning
- Capacity planning
- Planning & control
- Scheduling
- Workload management

Order management
- Order processing
- Order release planning
- Tracking & tracing
- Interfacing with Material Handling Equipment
- Weight and measuring system
- Automated warehousing systems
- Stock administration
- Order-entry
- Stock management
- Billing
- Pallet administration
Customs administration
- Entrecote license (C-sum, C-spec, C-bac, D, E)
- Declaration support
- Monthly reporting

Information and communication
- Management reporting
- Customer reporting on demand
- Connectivity
- Radio Frequency
- Internet

4.5 Radio Frequency

Direct database access remotely from mobile devices can reduce costs, increase productivity, and enhance customer service in Warehouse environments. Therefore Radio Frequency technology is fully integrated in our Warehousing solution.

4.6 Storagement

Storagement is a sophisticated, complex software system for online warehouse management and information retrieval. It uses an Intranet or the Internet to give configurable access to users, customers and partners. Storagement requires certain hardware and software platforms. The compatibility of components and systems not mentioned below can be checked in individual cases. Individual or proprietary hardware will however in many cases not be covered by our customer support and update policy, without prior adaptation of storagement.

Storagement requires certain hardware and software platforms. The compatibility of components and systems not mentioned below can be checked in individual cases. Individual or proprietary hardware will however in many cases not be covered by our customer support and update policy, without prior adaptation of storagement.
5. Management Information Systems (MIS) in Distribution Centers

The Management Information System (MIS) is an information database that provides the capability of on-line inquiry and is the source of distribution center workload and performance statistics. It is the source data in support of Net Landed Cost and major end item billing. Transaction records are received from DSS and other Center operating systems into MIS, which are then sorted. MIS calculates and produces data elements that reflect reporting requirements on distribution processing and workload reporting for the Distribution Center and each of the 22 sites within the Distribution Center.

5.1 World-Wide Express (WWX)

WWX began providing international commercial express small package service to OCONUS locations in 1998. This contract allows Centers to ship materiel weighing 150 pounds or less direct to overseas locations using commercial small parcel carriers such as FedEx. The carrier is responsible for all customs clearances and the delivery goal varies from 2–6 days. Some carriers can move cargo heavier than 150 pounds. (CAH III-64)

5.2 Commercial Air Lines of Communication (COMALOC)

COMALOC is a transportation initiative that provides overseas delivery of air pallet shipments from the Principal Distribution Sites (PDSs) using commercial carriers. This initiative requires delivery of air pallets within 4 business days.

It has significantly improved responsiveness to customers in OCONUS locations, reducing in-transit time from an average of 10–14 days to less than 4 days. The carriers are responsible for customs clearance and scheduling delivery times to meet customer’s requirements.
5.3 **Medical Express (MedEx)**

Similar to COMALOC, this initiative was developed to support hospitals and medical clinics overseas. Materiel is received, processed, and consolidated at the PDSs and shipped by commercial air. Unlike COMALOC, the materiel is not consolidated on air pallets. Rather, it is shipped on skids, cartons, wooden pallets, and boxes. Deliveries generally occur within 4 business days. The carrier is responsible for customs clearance.

5.4 **Radio Frequency Tagging (RFTag)**

This initiative uses radio frequency technology to track air pallet and Seavan shipments from the SDPs to customers in OCONUS locations. The RFTag is interrogated as it moves through the transportation channels providing moment-to-moment in-transit visibility using web technology. The customer can readily determine where the supplies are and download information on the pallet or van to determine what is being delivered.

5.5 **Automated Manifest System (AMS)**

Designed in conjunction with RF Tags, the AMS was developed to increase the accuracy of tracking materiel to receipt by the customer. AMS eliminates the need for hardcopy documentation with a shipment. Instead, the supply information for each shipment is captured on a credit card size optical memory card. Each AMS
card has the ability to hold 1,200 pages of data.

When the customer receives shipments with AMS cards attached, he or she simply runs the card through a reader, much like an ATM card, and downloads the manifest, Government Bill of Lading (GBL), Materiel Safety Data Sheet (MSDS), and other receipt-related data directly into the user's personal computer. Users can then manipulate this data to develop work lists, segregate materiel, confirm receipt, and prepare Supply Discrepancy Reports.

5.6 Dedicated Truck Deliveries

Dedicated Truck Deliveries were established to support high volume customers that receive numerous shipments from DDC Centers.

Coordination is accomplished with the intended customer to get an agreement to deliver all cargo, regardless of priority and size, up to 5 days per week. Delivery times and delivery locations are pre-arranged by customers when Dedicated Truck service is scheduled.

This is a win/win initiative for the customer. Saves transportation costs, and the customer knows exactly when his materiel will arrive. It also allows the customer to have orders bypass the central receiving point, thus saving additional on-base time.

5.7 Call Centers

Many activities have established Call Centers to respond to customer inquiries and provide status of shipments from all Centers.
5.8 Performance Oriented Packaging (POP)

POP was developed in conjunction with the United Nations to address the movement of hazardous materiel. POP specifically identifies the packaging and marking requirements for movement of hazardous materiel, by packaged quantity and mode of shipment.

Under POP, certain packaging materials are “POP Certified” and must be used in specific instances. DC is the librarian of test reports, maintains a software program that allows users to select approved packaging materials and teaches this course of instruction.

5.9 Business Systems Modernization

This Business Systems Modernization strategy will result in a new enterprise business architecture, which will enable to re-engineer its logistics processes to reflect best commercial practices. It will also contribute to improved military readiness by achieving the Joint Vision 2020 concept of Focused Logistics.

Within four years, will have said goodbye to venerated, yet antiquated, materiel management systems. Replacing programs dating back to the 1960s will be state-of-the-art software representing the best of today’s business applications. In addition to information technology replacement, BSM will also enable to take on industry best practices, collaborate more directly with customers and suppliers and provide best-value solutions. BSM will replace such programs as the Standard Automated Materiel Management System and Integrated Subsistence Management System.

BSM involves system and technology change, along with process reengineering and other elements. It also requires new jobs and new tools. BSM will affect every
Study on Establishment of Management Information Systems (MIS) in Distribution Centers

aspect of DLA business, including forecasting customer needs. BSM employs three major commercial off-the-shelf software components that will form the major building blocks of the new system. The three software packages are SAP, Manugistics and PD2. SAP will focus on order fulfillment, planning and financial management. Manugistics will focus on demand and supply planning activities.

BSM is, in reality, a single set of business processes and practices that will be institutionalized as BSM is deployed.

5.10 UPS Competes Globally with Information Technology (case)

United Parcel Service, the world's largest air and ground package Distribution Company, started out in 1907 in a close-size basement office. Jim Casey and Claude Ryan – two teenagers from Seattle with two bicycles and one phone – promised the “best service and lowest rates.” UPS has used this formula successfully for over 90 years.

UPS still lives up to that promise today, delivering more than 3 billion parcels and documents each year to the United States and to more than 200 other countries and territories. Critical to the firm's success has been its investment in advanced information technology. Technology has helped UPS boost customer service while keeping costs low and streamlining its overall operations.

Using a handheld computer called a Delivery Information Acquisition Device (DIAD); UPS drivers automatically capture customers' signatures along with pickup, delivery, and time-card information. The drivers then place the DIAD into their truck's vehicle adapter, an information-transmitting to UPS's computer network for storage and processing in UPS's main computer in Mahwah, New Jersey. From there, the information can be accessed world wide to provide proof of
delivery to the customer. The system can also generate a printed response to queries by the customer.

Through its automated package tracking system, UPS can monitor packages throughout the delivery process. At various points along the route from sender to receiver, a bar code device scans shipping information on the package label; the information is then fed into the central computer. Customer service representatives can check the status of any package from desktop computers linked to the central computer and are able to respond immediately to inquiries from customers. UPS customers can also access this information directly from their own computers, using either the World Wide Web of the Internet or special package tracking software supplied by UPS.

Anyone with a package to ship can access the UPS Web site to check delivery routes, calculate shipping rates, and schedule a pickup. Eventually people will be able to use the Web to pay for their shipments using credit card or business account that tracks on-line purchase orders for large regular customers. The data collected at the UPS Web site are transmitted to the UPS central computer and then back to the customer after processing. UPS recently started a new service called UPS Document Exchange to deliver business documents electronically using the Internet. The service provides a high level of security for these important documents as well as document tracking.

UPS's Inventory Express, launched in 1991, warehouses customers' products and ships them overnight to any destination the customer requests. Customer using this service can transmit electronic shipping orders to UPS by 1:00 a.m. and expect delivery by 10:30 that same morning. UPS is enhancing its information system capabilities so that it can guarantee that a particular package, or group of packages, will arrive at the destination at a specified time. If requested by the customer, UPS
will be able to intercept a package prior to delivery and have it returned or rerouted.
6. Content of the Management Information in a Distribution Center

6.1 Analysis on the Layers of Information Management in a Distribution Center

The information management in a distribution center is dealt with in three different layers (Fig. 6.1).

![Diagram of Information Management Layers in a Distribution Center]

The purpose of information management at the business operation layer is to arrange routine job tasks, rationally plan and utilize the resources of the distribution center and provide the upper layer with necessary management data. The information management at the business operation layer in the distribution center includes: transmitting, processing and monitoring the information of documents; determining prices; maintaining and using the information about equipment such as vehicles; planning the commodity packaging and processing in circulation; taking
information about warehousing in and out; tracking and inquiring the information about job status; customs declaring for exported goods; taking financial information; etc.

The purpose of information management at the business management layer is to conduct the achievement and efficiency examination and assessment through statistic analysis on routine operation information, and work out or revise job plans of the distribution center on the actual basis. The information management at the business management layer in the distribution center includes: cost accounting and account settling; management and analysis of information about customer relationship; information about transport and distribution scheduling; and inventory planning and analyzing. The purpose of information management at the strategic decision-making layer is to conduct analysis and simulation by using the utility model based on the routine operation information and analysis in combination with external information analysis in relation to the distribution center, assess the overall business of the distribution center, draw up the composite resources allocation scheme for the distribution center, give scientific and rational forecasting, and define the targets of business development and strategy. The information management at the strategic decision-making layer in the distribution center includes: analysis on the market environment information, forecasting information, model information and emulation results; and strategic planning.

6.2 Basic Work Flow of Information Management in a Distribution Center

The basic work flow in carrying out the above-mentioned information management is described as follows:

1. **Document processing and monitoring**

The business basis of the distribution center starts from customers' inquiries and
business departments’ quotations. After accepting the orders, the business department should check the stock level on the delivery date, the loading/unloading capacity, load of the processing in circulation and load of the distribution so as to meet the customers’ demand and monitor the execution of orders. In case it is unable to deliver goods according to the customer’s requirement in the order, the business departments should conduct coordination. Further, they should sum up the ordered quantity in those period, schedule goods and arrange the procedures and quantity of goods for delivery the returned goods data processing is also performed at that stage. Besides, the business department should work out the quotation and make the quotation history management, and fix the minimum batch ordered by customers, mode of ordering and the order settlement deadline.

2. **Operation of procurement and warehousing**

After accepting the order, the distribution center will purchase goods while summing up the quantities of demanded commodities and inquiring of the supplier about the transaction conditions. Then they should make the purchase list based on the demands. After the purchase list is issued, the operation of goods warehousing is started. The job scheduling and warehouse platforms scheduling are conducted according to the warehousing date specified on the purchase list. On the same day when the goods are warehoused in, the warehousing records should be checked and the goods should be inspected. Any discrepancy in quality or quantity of the goods should be corrected or disposed appropriately at once with the data entered.

3. **Operation of inventory management**

The operation of inventory management includes the warehouse management and inventory control. The warehouse management includes: stock lying out and stock space division; control of goods coming in and going out; stock handling tools and procedure arrangement; and stock space adjustment and changing. The inventory control is to confirm the purchase quantity and schedule according to the number of
commodity to be delivered and time length needed for warehousing make the precaution system for purchasing, draw up the inventory checking schedule, and check the inventory, correct the inventory account and work out the inventory profit/loss statement according to the schedule. The inventory management also includes the custody and maintenance of packing and transporting vessels. For some distribution centers that just start their business, they have to deal with lease out or in of warehouses, and should consider the extra management of leased warehouses.

4. **Operation of goods makeup and pickup**
The orders should be statistically inquired to know the goods demand. If the stock level can meet the delivery demand on the day of goods ex-warehouse the goods pickup sheet for ex-warehouse and various goods pickup instructions can be printed out according to the demanded quantity for arranging the goods pickup space, selecting tools and allocating workers. Any shortage of the goods should be made up, for which, the made-up quantity and goods making up schedule should be worked out, the goods making up job be arranged and workers be allocated.

5. **Operation of processing in circulation**
The processing in circulation can realize the added value of the goods. The operation includes commodity sorting, weighing, unpacking and repackaging, labeling and commodity reassembling and packaging. These need management of packing materials and packing vessels, reassembling and packaging planning, selection of packing tools for processing in circulation, job scheduling for processing in circulation, and workers allocation.

6. **Operation of ex-warehouse warehouse and distribution**
The operation of ex-warehouse warehouse and distribution should be performed after the goods pickup and processing in circulation. The operation of ex-
Study on Establishment of Management Information Systems (MIS) in Distribution Centers

warehouse includes printing out the delivery note based on the order, drawing up the delivery schedule, printing out the goods batch statement, delivered address label and delivery checklist, selecting the method, tools and workers for goods collection, and determining the vehicle tonnage and number. The operation of distribution includes goods loading on truck, transport routing, midway tracking, and control and accident disposal.

7. Financial operation
The receivable account bill should be worked out according to the delivery data after the goods distribution is completed, and the bill should be transferred to the accounting department as the payment collection evidence. After the goods are warehoused in, the receiving department also makes the statistic statement as the evidence of payment to the supplier. The accounting department makes various accounting statements for reference for drawing up the business policies and business management.

8. Operation of business management and achievement & efficiency management
Senior staff members must deal with the efficiency management of the distribution center through various examinations and assessments, and work out the business policies and strategies. The business management and achievement & efficiency management are conducted with various information and statements provided by each work personnel and mid-level managerial personnel, including different types of statistic data, feedback from customers about the business of the distribution center, analysis of the job errors and stock shortage, report on automated tool wastage and maintenance, consumption of fuel and consumable materials, equipment cost analysis, casual workers, returned goods statistics, employees' efficiency and so on.
7. Configuration and Construction of the Information Management System Platform in a Distribution Center

7.1 Structure of the Information Management System Platform in a Distribution Center

The information management system platform in a distribution center shall have the functions of processing and generating the above-mentioned information management content of the distribution center, summarized as follows:

- planning and monitoring routine operation with rational optimization of goods handling and transporting and with goods tracking;
- the capability of electronic data inter-exchange (EDI) to meet the information interaction with partners in the supply chain;
- the capability of information added value service, such as checking the goods status, etc;
- communication with the financial service and governmental departments and the environment for e-business operation;
- support for decision making in business management.

According to the characteristics of information management in the distribution center and the corresponding functions, the management information system platform for the distribution center can be divided into five platforms and one shared data center:

- the EID platform: document entry standardization and translation, and information transmission standardization;
- the operation management platform: basic management information system for the logistic center;
Study on Establishment of Management Information Systems (MIS) in Distribution Centers

- the e-business platform: including the on-line transaction handling, transaction status checking and transaction fund information processing;
- the information release platform: release of the business functions, transport distance, charge inquiry and related information of the distribution center;
- the management decision making platform: providing the function of advanced management decision making support;
- the shared data center: providing the basic data for operation of all functional platforms as well as access authority management.

Figure 7.1 (Framework of the Information Management Platform of the Distribution Center)

7.2 Network Configuration of the Management Information System in a Distribution Center

In view of the characteristics and content of the information management in the above analysis, the model of internal information management network, i.e. the Intranet, can be created by using the matured Internet technology with open standards in construction of the management information system for the
distribution center. The Intranet model is an Internet-based web model, while the basic mode of web is the browse/server. Therefore, this model can be called the browse/server model. With the configuration of client/server system having three layers, it is the assembly of the Internet-based web technology with such concepts as the "fire wall" and agency service. It can be an independent system and also can be conveniently linked up to form a part of the Internet to obtain more flexible external applications. It uses TCP/IP as the communication protocol for the internal network and utilizes the Internet-based web model as the standard platform. In the event that the safety is required, the internal network is separated from the Internet through the "fire wall". According to the sorting for the reference models of interconnection in an open system, the devices downstream of the transmission layer use the TCP/IP protocol as the basic transmission control protocol based on which different application platforms are created.

Construction of the Intranet model include the following contents: selection of the operation system for the network and use of the TCP/IP transmission protocol; creation of the web, FTP domain name and e-mail server; agency server; creation of the fire-wall server; the web linked up with the company database; and realization of client browse. The network topology is as shown in Figure. 7.2.

The ex-net is introduced at the same time of construction and perfection of the Intranet model. The ex-net is the extended application of the Intranet model of the distribution center. It is used to form a system between companies. It links up the distribution center with the partners in the supply chain to fulfill the common targets. The ex-net is an external network under control. On one hand, the distribution center communicates the partners in the supply chain through the Internet technology. On the other hand, it provides the safety system to prevent external customers from accessing the internal data of the logistic center. Thus access of two different types of main bodies is realized: individual customers can...
access the Intranet of the distribution center through the Internet, while the partners in the supply chain can be accessed through the ex-net of the distribution center.

Figure 7.2 (Network Topology of the Information Management Platform of the Distribution Center)
8. Guideline for Construction of the Management Information System in a Distribution Center

Construction of the management information system in a distribution center must be performed on the actual basis and step by step with three “combinations”, i.e. combination of the world advanced technology and the actual situation of individual country; combination of the conventional operation method and the international practice; and combination of the conventional business and e-business. Meanwhile, it should be considered to well conduct the renewal, utilization and upgrading of existing computer systems. For the development and construction, multiple distribution centers may establish a common data service center to reduce the cost and realize the specialized management and maintenance. For the development strategy, the “three-stage” development mode can be adopted, i.e. the stage of the operation management system development, the stage of fully automated management and the stage of the e-business development oriented to the supply chain.

The main tasks at the stage of the operation management system development are to complete the construction of the operation management platform for the distribution center and create the Intranet in the enterprises by using the modern electronic information technology. The main features realized at this stage are: operation rationalization, statements and documents rationalization and standardization, computer information processing and release of the summary and statistics.

The main tasks at the fully automated management stage are to realize the automation of information collection and overall combination of the automatic monitoring of storage, handling and transport systems through computers with the operation management. The main features at this stage are: integration of computer
hardware and software, perfection of the database management center, automatic communication of the computer data, computer-aided statistic analysis and decision making support.

The tasks at the stage of e-business development oriented to the supply chain is to complete the construction of ex-net for enterprises and realize cooperation with the financial service and governmental departments concerned so as to completely turn into the e-business.
9. Conclusion

Business monitoring is an important foundation for an enterprise positioning system, but this foundation must be complemented by a range of analytic applications focused on the specific data analysis needs of individual data collection systems. E-business analytics is about more than traditional business analytics, in e-business, important data collection systems exist outside of the ERP system that houses the target data leveraged by most traditional business analytic software. The data collection systems used for e-mail, supply chain, and e-commerce management need their own specialized analytical systems focused on clickREAM, message, and process analytics.

Managers perceive business challenges in the environment; they set the organizational strategy for responding; and they allocate the human and financial resources to achieve the strategy and coordinate the work. Throughout, they must exercise responsible leadership. Management’s job is to “make sense” out of the many situations faced by organizations and formulate action plans to solve organizational problems. The business information systems described in this dissertation reflect the hopes, dreams, and realities of real-world managers.

Information System (IS) from an integral part of modern organizations and business computer-based ISs are now used to support all aspects of an organization’s normal functions and activities. For many businesses and industries, information systems (IS) have become an increasingly intrinsic part of business operations. In addition to the use of IS for back-office operations, there has been a growing awareness of the IS function’s potential to directly contribute to the strategic objectives of the organization.

New technology creates new opportunities for forward-thinking companies. Higher
levels of automation, high speed communications and improved access to information can all provide significant benefits to a modern business organization. However, the benefits of new and emerging technologies can only be realized once they have been harnessed and direct towards an organization’s goals.

How to use Management Information Systems (MIS) in the warehousing and Distribution centers is the key I discussed in this dissertation. Construction of the Management System in a distribution center must be performed on the actual basis and step by step with three “combinations”, i.e. combination of the world’s advanced technology and the actual situation of individual country; combination of the conventional operation method and the international practice; and combination of the conventional business and e-business. Meanwhile, it should be considered to well conduct the renewal, utilization and upgrading of existing computer systems. For the development and construction, multiple distribution centers may establish a common data service center to reduce the cost and realize the specialized management and maintenance. For the development strategy, the “three-stage” development mode can be adopted, i.e. the stage of the operation management system development, the stage of fully automated management and the stage of the e-business development oriented to the supply chain.
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Appendices
– Questionnaire and Interview Guide

Questionnaire:

Q1. To what extent are you concerned about the following public policy issues?

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<thead>
<tr>
<th></th>
<th>Not At All Concerned</th>
<th>Not Very Concerned</th>
<th>Somewhat Concerned</th>
<th>Very Concerned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crime</td>
<td>1</td>
<td>8</td>
<td>38</td>
<td>53</td>
</tr>
<tr>
<td>The environment</td>
<td>3</td>
<td>12</td>
<td>44</td>
<td>40</td>
</tr>
<tr>
<td>Health care</td>
<td>2</td>
<td>11</td>
<td>33</td>
<td>54</td>
</tr>
<tr>
<td>Education</td>
<td>2</td>
<td>7</td>
<td>33</td>
<td>58</td>
</tr>
<tr>
<td>Loss of personal privacy</td>
<td>2</td>
<td>10</td>
<td>32</td>
<td>56</td>
</tr>
<tr>
<td>Racial tensions</td>
<td>6</td>
<td>24</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Social Security</td>
<td>3</td>
<td>13</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Taxes</td>
<td>3</td>
<td>10</td>
<td>36</td>
<td>52</td>
</tr>
</tbody>
</table>

Q2. How many times have you placed an order for products or services online in the last 12 months?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td>48</td>
<td>1-5</td>
</tr>
<tr>
<td>14</td>
<td>6-10</td>
</tr>
<tr>
<td>6</td>
<td>11-15</td>
</tr>
<tr>
<td>9</td>
<td>16 or more</td>
</tr>
</tbody>
</table>

Q3. Why haven’t you bought anything online in the last 12 months? Please check all that apply.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>Afraid my credit card number will be stolen if given online</td>
</tr>
<tr>
<td>57</td>
<td>Concerned that my personal information may be abused</td>
</tr>
<tr>
<td>38</td>
<td>Worried those sellers may be fraudulent</td>
</tr>
<tr>
<td>26</td>
<td>Want to be able to talk to someone when I place an order</td>
</tr>
<tr>
<td>37</td>
<td>Don’t know if sellers will be reliable</td>
</tr>
<tr>
<td>47</td>
<td>Want to see a product in person</td>
</tr>
<tr>
<td>25</td>
<td>Other</td>
</tr>
</tbody>
</table>
Q4. Where do you usually look for information about online privacy and security? Please check all that apply.

- 8 Government source
- 9 Nonprofit consumer organization
- 39 My Internet service provider
- 5 A computer manufacturer
- 6 Books
- 21 Magazines
- 22 Newspapers
- 17 Online news groups
- 11 Other
- 40 I haven’t looked for that information

Q5. When you use the Internet, how concerned are you about each of the following possibilities regarding your privacy?

<table>
<thead>
<tr>
<th>Possibility</th>
<th>Not At All Concerned</th>
<th>Not Very Concerned</th>
<th>Somewhat Concerned</th>
<th>Very Concerned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web sites I visit may put me on their mailing lists even though I do not request it</td>
<td>4</td>
<td>18</td>
<td>34</td>
<td>45</td>
</tr>
<tr>
<td>Web sites track my movements when I browse the site, but don't tie that information to my name or real world identity</td>
<td>16</td>
<td>33</td>
<td>29</td>
<td>22</td>
</tr>
<tr>
<td>Web sites merge my browsing habits and shopping patterns into a profile that is linked to my real name or other</td>
<td>4</td>
<td>14</td>
<td>29</td>
<td>53</td>
</tr>
</tbody>
</table>
personally identifiable information
Web sites provide my information to other organizations without my knowledge
Web sites collect information about me without my knowledge

Q6. Please check all of the statements below that you believe to be true.

34 It’s illegal for Web sites I visit to share or sell information I provide about myself with others unless I am notified and agree.

18 Web sites can legally share personal information they collect from children under 13 with others as long as they clearly state that policy on their sites.

9 Web sites must be certified as secure by the government.

53 There is no way to tell if information I provide to websites is secure.

29 None of these are true.

Q7. To your knowledge, have you ever personally been a victim of any of the following? Please check that apply.

3 My financial or other sensitive information was stolen by someone while I was
transmitting it to a website.

2 Someone got into a company database and stole my computer information.

28 I got a virus on my computer via email.

1 Someone used information that I provided online to stalk me or threaten me.

8 My privacy was invaded when I was using the Internet.

66 I haven't been a victim of any of these.

**Interview Guide (Questions):**

Q. Please tell me about your business.

Q. Where do you market your products?

Q. Do you think your products are more successful in the current business environment? Why?

Q. Why did you decide to locate ...... in ......?

Q. Where do the consumables come from?

Q. Who are your main users?

Q. How was business last year? What about this year?

Q. What's it like working at ......?

Q. Any final comments?

......