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Chapter 7: Information System in Logistics Management

Objectives

- Able to differentiate between data and information.
- Understand the importance of information in logistics planning.
- Understand how EDI improves logistics processes.
- Understand the advantages and disadvantages of computerization of logistics functions of purchasing, inventory and transportation.

1. Introduction

This chapter discusses why information is vital to management and explains the important distinction between data and information. The creation of value from information and the characteristics of relevant information are described.

There is an introduction to the problems of perception by the receivers of messages. Finally a management information system (MIS) is defined and the major influences of the structure and scope of MIS are carefully considered.

2. Importance of Information to Management

In all but the smallest organizations management rarely observe operations directly. They attempt to make decisions, prepare plans and control activities by using information which they obtain from formal sources - for example the organization's MIS - and also by informal means, such as face to face conversations, telephone calls, through social contacts and so on.

Management is faced with an accelerating rate of change and an ever more complex environment. A multitude of factors may need to be considered for a given decision.

Without relevant information no manager can function effectively. A worthwhile extension to the well-known adage that "management get things done through and with people", would be that, "management get things done through and with people, by using relevant information".

3. Data and Information

Although the terms 'data' and 'information' are commonly used interchangeably, such imprecision is inappropriate for managers and information specialists. Data can be defined as groups of words, values and figures which represent things that have happened.

Data are facts obtained by observation or research and which are recorded. Frequently they are called raw or basic data and are often records of the day to day transactions of the organization. For example; the date, amount and other details of

an invoice or check, payroll details of pay, insurance and tax for a person, the output for a machine or shift, the number of vehicles passing a road monitoring point and so on.

In general terms data is processed in some way to form information. In essence, information is processed data.

4. Definition of Information

The concept of information in an organizational sense is more complex and difficult. Information is data that have been interpreted and understood by the recipient of the message. It will be noted that the user not just the sender is involved in the transformation of data into information.

It is the user who determines whether a report contains information or just processed data. Accordingly it is vital for the producers of reports and messages of all types to be aware of the user's requirements, education and position in the organization.

5. The Value of Information

Information has no value in itself; its value derives from the value of the change in decision behavior caused by the information being available minus the cost of producing the information.

There is a tendency to assume that more information, earlier or more up to date information, more accurate information etc. is all better information. It may be better information but only if it improves the resulting decisions, otherwise it has no value.

It will be seen that, once again, the user is all important. Data capture, handling, recording and processing - by whatever means - incur costs and do not produce value.

It is only when data are communicated and understood by the recipient, and is thus transformed into information, that value may arise - providing that the information is used to improve decision making.

A typical relationship between costs and values is shown in the figure below:

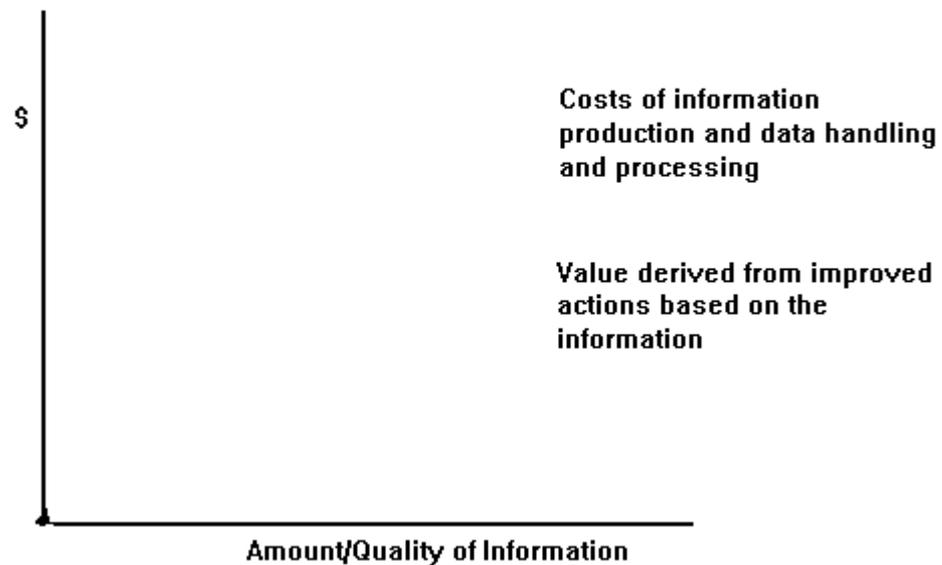


Figure 7-1 Information Cost-Value

6. Characteristics of Relevant Information

Experience and research show that information which has the following characteristics is more likely to be used.

a. Timing

Delays in data gathering, processing or communication can transform potentially vital information into worthless waste paper.

b. Accuracy

The level of accuracy must be related to the decision level involved. At operational levels minute accuracy may be essential, for example, individual output levels, purchase quantities, goods returned and so on, but at higher levels great accuracy is usually irrelevant.

c. Detail

Control information, particularly at lower levels, often has to be very detailed to be useful, but the general rule of as little as possible consistent with effective use, must always apply.

d. Frequency

At operational levels this may mean a requirement for information to be available virtually continuously but at other levels much longer intervals are likely to be appropriate which should not be determined merely by the Conventions of the calendar.

7. Definition of MIS

MIS is a system providing management at all levels in all functions with appropriate information, based on data from both internal and external sources, to enable them to make timely and effective decisions for planning, organizing, directing and controlling the activities for which they are responsible.

8. Electronic Data Interchange (EDI) - Definition of EDI

The technique based on agreed standards, which enables computers in different organizations to successfully send business or information transactions from one to the other.

Business transactions include orders, invoices, delivery advice and payment instructions.

In other word, EDI is the B2B exchange of business data in a structured, machine-processable format.

The purpose of EDI is to eliminate duplicate data entry to improve the speed and accuracy of the information flow by linking computer applications between companies as illustrated below:

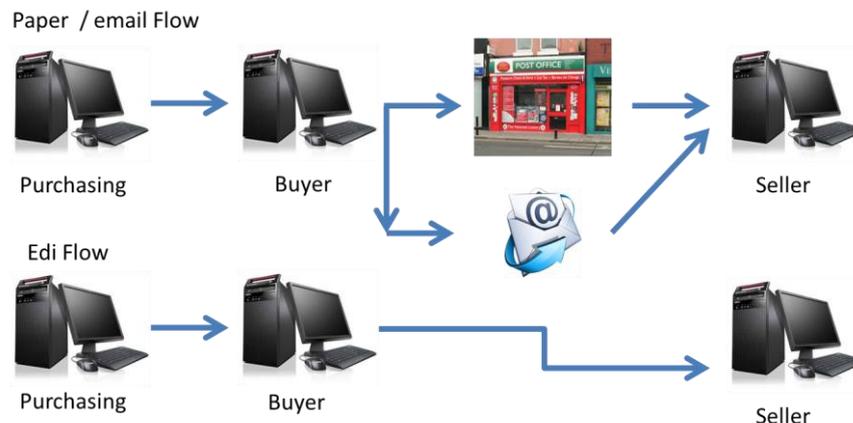


Figure 7-3 Comparison of Paper / email and EDI Flows

Thus, EDI provides an alternative to the transfer of purchasing documents by post or the high cost and problems of directly linking the computer systems of buyers and sellers.

These problems include the high number of suppliers likely to be involved, the differing formats of the documents used and the differing makes and characteristics of computers.

8.1 Advantages of EDI

- The replacement of paper documents.

- Cost savings through the avoidance of data re-entry and the transmission of timely, error-free information.
- Reduction in lead times.
- Reduction in the cost of inventory.
- Better customer service.

9. Impact of Information System & Technology on Logistics

Information technology is emphasizing the wider, more integrative materials management and logistics approaches in which the interrelationship of marketing, production, purchasing, transportation and finance is recognized. Developments such as MRP and JIT, which require on-line data transmission between suppliers and the company for the automatic replenishment of stocks, also highlight the importance of EDI in supplies operations.

The trend in technology is also towards the integration of processes and procedures relating to communication, computing, information storage and retrieval, reprographics and mailing.

9.1 Purchasing

9.1.1 Processes

- Storage of materials specifications
- Issuance of requests for quotation (RFQs)
- Order
 - Alert
 - Computation
 - Preparation/placement
 - Confirmation
 - Changes
 - Follow-up
- Record keeping/Statistical analysis
 - Inventories
 - By stockkeeping unit
 - By location
- Vendors
 - Purchases Prices
 - Performance
 - Delivery
 - Quality

- Quality
- Invoice auditing
 - Materials
 - Transportation
- Report preparation
 - Text
 - Statistics
 - Graphics

9.1.2 Advantages of Computerized Purchasing

- Reduction of routine clerical activity by the automatic generation of documents e.g. purchase requisitions, orders, acknowledgement forms and progress letters.
- Provision of accurate and up-to-date information essential for routine purchasing, e.g. forward material requirements, supplier data, outstanding and overdue orders.
- Reduction of staff and consequent costs.
- A computer can easily cope with fluctuations in workload.
- Reduction, of the time required to process orders.
- Rapid calculation of order quantities, consolidation of orders, EOQs (economic order quantities) and variations in price from standards and budgets with price increases related to material and labor indices.
- Rapid provision of reports at prescribed intervals, e.g. daily, weekly, monthly, etc., enabling more informed decision-making to be undertaken.

9.1.3 Disadvantages of Computerized Purchasing

- The cost of installing a computerized purchasing and supplies system may be high.
- Errors can be difficult to rectify, e.g. when an incorrect code number is entered. One such error can result in the computer rejecting many correctly completed transactions.
- A computerized system is inflexible in comparison with manual procedures. Once a computer has been programmed, the routine of operations must be followed since deviations lead to confusion and mistakes.
- Steps must be taken to protect both purchasing records and sensitive purchasing information from being accessed by unauthorized persons.

- In on-line systems with remote terminals there may be telecommunication difficulties resulting in a high mainframe but low total system availability.

9.2 Computerized Inventory Management

9.2.1 Processes

- Maintaining accurate records of current stocks
- Updating these records after each delivery and withdrawal
- Extensive validation of all data
- Automatic reordering when stocks decline to reorder levels
- Order follow-up for overdue orders
- Clearing of invoices and printing checks
- On-line display of any information on request
- Exception of reporting of conditions needing management action

9.2.2 Advantages of Computerized Inventory

- Reduction in receiving.
- Single data entry point.
- No writing or typing of data.
- Real time tracking of inventory.
- Able to consolidate data and report the total value of inventory at any time.
- Discrepancies such as excess and shortfall are highlighted instantaneously.

9.2.3 Disadvantages of Computerized Inventory

- The cost of installing a system is high.
- Errors can be difficult to rectify.
- When system fails, backup may not be able to restore to the last minute transaction.

9.3 Transportation Management System (TMS)

A technology solution that helps companies efficiently, reliably, and cost effectively

move freight from origin to destination, TMS includes both planning and execution solutions (systems for freight moves involving carriers) and fleet management solutions (for freight moves involving transportation assets owned by the company). Some of its features are:

- Route planning and optimization
- Load optimization
- Execution
- Freight audit and payment
- Yard management
- Advanced shipping
- Order visibility
- Carrier management

TMS focuses on the inbound and outbound and is part of the Logistics Information System. Like the WMS, it shares information with other systems such as order content, item weight and volume, quantity, promised delivery date, and vendor shipment schedules. Its purpose is to assist in the planning and controlling of transportation activity.

9.3.1 Process

- Mode selection
- Freight consolidation
- Routing and scheduling shipments
- Claims processing
- Tracking shipments
- Freight payment

9.3.2 Advantages of TMS

- Vehicle visibility
- Reduce expedited order costs.
- Increased load consolidation.

- Optimize carrier and mode selection.
- Identify shipping invoice discrepancies.
- Lower administration costs.
- Use assets more effectively.
- Lower contract costs.

9.3.3 Disadvantages of TMS

- Initial costs can be high.
- TMS may not accurately capture the multiple variables that factor in to truckload transport costs and delivery time, often producing inaccurate total freight cost predictions.
- Shipping decisions are made based on inaccurate cost and service information.

10. Conclusion

Modern logistics require information real time and online. Computerized systems are a necessity in daily operations. Customers demand more than just information. They need information to be processed to help them grow their businesses. Logistics providers need information technological tools and internet tools to help them help their customers achieve their business objectives.

In essence, information systems are now an essential component of the logistics infrastructure. It is unthinkable to operate a logistics systems without information technology and systems.