Chapter 2

Background Literature

2.1 Introduction

A literature review is an evaluative chapter of information found in the literature related to the research area and some of the systems which are already there in real world. This review describes, summaries, evaluates, analyses and clarifies some of the studies that are founded in previous and current literature that are related to this area of study. This includes online systems that are related to decision support system for retail chain store which is in existence in the real world.

It gives a theoretical base for the research and helps to determine the nature of the research and what should be done to overcome some of the problems that face the decision support system for retail chain store. E-commerce as a science is a vast area of study. Therefore works which are irrelevant in the research area should be discarded and those which are peripheral should be looked at critically. For this research, the literature review covers the concept of e-commerce, concept of online purchasing, decision support system, web technologies and decision support systems, and finally studies some systems related to online decision support systems for retail chain store (ODSS-RCS).
2.2 E-commerce

Today, e-commerce has become a part of living activity and a turning point in transforming daily transactions from the old style to an electronic style.

2.2.1 Definitions

There are many definitions of e-commerce with many different focuses. Some of the definitions are limited to the exchange of processes over the net, but other definitions extended to the exchange of processes with other business activities and related commerce technologies. The following table gives different definitions of e-commerce.

<table>
<thead>
<tr>
<th>Definitions</th>
<th>Focuses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E-commerce</strong>: The transaction of business electronically rather than via paper. (Petroleum Industry, 2003)</td>
<td>New way to deal with others in business</td>
</tr>
<tr>
<td><strong>Electronic commerce</strong> is the exchange of goods or services via the internet (<a href="http://www.artofthegroove.com">www.artofthegroove.com</a>)</td>
<td>Exchange of goods and services via the internet</td>
</tr>
<tr>
<td><strong>E-commerce</strong>: The conducting of business communication and transactions over networks and through computers. As</td>
<td>This defines e-commerce as a basic</td>
</tr>
</tbody>
</table>
most restrictively defined, e-commerce is the buying and selling of goods and services, and the transfer of funds, through digital communications. However e-commerce also includes all inter-company and intra-company functions (such as marketing, finance, manufacturing, selling, and negotiation) that enable commerce and the use of e-mail, EDI, file transfer, fax, video conferencing, workflow, or interaction with a remote computer. E-commerce also includes buying and selling over the Web, electronic funds transfer, smart cards, digital cash (eg Mondex), and all other ways of doing. (Hooker, 2000)

| ✤ **E-commerce**: Any on-line transaction of buying and selling where business is done via Electronic Data Interchange (EDI),
| — (World net Daily, www.worldnetdaily.com) |
| ✤ **E-commerce**: is a business to business (B2B) initiative aimed at communicating business transaction documents on a real time or near real time basis between known trading partners, such as suppliers, customers and increasingly, between a suppliers’ supplier or a customers’ customer (Viradix, www.viradix.com/terminology.html). |
| Transaction via Electronic Data Interchange |
| This definition is concerned with the activities in a business through a chain between the business and suppliers. |
- **E-commerce**: Doing business online, including buying and selling online via the Internet, electronic funds transfer, business communications, and using computers to access business information resources (IBM, www.ibm.com).

- **E-commerce**: is any business transaction whose price or essential terms were negotiated over an online system such as an Internet, Extranet, Electronic Data Interchange network, or electronic mail system. It does not include transactions negotiated via facsimile machine or switched telephone network, or payments made online for transactions whose terms were negotiated offline, (Census Bureau, http://help.econ.census.gov)

- **E-commerce** refers to all forms of business activities conducted across the internet. This can include E-tailing, B2B, intranets and extranets, online advertising, and simply online presences of any form that are used for some type of communication (customer service for example), (Human-IT, www.human-it.com).

- **E-commerce**: A broad term encompassing the remote procurement and payment by businesses or consumers of goods and services through electronic systems such as the Internet. (Retail Payment Systems, 2004)
**Electronic commerce:** or e-commerce consists of the buying, selling, marketing, and servicing of products or services over computer networks. The information technology industry might see it as an electronic business application aimed at commercial transactions, and may also involve the electronic transfer of information between businesses (EDI).


Add e-marketing to buying and selling via internet and related it’s to EDI

<table>
<thead>
<tr>
<th>2.2.2 History</th>
</tr>
</thead>
</table>

The Internet was conceived in 1969, when the Advanced Research Projects Agency (a Department of Defense organization) funded a research on computer networking (http://ecommerce.insightin.com). E-commerce has become a reality since the 1990's, when the internet became a popular and mainstream medium for the dissemination of information (university of Virginia, www.cs.virginia.edu).

The emergence of the internet and subsequent development of e-commerce has become a viable and likely medium to conduct trade. This has occurred only during the past fifteen years and is most likely due to the increasing popularity of the Internet.
Moreover, a drastic drop in computer prices in the last two decades helped to boost e-commerce. Further, operating systems and software have become more powerful and user-friendly to the business market (Chan, 1998).

The development of e-commerce can be categorized under different generations though there are some overlapping between them.

2.2.2.a First Generation

It uses the Internet to reach millions of people anywhere, anytime and provide potential customers with information.

⇒ Business success

• Web search services: Yahoo!, AltaVista, Lycos, AOL, Infoseek, etc.

• Information sites: MSNBC, ESPN, Dow Jones, etc.

2.2.2.b Second generation

It uses the Internet as a new way to conduct business. And with this emerged the concept of online sales and purchases and merchants and businessmen looked at reduced costs of buying and selling and minimizing the cost of business expansion.

⇒ Business success

• Online sales: Amazon.com, Dell Computer, eBay etc.

• Financial trade: E Trade, Charles Schwab, etc.
2.2.2.c Third Generation

Most of the companies recognized a new need to integrate their companies with suppliers and customers in order to create new business opportunities through enhanced supply chain management to increase profits and improve customer services and relationships.

⇒ Business success

- Business organizations determined to succeed for survival.

This figure below illustrates the phases of the development of e-commerce through the generation.

![Diagram of e-commerce development](image)

**Figure 2.1: Generation of e-commerce development.**
2.2.3 Categories of Websites in E-commerce

E-Commerce creates many types of businesses in the Internet. The Internet enables a company to conduct business everywhere and anytime. Wider contacts have led to the concept of e-commerce being done electronically within government and between governments itself (e-government). Figure 2.2 shows the categories of website through the internet (Paulk, 2001).

| Category                          | Symbol
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business and government</td>
<td>B</td>
</tr>
<tr>
<td>Businesses and consumers</td>
<td>B</td>
</tr>
<tr>
<td>Businesses and business</td>
<td>B</td>
</tr>
<tr>
<td>Business and employee</td>
<td>B</td>
</tr>
<tr>
<td>Government and government</td>
<td>G</td>
</tr>
<tr>
<td>Government and people</td>
<td>G</td>
</tr>
</tbody>
</table>

**Figure 2.2: Category of website through business**

There are two major types of e-commerce in the business; the first business to consumer (B2C), as a consumer purchase products and services from businesses, and the second business to business (B2B), such as businesses that buy and sell among themselves (Shim & el, 2002).
2.2.3.a Business to Consumer (B2C)

Business to consumer e-commerce consists of two parties; the first side is a business and the second side is a consumer (Chaudhury & Kuilboer, 2001). Here, consumers purchase products and services from businesses such as shopping and other activities such as promotion, ordering and payment. Table 2.2 shows the activities involved in B2C e-commerce.

**Table 2.2 Activity in business to consumer e-commerce**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion</td>
<td>Online advertising expanded quickly and this is reflected in the advertisements that appear on portal sites such as Yahoo, and AltaVista.</td>
</tr>
<tr>
<td>Ordering</td>
<td>The consumers order the product or services from a site, and can use the web to obtain some information.</td>
</tr>
<tr>
<td>Product delivery</td>
<td>Digital products, such as software and music can be downloaded directly from a site after purchasing, but products that need to be transported in some ways are determined by the online company.</td>
</tr>
<tr>
<td>After-sales support</td>
<td>The customer service support after a sale is considered the final link in the chain between business and consumers, whereby consumers can use e-mails, search engines, and some company developed knowledge based system to help them to find a</td>
</tr>
</tbody>
</table>
solution. Data mining tool and customer relationship customer tool are used to build a long relationship with customers.

Model for B2C E-commerce

There are some examples of models for B2C e-commerce, whereby companies have built their websites in order to achieve on objective. These business models describe the basic framework for the business that answers the following questions:-

- Who will access this site; this means market segment?
- What products or services?
- How can it be useful to consumer?

Table 2.3 shows some of the website and the business model for it

<table>
<thead>
<tr>
<th>Site</th>
<th>Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yahoo.com</td>
<td>Advertisement</td>
</tr>
<tr>
<td>EBay.com</td>
<td>Auction-based</td>
</tr>
<tr>
<td>Amazon.com</td>
<td>Retail merchants</td>
</tr>
<tr>
<td>Toyota.com</td>
<td>Promotion</td>
</tr>
<tr>
<td>BN.com</td>
<td>Retail transaction</td>
</tr>
<tr>
<td>Fedex.com</td>
<td>Customer support</td>
</tr>
</tbody>
</table>
2.2.3.b  **Business to Business (B2B)**

This model was first started through Electronic Data Interchange (EDI) whereby it is used to enable two companies to achieve a more efficient data and information transfer between them and to improve supply chain management. There are still a lot of companies that do not yet use EDI due to the relatively high costs of implementing and running such systems (Dai & Kauffman, 2001). EDI is considered as the first form of electronic commerce used 20 years ago. Now most of B2B e-commerce is an adaptation to EDI or the concept or principle of EDI (Schneider, 2004).

B2B e-commerce considers opportunities for online transactions. It focuses on systems and processes that support the flow and exchange of information within and between firms, and their suppliers. Business to business e-commerce activities are often related to procurement. Here, businesses buy and sell among themselves.

A number of models for B2B e-commerce have begun to originate that manage the exchange of transactions between buyers and suppliers. Table 2.4 shows the models for B2B (McIvor and Humphreys, 2004).
Table 2.4: Models for B2B.

<table>
<thead>
<tr>
<th>Model</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established buyer-supplier relationship</td>
<td>• Pre-determined one-to-one relationship between a buyer and supplier.</td>
</tr>
<tr>
<td></td>
<td>• Companies now become more intensive and have interactive relationships with their suppliers</td>
</tr>
<tr>
<td>Supplier-oriented marketplace</td>
<td>• Both organisations and consumers use the supplier-provided marketplace.</td>
</tr>
<tr>
<td></td>
<td>• Business buyers and individual consumers use the same supplier-provided marketplace.</td>
</tr>
<tr>
<td>Buyer-oriented marketplace</td>
<td>• Both organizations and consumers use the supplier-provided marketplace.</td>
</tr>
<tr>
<td></td>
<td>• Business buyers and individual consumers use the same supplier-provided marketplace.</td>
</tr>
<tr>
<td>B2B intermediary</td>
<td>• This model is sometimes referred to as a “hub” or “exchange”.</td>
</tr>
<tr>
<td></td>
<td>• It is established by an electronic intermediary that runs a marketplace where suppliers and buyers have a central point to come together</td>
</tr>
</tbody>
</table>

2.2.4 Concepts Regarding E-commerce

The emergence of the internet has given a tremendous boost to e-commerce and a user can do many tasks such as shown in Table 2.5.
Table 2.5: List of E-task

<table>
<thead>
<tr>
<th>E-Cash</th>
<th>E-cash is a payment mechanism designed for the Internet. It is electronic money that can be passed along from person to person like cash. It is anonymous like cash, and has immediate value. It's cash, not a promise to pay later. (Petroleum Industry, 2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Check</td>
<td>The electronic equivalent of a paper check (Student company secretary, 2004).</td>
</tr>
<tr>
<td>Electronic Bank</td>
<td>A form of banking in which funds are transferred through an exchange of electronic signals between financial institutions, rather than an exchange of cash, checks or other negotiable instruments (Economic Perspectives, 2001).</td>
</tr>
<tr>
<td>Electronic Bill Delivery</td>
<td>A bill delivery system offered by Visa Interactive that allows banks to send consumers their bills through their personal computers or via telephone lines. This system now allows consumers to transfer funds through their bank to the billing agent itself. (NECCC, 2005)</td>
</tr>
<tr>
<td>Electronic Bill Payment (E-pay)</td>
<td>An alternative to paper checks for paying bills. Consumers can use PCs, telephones, screen phones or ATMs to send electronic instructions to their bank or bill payment provider to withdraw funds from their accounts and pay merchants. Payments may be made either electronically or</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronic Bill Presentment (EBP)</strong></td>
<td>The electronic delivery of vendor requests for payment. Vendors send consumers their bills via PCs, telephones or screen phones.</td>
</tr>
<tr>
<td><strong>Electronic Cash Register (ECR)</strong></td>
<td>A system which functions most efficiently and effectively for large businesses with many registers in single or multiple locations. Provides a direct, computer-to-computer linkup between the First Data host and the merchant's host.</td>
</tr>
<tr>
<td><strong>Electronic Check Acceptance (ECA)</strong></td>
<td>A system that captures banking information off a paper check and converts it into an electronic item processed through the Automated Clearing House network. With ECA, checks are processed similarly to credit cards, and the paper check is returned to the consumer at the point of sale.</td>
</tr>
<tr>
<td><strong>Electronic Data Interchange (EDI)</strong></td>
<td>The electronic communication of business transactions; specifically the exchange of trade-related documents, such as purchase orders, invoices and corporate Electronic Funds Transfer (EFTs) in a standard format. With EDI, electronically transmitted data replaces paper documents in the business accounts receivable cycle.</td>
</tr>
<tr>
<td><strong>Electronic Draft Capture (EDC) Terminal</strong></td>
<td>Also referred to as Electronic Data Capture terminal. A point-of-sale device that reads information encoded in the bankcard's magnetic stripe, performs authorization functions, stores transaction data, and batches and transmits</td>
</tr>
</tbody>
</table>
that data to the acquirer for processing. The stored transactions are used to create settlement files and transaction reports.

| **Electronic Financial Services (EFS)** | Financial services that are provided via electronic delivery channels (e.g. PCs, telephones, screen phones and ATMs). These services may be transaction and/or information oriented and may be provided by bank and non-bank providers. |
| **Electronic Funds Transfer (EFT)** | A transfer of funds between accounts by electronic means rather than conventional paper-based payment methods. EFT is any financial transaction originating from a telephone or electronic terminal, or from a computer or magnetic tape. |
| **Electronic Funds Transfer at the Point of Sale:** | The technology and practice of making payments for goods and services by means of electronic funds transfer initiated at the point where goods and services are purchased. |
| **Electronic Mail (E-mail)** | Messages that are sent from one user to another (or multiple recipients) using particular mail programs and protocols (Schneider, 2004). |
| **Electronic Point of Sale** | A point-of-sale merchant with electronic equipment for pricing and recording transactions, but not necessarily incorporating functions for electronic funds transfer. |
| **Electronic** | The use of internet technology in a company’s purchasing |
2.2.5 Why e-commerce?

Today, most companies have a web site and they develop e-commerce web sites for different reasons; such as

✓ To reach for new customers
✓ Allow on-line purchasing
✓ To stay abreast with their competitors
✓ To meet their customers expectations and needs
✓ To enter new market
✓ To lower cost
✓ To survive in the market.

2.2.6 Types of E-commerce

Day by day, e-commerce is growing by leaps and bound. Below are main types of e-commerce.

• Online purchasing
• Online marketing

2.3 Online Purchasing

A website allows consumers to order products or services and pay for this online, usually by providing credit card details, and/or other mode of payment, such as e-
cash and etc. Online Purchasing is the technology infrastructure for the exchange of data and the purchase of a product over the Internet. On-line purchasing extends e-commerce through a range of on-line business activities for products and services, such as business-to-business or business-to-consumer, via the Internet.

Therefore the concept of e-commerce can be broken into:

- Concept of online shopping.
- Concept of online purchasing.

### 2.3.1 Concept of Online Shopping

Refers to the scope of information and activities that provide a customer with the information that he/she needs in order to conduct business, and the knowledge to make informed buying decisions. For example, a consumer who is interested in purchasing a personal computer (PC) through the web may first research on the specification, then the prices and maintenance of PC online.

A company may provide product pictures, logos, technical specifications, and product availability, service, and availability to choose some specification on their site. Online shopping speeds the gathering of information that a customer needs and hence, provide timely access to accurate information.
2.3.2 Concept of Online Purchasing

Online purchasing is defined as the infrastructure that allows the purchase of products or services, through the Internet. For example, if a consumer is interested in buying office supplies, they might go to the Staples website. There they can shop in the site, choosing products and placing them in their online shopping basket. When they have found all the products they want to purchase, they can choose the Staples' online purchasing form to buy the products they have chosen, (Ready Go, www.readygo.com).

2.3.3 Benefits of Online Purchasing

Some of the benefits of on-line purchasing are given below:-

✓ Create efficient purchasing processes through decreasing order costs and increasing buyer availability.

✓ Convenient to purchase goods 24 hours a day and 7 days per week.

    Therefore, there is time efficiency.

✓ More speed to accomplish the process due to shorter processing time

✓ Most of the processes are automated, therefore increasing the control and consequently reduce error administration (Benjamin, and el, 2002).
2.3.4 Classifying Online Purchasing System

Online purchasing system can be divided into the following three categories, as shown in Table 2.6 (Benjamin).

<table>
<thead>
<tr>
<th>Number Of Suppliers</th>
<th>Buyer Driven Catalogs &amp; Bidding System</th>
<th>Third Party Catalogs &amp; Trading Exchanges.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many</td>
<td>Many</td>
<td>One Supplier-Driven Extranets.</td>
</tr>
<tr>
<td>One</td>
<td>One</td>
<td>One Many</td>
</tr>
</tbody>
</table>

Table 2.6: Classification of online purchasing system

The above categories depend on the number of suppliers and the number of businesses.

2.3.4.a Buyer Driven Catalogs & Bidding System

Here, a company implements an on-line procurement system which enables its suppliers to bid on auctions and upload catalogs. One buyer to many suppliers is used in large company such as Sony as it can attract more than one supplier.
2.3.4.b Third Party Catalogs & Trading Exchanges

Here a third party sets online procurement service for buyers and suppliers. But in this category, there are many buyers to many suppliers and this online system may have vertical or horizontal exchange.

Some examples of this type of system are as follows:

- **www.wiznet.com**: a buyer can search online based on a huge published buyer catalog.
- **www.fastpart.com**: provides an online spot market for new electronic components
- **www.partsmart.com**: provides an online market for PC components.

2.3.4.c Supplier-Driven Extranets

In this popular online purchasing system, customers can navigate the supplier website to get product information and then can purchase then according to their needs. In this situation, there are many buyers to one supplier.

Some examples of these systems are as follows:

- **www.dell.com** (Dell company)
- **www.cisco.com** (Cisco company)
- **www.ibm.com** (IBM company)
2.3.5 An Interactive Experiential Web Site

A company's web site plays an important role in furthering the shopping experience. A successful product or web site must be multi-sensory for a great experience. Experiential web sites are interactive sites that stimulate the user through interaction with the interface and product offerings virtually, resulting in a memorable shopping experience. In essence, the customer feels as if they are transported into a virtual environment, such as browsing a cyermall or trying on clothes in a virtual dressing room. This feeling of being transported to a virtual environment is called telepresence. Some examples of experiential web sites that simulate a sensory experience is shown in Table 2.7 Sites (Mahfouz, 2005):

<table>
<thead>
<tr>
<th>Web Site</th>
<th>Interactive Experiential Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landsend.com</td>
<td>• Customized clothes and virtual models of users</td>
</tr>
<tr>
<td></td>
<td>• Sense of community via shopping with a friend</td>
</tr>
<tr>
<td></td>
<td>• Online personal shopper recommending products</td>
</tr>
<tr>
<td>Amazon.com</td>
<td>• Personalized greetings</td>
</tr>
<tr>
<td></td>
<td>• Product suggestions based on purchasing history</td>
</tr>
<tr>
<td></td>
<td>• Virtual book with the capability of looking inside this book</td>
</tr>
<tr>
<td></td>
<td>• Community sense: shared shopping experiences</td>
</tr>
<tr>
<td>dell.com</td>
<td>• Customizable products</td>
</tr>
<tr>
<td></td>
<td>• Online community sharing advice &amp; experience</td>
</tr>
<tr>
<td>ebay.com</td>
<td>• Sense of exploration</td>
</tr>
<tr>
<td></td>
<td>• Sense of community</td>
</tr>
</tbody>
</table>

Table 2.7: Interactive Experiential
### everestgum.com
- Imagery of mountains conveying cool sensations
- Sounds mimicking intense winter winds blowing
- Animation flashing words like "icy, cold, pure"

### reflect.com
- Customized design/naming of products by users
- Fresh look of the web page
- Community sense: beauty expert, dermatologist

## 2.4 Decision Support Systems

Any successful business needs information to make business critical decisions relating to sales, purchasing, budgeting, finance, and/or supplies. For decision support systems, you must have data to support it. Databases that contain information support business decisions.

### 2.4.1 What is Decision Support System

Decision Support System (DSS) is an information system that has the ability to obtain information -also known as knowledge- from data and information stored in computers to specify goals, analyze information and predict the impact of decisions before they are made. Database Management Systems (DBMSs) help user to select data and information for reporting and analysis (Intergraph Solutions Group, http://solutions.intergraph.com).
DSSs are a class of computerized information systems that support decision-making activities. There are 5 types of DSS: communications-driven, data-driven, document-driven, knowledge-driven and model-driven. DSS are interactive computer-based systems intended to help decision makers use communications, data, documents, knowledge and models to identify and solve problems and make decisions.

### 2.5 Decision Support Systems and Web Technologies

Modern decision support system provides managers a wide range of capability. Computerized systems support decision tasks like information gathering, model building, alternative evaluation and analysis. In addition, decision support is increasingly integrated into business processes and DSS are used for ad hoc analysis. The internet is now the primary enabling technology for delivering DSS, whereby web technology is facilitating it (Bhargava & Power, 2001).

#### 2.5.1 General Approaches for Decision Support Systems

There are a number of approaches in delivering decision support. They are
2.5.1.a  Data-Driven DSS.

Data-Driven DSS help managers organize, retrieve, and synthesize large volumes of relevant data using database queries, On-Line Analytical Processing (OLAP) techniques, and data mining tools.

2.5.1.b  Model-Driven DSS

Model-Driven DSS use formal representations of decision models and provide analytical support using the tools of decision analysis, optimization, stochastic modeling, simulation, statistics, and logic modeling.

2.5.2  General Approaches for Decision Support Systems with Web

The general approaches have become most widely implemented for delivering decision support due to Web technologies. The approaches that use the web are:-

2.5.2.a  Communication-Driven DSS

These rely on electronic communication technologies to link multiple decision makers who might be separated in space or time, or to link decision makers with relevant information and tools. The Web has expanded this technology.

2.5.2.b  Knowledge-Driven DSS

This system can suggest or recommend actions to managers. The Web helps deliver this type of DSS to a much broader audience of decision-makers.
2.5.2.c Document-Driven DSS

It integrates a variety of storage and processing technologies to provide managers with document retrieval and analysis (Bhargava & Power, 2001).

2.6 Online purchasing and Decision Support System

There is increasing competition between companies through online purchasing systems and activities that is done on the net, such as online purchasing and marketing and etc. As there is a link between suppliers, retailers and consumers decision support system in e-commerce has become important as it helps managers in managing their business and in making strategic business decisions. DSS also supports the customers in decision making and supports companies and suppliers in achieving their goal. Therefore, companies that incorporate DSS in their e-commerce applications have competitive advantage in the market.

2.6.1 Consumer Decision Making in Online Shopping Environments

With the revolution of e-commerce and the explosive growth of the number of consumers who use interactive media for pre-purchase information search and online shopping, it has become essential for companies to support the consumers to make purchasing decisions.
A unique characteristic of online shopping environments is that they allow vendors to create retail interfaces with highly interactive features. The availability of tools, which we refer to as interactive decision aids for consumers, may lead to a transformation of the way in which shoppers search for product information and make purchasing decisions.

2.6.2 Interactive Decision Aids for Online Shopping

The technology available for implementing machine interactivity in online shopping environments has the potential to provide consumers with unparalleled opportunities to locate and compare product offerings. Such capabilities are particularly valuable given that online stores cannot offer physical contact with products, do not allow face-to-face interaction with a salesperson, and may offer a very large number of alternatives as it lacks the physical constraints with respect to product display.

Interactive decision aids that may be of use to consumers who wish to shop online include a wide variety of software tools, ranging from general-purpose search engines (e.g., www.infoseek.com, www.lycos.com) to sophisticated agent-mediated electronic commerce systems (e.g., compare.net, www.jango.com). A common classification of interactive shopping agents is based on whether a tool is designed to help a consumer determine (1) what to buy or (2) whom to buy from. (Ha¨ubl & Trifts, 2000)
2.6.3 The Support of Online DSS for Online Purchasing

The important issue in on-line retail chain store is getting the correct goods to the right place at the right time, in the right condition with the minimum of cost.

There are some products or services that are delivered more easily than others. When a customer buys online they tend to expect a better standard of service.

Basically, poor delivery of customer orders damages customer loyalty and his/her trust in online purchasing system.

Some improvements in online retail chain stores can be achieved by answering the following questions

- How is the on-line retail chain store going to distribute the goods or services to the customer?
- What are the delivery options?
- What criteria are to be used to define the store which should deliver customer orders?
- How much is the cost of delivery?
- How can retail chain stores improve delivery time?
- Is the online retail chain store smart enough to find which supplier should deliver a product for a store?
- Can the managers a make proper decision based on the information that available in the online system?
- Are customers satisfied with the on-line purchasing system?
So, online decision support system should support the retail chain store to achieve the aims of business.

Solution

- Keep the customer informed – probably via email. This is vitally important and may include: confirming the sale, the expected delivery date and follow-ups to check if the delivery has been completed. Effective communication will help to establish a relationship of trust with the customers.
- Online DSS should support the managers in decision making.
- Online DSS should manage the inventory.
- Online DSS should support the staff in dealing with customers orders.
- Online DSS should help to find new ways of managing retail chain store.
- Online DSS should find effective ways to deliver orders to customers in the right place at the right time, in the right condition with minimum cost.
- Online DSS should let the customer be satisfied with the way of purchasing.
- Online DSS should offer the flexibility of conducting business with a centralization and decentralization management style.
2.7 Review of four Online Purchasing System in the Real Word

Today, users can find many online purchasing sites for companies, products, supermarkets, malls, and so on. Customers can buy online and the company or shop will deliver the orders to the customer based on the given address, whereby most companies depend on the postal /zip code to determine the delivery area. Therefore, in this section, some on-line purchasing systems were reviewed in order to gather the basic steps or procedures in online purchasing.

2.7.1 IBM

IBM, is the leader in the invention, development and manufacture of the industry's most advanced information technologies including computer systems, software, storage systems and microelectronics (IBM, ibm.com/ibm/us). Figure 2.6 shows the IBM main web site.
For reviewing the IBM web-site, the main characteristics identified are:-

- **Customized site;** the customer can see the catalogue, that includes the purchasing rules to help customer.

- **Pricing and shopping cart options;** to allow customers to view the price of each item and to add to their shopping carts, if necessary.

- **Detailed product specifications;** can be viewed by click of a button.

- **Actual inventory states in real time;** in order to ensure whether the products needed are available.

- **Ability to manage customer order.**
• Order status and tracking, and 60-day history. For the customers to track their purchasing order.

• Advanced search on category, subcategory, keywords and price, for customers to refine their search, if and when necessary.

• Access to IBM’s portfolio of hardware, software and services.

IBM allows customers to also control their purchasing activities using the business Access web site’s Orders Management tool. Here, customer can get details information on their quotes and orders at their convenience, (IBM business access, 2004). The main processes involved are:-

• Save customer’s cart as quote

• Convert quote to order

• E-mail and print customer’s quote

• Detailed order status & tracking

• Detailed order/quote history.
2.7.2 Wal-Mart Site

Wal-Mart has become the world's number one retailer. It sells furniture, décor, toys, electronic, sport tools, and etc… Figure 2.4: shows Wal-Mart web Site

![Figure 2.4: Wal-Mart web Site](image)

Though wal-mart allows for convenient on-line shopping, it has several drawbacks, such as

- Does not accept checks, money orders or credit cards issued by foreign (non-U.S.) banks.

- Does not verify the postcode. Entered by the customer.
2.7.3 **Amazon.com**

Amazon.com is considered one of the leaders that sell via internet as retail merchants use online purchasing system, and it has a 1-Click Patent.

**Amazon.com and the 1-Click Patent**

According to Amazon.com CEO Jeff Bezos in United State “We spent thousands of hours to develop our 1-Click process, and the reasons we have a patent system in this country is to encourage people to take these kinds of risks.” (Jarvenpaa & Tiller, 2002).

Amazon.com enables customers to find and purchase products such as books, music, videos, and other items over the World Wide Web. Because of the increasing the competition between companies through online purchasing system amazon.com pursued a strategy of innovation to distinguish its shopping experience from other competition, and made investments to build customer relationships during the early growth phase of e-commerce. Reinforcement of the user interface creating easy-to-use and easy-to-learn application has become amazon’s strategy.

In September 1997, Amazon.com implemented the idea to enable Amazon.com customers to purchase items with a single-click of a computer mouse button. That idea resulted in a system in which a consumer can complete a purchase order for an item via the Internet using only a single click, once information identifying the
item was displayed to the consumer. This system is applicable in situations where a retailer already has, in its files, various information about the purchaser (such as the purchaser's address and credit card number) and where the purchaser's client system (e.g., a personal computer) has been provided with an identifier – or “cookie” -- that enables the retailer's server system to identify the purchaser. Technologically, the 1-Click was an order fulfillment component of a server system that took the information provided by the databases of user information and inventory, combined those into a shipment order, and then notifies the customer that the order was ready for shipment. (Jarvenpaa & Tiller, 2002), From the analysis and from the information that is available on Amazon.com site we can find out some concepts that is related to 1–click, which are:-

1) 1-Click Default Address for Amazon

A list of shipping addresses will appear beneath the "Buy now with 1-Click" button on every product information page. The addresses that appear at the top of this list is the customer’s 1-Click default address. A customer can change the default address if he /she wishes. The customer can also change its 1-Click settings after he/she signs in (Amazon, www.amazon.com)

ii) 1-Click Settings

1-Click allows its customers to place orders to any or all of the addresses commonly used. Customer 1-Click settings include customer’s preferred shipping method and credit card for every shipping address in the customer’s address book [Amazon, www.amazon.com].

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2.7.4 Sainsbury’s

It is an on-line shopping in British, they deliver an ever improving quality shopping experience for customers with great product, it aims to exceed customer expectations for healthy, safe, fresh and tasty food making their lives easier every day.

The specifications for the Sainsbury website are as follows:-

• Before an account is created, the system will let the customer check the customer’s area in the delivery section.

• It offers one address for one customer

• If a product is out of stock on the day of customer delivery, the customer will get a substitute, selected by the Sainsbury’s shopper in the customer local centre as a close alternative to the customer’s original choice. Customer can accept or decline this substitute at the customer doorstep. The price of the substitute will be included in the final bill, so that a refund will be arranged by the company the customer should not wish to accept it.

• The customer can pay using Switch, Maestro, Visa Credit, Visa Debit, MasterCard, American Express, Style and Electron.

• Passwords or payment details are delivered using 128 bit Secure Socket Layer encryption (Sainsbury, www.sainsburystoyou.com).
A summary of the main features of the reviewed application is given in Table 2.8.

<table>
<thead>
<tr>
<th>Main Features</th>
<th>IBM</th>
<th>Wal-Mart</th>
<th>Amazon</th>
<th>Sainsbury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer chooses which store to shop from</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✔</td>
</tr>
<tr>
<td>System automatically chooses which store to deliver products to customer</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>If product is not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. System will deliver error message</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2. System will automatically choose another store to deliver the product</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>3. System will replace the products with another similar to it.</td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td>✔</td>
</tr>
<tr>
<td>One-click purchasing experience</td>
<td>x</td>
<td>x</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>e-mail notification sent automatically after customer has completed his/her purchase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow more than one delivery address</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>The Choose the nearest store which will deliver the order, depending on lowest cost of delivery</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
2.7.5 An on-line Purchasing and Decision Support System for Distributed Retail Chain Stores

In the real world, a lot has been written about subjects relating to online purchasing and decision support system from different perspectives. One such study was done by (M. Yusof, 2005) whereby the study looked into how integrating on-line purchasing with inventory management system for distributed retail chain stores can automate and aid the process of decision-making in relation to on-line product sales and distribution. M. Yusof's study aims to allow on-demand and automatic communication between the retail chain store’s head office and point-of-sale (POS) outlets, and on-line purchasing for home users. Product transactions are at different geographical locations.

The system facilitates transaction between the head office and (POS) outlets and it aids top-level management to make the right business decisions. i.e. to find the right products at the right location, at the right time and to ensure that products ordered by users are sent by the right POS outlet.

2.8 Summary

This chapter has looked into the literature review for related researches and studies. The topics in this field of study were read and analysed, such as definition
of e-commerce, category, and model of e-commerce. The concept of online purchasing and its categories studied. Moreover, the decision supports system and its approaches, and the relationship between DSS and web technology have been studied. Finally, some real world systems that are related to the research area were examined such as Amazon, IBM, Sainsbury, and Wal-Mart to understand the proprieties of those systems.
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