Chapter Two
Technology in E-procurement

After completing this chapter students should be able to:

- ✓ Outline the hardware and software technologies used to build an e-business infrastructure within an organization and with its partners
- ✓ Outline the hardware and software requirements necessary to enable employee access to the Internet and hosting of e-commerce services.

2.1. Origins of the Internet and New Uses for the Internet

As you will know, the **Internet** enables communication between millions of connected computers worldwide, but how does the seamless transfer of data happen? Requests for information are transmitted from client computers and mobile devices whose users request services to server computers that hold information and host business applications that deliver the services in response to requests. Thus, the Internet is a large-scale **client/server** system. (The client/server architecture consists of *client* computers, such as PCs, sharing resources such as a database stored on a more powerful *server* computer.)

'Internet' refers to the global information system that – (i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/ follow-ons; (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein.

The Internet is a global communications network that is used to transmit the information published on the World Wide Web (WWW) in a standard format based on Hypertext Markup Language (HTML) using different standard protocols such as HTTP and TCP/IP.

The Internet timeline

The Internet is only the latest of a series of developments in the way that the human race has used technology to disseminate information. Kampas (2000) identifies ten stages that are part of five 'megawaves' of change. The first six stages are summarized in *Table 3.2*. It is evident that many of the major advances in the use of information have happened within the last hundred years. This indicates that the difficulty of managing technological change is likely to continue. Kampas goes on to speculate on the impact of access to lower-cost, higher-bandwidth technologies.

Table 3.2	Six stages of advances in the dissemination of information	
Stage	**Enabling technology**	**Killer applications* and impact**
1 Documentation: 3500 BC to AD 1452	Written language and the development of clay tablets in Mesopotamia	Taxes, laws and accounting giving rise to the development of civilization and commerce
2 Mass publication: 1452 to 1946	The Gutenburg press of movable metal type	Demand for religious and scientific texts resulting in scientific advances and ideological conflicts
3 Automation: 1946 to 1978	Electric power and switching technologies (vacuum tubes and transistors)	Code breaking and scientific calculations. Start of information age
4 Mass interaction: 1978 to 1985	Microprocessor and personal computer	Spreadsheets and word processing
5 Infrastructuralization: 1985 to 1993	Local- and wide-area networks, graphical user interfaces	E-mail and enterprise resource planning
6 Mass communication: 1993 to c.2010	Internet, World Wide Web, Java	Mass information access for communications and purchasing

*Very useful applications which will encourage adoption of a technology.
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The history and origin of the Internet as a business tool is surprising since it has taken a relatively long time to become an essential part of business. It started life at the end of the 1960s as the ARPAnet research and defense network in the USA which linked servers used by key military and academic collaborators. It was established as a network that would be reliable even if some of the links were broken. This was achieved since data and messages sent between users were broken up into smaller packets and could follow different routes. Read Gillies and Cailliau (2000) for a detailed description of the history of the Internet.

Although the Internet was subsequently extended worldwide and was used extensively by academic and defense communities, it has only recently been catapulted into mainstream business and consumer use. It is the advent of the World Wide Web, which was invented by Tim Berners-Lee of CERN to help share research easily, that is responsible for the massive growth in business use of the Internet, (See Berners-Lee (1999) for a description of the invention of the web). The World Wide Web provides a publishing medium which makes it easy to publish and read information using a web browser and also to link to related information.

Uses of the internet

Internet is today one of the most important part of our daily life. There are large numbers of things that can be done using the internet and so it is very important. You can say that with the progress in the internet we are progressing in every sphere of life as it not only makes our task easier but also saves a lot of time. Today internet is used for different purposes depending upon the requirement.

i. *Communication:* We can communicate with the people living far apart from us with extreme ease through Chat, Video conferencing, Email and social networking

ii. *Research:* In order to do research, you need to go through hundreds of books and references and that was the difficult job to do earlier.

iii. *Education:* Education is one of the best things that the internet can provide. There are a number of books, reference books, online help center, expert's view and other study oriented materials over the internet that makes the learning process easier and fun.

iv. *Financial Transaction:* With the use of internet in the financial transaction, your work has become a lot easier. You don't need to stand in the queue at a bank to do any transaction.

v. *Online Booking:* To book the railway, bus, or plane tickets at the mouse click.

vi. *Shopping:* Shopping has now become one of the most pleasing things to do using the internet

2.2. The Internet, Intranets, Extranets and the World Wide Web

The Internet

The Internet refers to the physical network that links computers across the globe. It consists of the infrastructure of network servers and communication links between them that are used to hold and transport information between the client computers and web servers.

The internet is network of networks. The internet transmits data from one computer (called a host) to another. Internet networks is linked networks that work much the same way they pass data around in packets, each of which carries the addresses of its sender and receiver

The Intranet

Intranet is an internal corporate network built using Internet and World Wide Web standards and products that allows employees of an organization to gain access to corporate information.

Intranets are private networks used inside companies to share information. Internet-based tools such as e-mail, FTP and the World Wide Web are all used as methods of sharing this information. Not all Internet users can access intranets since access is restricted by firewalls and password controls. Extranets are similar to intranets, but they are extended beyond the company to third parties such as suppliers, distributors or selected customers.

Intranet applications

Intranets are used extensively for supporting sell-side e-commerce from within the marketing function. They are also used to support core supply-chain management activities as described in the next section on extranets. A marketing intranet has the following advantages:

- ✓ Reduced product lifecycles – as information on product development and marketing campaigns is rationalized we can get products to market faster.
- ✓ Reduced costs through higher productivity, and savings on hard copy.
- ✓ Better customer service – responsive and personalized support with staff accessing customers over the web.

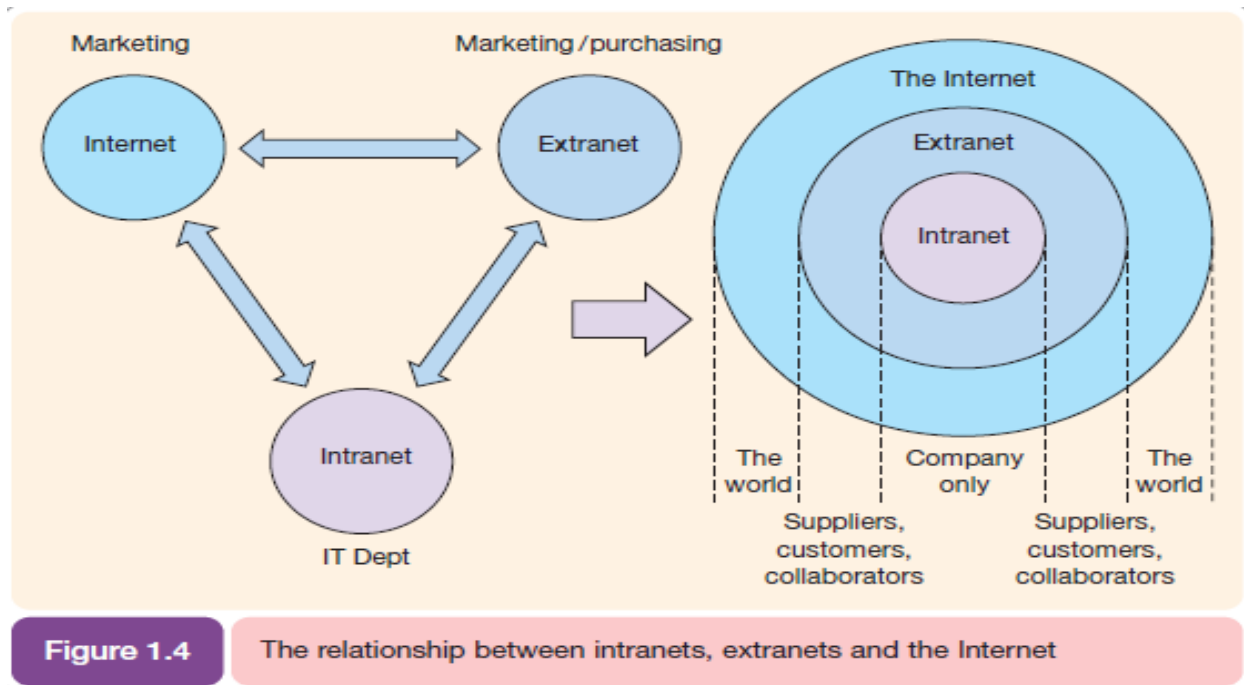✓ Distribution of information through remote offices nationally or globally.

Intranets are also used for internal marketing communications since they can include the following types of information:

✓ Staff phone directories;
✓ Staff procedures or quality manuals;
✓ Information for agents such as product specifications, current list and discounted prices, competitor information, factory schedules, and stocking levels, all of which normally have to be updated frequently and can be costly;
✓ Staff bulletin or newsletter;
✓ Training courses.

The Extranet

A service provided through Internet and web technology delivered by extending an intranet beyond a company to customers, suppliers and collaborators. Extranet is a network based on Web technologies that links selected resources of the intranet of a company with its customers, suppliers, or other business partners.

If access to an organization's web services is extended to some others, but not everyone beyond the organization, this is an **extranet**. Whenever you log on to an Internet service such as that for an e-retailer or online news site, this is effectively an extranet arrangement, although the term is most often used to mean a business-to-business application where certain customers or suppliers are given shared access.

Figure 1.4 The relationship between intranets, extranets and the Internet

The World Wide Web

The World Wide Web provides a standard method for exchanging and publishing information on the Internet. The main standard document format is HTML (Hypertext Markup Language), which can be thought of as similar to a word-processing format such as that used for Microsoft Word documents.

2.3. Internet Protocols
2.4. Web Page Request and Delivery Protocols
2.5. Electronic Mail Protocols
2.6. Markup Languages and the Web

Standards to enable delivery of information include:
- ✓ Communications standards such as TCP/IP and HTTP.
- ✓ Text information standards such as HTML, XML and WML.
- ✓ Graphical information standards such as GIF and JPEG.
- ✓ Multimedia standards such as Shockwave, Flash and streaming audio and video.
  - 2.6.1. Markup Languages
  - 2.6.2. Hypertext Markup Language
  - 2.6.3. Extensible Markup Language (XML)
  - 2.6.4. HTML and XML Editors
2.7. Electronic data interchange (EDI)