Chapter 6 – Role of Communication Systems

1. **Introduction.**

The late 20th century has become known as the 'information age'. It would be impossible to conduct modern day businesses without the use of communication technologies such as the telephone, fax machine and computer communications networks. Communications and computer technology have become inextricably linked, resulting in *telecommunications*, the transmission of data of all kinds (text, graphics, sound and video) over a variety of different communication channels such as public telephone lines, private cables, microwave and satellite. In this chapter we'll look at some of the important developments in communications.

2. The Internet

The Internet is the largest wide area network in the world. In fact it is not a single network, but a collection of thousands of computer networks throughout the world. These linked networks are of two types:

- LAN (Local Area Network), covering an office block or University campus, for example;
- WAN (Wide Area Network) connecting computers over a wide geographical area, even over several countries.

All LAN and some WANs are owned by individual organisations. Some WANs act as **service providers**, and members of the public or businesses can join these networks for a monthly charge.

There is no central authority or governing body running the Internet; it started with an initial 4 computers in 1969 and grew over the next ten years to connect 2000 computers in military and research establishments in the US. Today there are more than 4 million host computers, any of which could be holding the information you are looking for, and as many as 50 million people connected, any of whom could be future customers, friends or problem-solvers.

3. The World Wide Web

The Web is a collection of pages stored on computers throughout the world, and joined by *hypertext* links. A hypertext link enables you to click on a word or graphics, and be taken automatically to the related Web page. It is the fastest-growing part of the Internet, owing much of its popularity to Web-browsing software such as Netscape, which enables you to quickly find references to any particular topic.

4. Online information services

Hundreds of companies such as CompuServe and BT now provide online information services, enabling subscribers to gain access to the latest news, share prices, weather and sport as well as providing services such as home banking or shopping, education and entertainment and access to thousands of online databases all over the world.

5. Case Study: Those little white lies

You know you're the best person for that dream job you've seen advertised, but your CV doesn't quite convey this. Surely it wouldn't hurt to shove in an extra language GCSE and exaggerate your knowledge of Excel?

Checking job applications' CVs for little white lies is about to get much easier. Credit reference company Experian announced last week that it had struck a deal with the UK's universities to complete a database of all degree results after 1995, available to sceptical employers for a fee. Interviewers will simply need to call Experian to check candidates' grades (it plans an Internet service soon). By collating the information centrally and accessibly, the company has allowed firms to become merciless in their attempts to distinguish the fraudulents from the faithful.

6. Electronic bulletin boards

Electronic bulletin boards are Internet sites for groups of people with similar interests to exchange information and discuss issues. Bulletin boards are used by thousands of different user groups from University 'Open Learning' providers and software manufacturers user groups to less savoury groups interested in terrorist activities or paedophilia.

7. Intranets

An Intranet is a company-wide network run along the lines of the World Wide Web, making it possible to share documents, databases and applications. Intranets have the potential to revolutionise the way that organisations share information internally, just as the Internet will revolutionise the way that businesses communicate with external suppliers, customers and consultants.

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8. Electronic mail (E-mail)

E-mail systems allow you to send memos, letters and files containing data of all types from your computer to any other computer with an e -mail address and a modem, simply by typing the recipient's name and pressing the 'Send' button.

E-mail has many advantages over both ordinary mail and the telephone. For example:

- A message can be sent anywhere in the world at the price of a local call, without having to leave your desk;
- The same message can be sent simultaneously to a group of people;
- The message will arrive in at most a few hours, and can be picked up the next time the recipient looks at their e -mail;
- It is very easy to send a reply to an e -mail as soon as it is received, using a 'Reply' button;
- Long files including video, sound and graphics can be sent automatically when the cheap rate starts after 6pm;
- Graphics and text can be electronically transmitted and placed in a document by the recipient.

9. Case Study: Monitoring employee e -mail

Monitoring employees e-mail is considered by many to be unethical and an invasion of privacy, but is considered legitimate by many companies who claim they need to know that their facilities are being used to further business goals. Some also argue that they need to be able to search electronic mail messages for evidence of illegal activities, racial discrimination or sexual harassment. Others argue that the company needs access to business information stored in e -mails, just as if it were stored in filing cabinets.

- **Discussion: Many companies have stated policies regarding e-mail. Do you think employees should be granted privacy, or should companies have the right to monitor e-mail?**

10. Hardware required to access the Internet

The basic hardware needed to set up online communications is a computer, a modem and a telephone line. The overall speed of online communication is governed by the speed of the modem and the speed of the communications link. An ordinary telephone line is the cheapest but not the fastest link. An ISDN Line has a greater bandwidth and will s end data much faster.

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A **Modem** (**Mo**dulator/**Dem**odulator) converts the data from your computer from digital form (0s and 1s) into analogue or waveform so that it can be sent over the telephone line, which was originally designed for speech. Modems typically transmit data at rates of between 28,800 bps (bits per second) and 56,600bps. A second modem at the receiving end translates the analogue signal back into digital form.
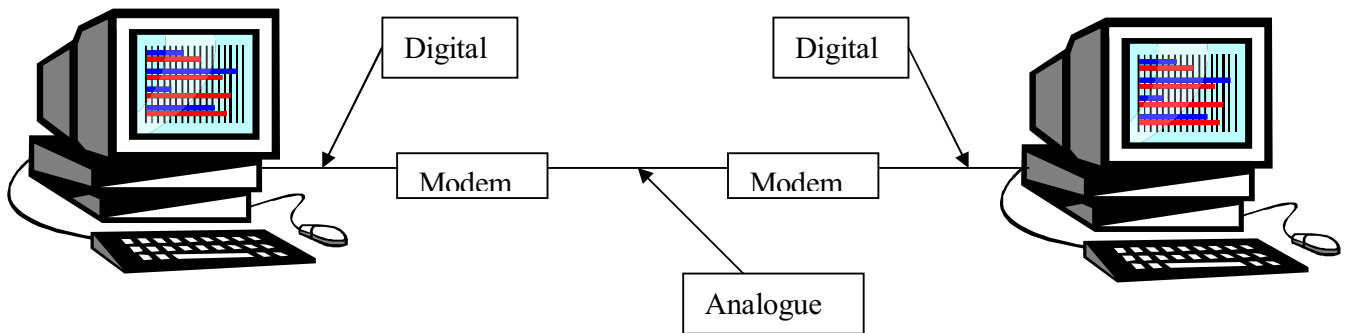
Many computers come equipped with an internal **modem card** in one of the free expansion slots inside the computer. (Most PCs have four to eight expansion slots into which you plug a variety of peripheral devices.)

In the near future you will be able to access the Internet, send e-mails and order your shopping online using a mobile phone, as described below.

11. Software and services required to access the Internet

To connect to the Internet you need to sign up with an **Internet Service Provider (ISP)** who will supply you with a user account on a host computer and a complete software package that includes:

- A browser which enables you to download and view pages from the World Wide Web;
- Communications software which allows your computer to transmit and receive data using the Internet TCP/IP communications protocol;
- An e-mail package to enable you to send and receive e-mails;
- A newsreader which you use to read and post messages to the User-net groups;
- An FTP client, which you use to download and upload files and software.

A good ISP should provide you with all of this t no charge. There are over 200 ISPs in the UK including Virgin and BT who charge a monthly

rate for unlimited access, and Freeserve from the High Street retailer Dixon's, which is free. (Further details on http://www.freeserve.net)

- Some users may want to install filtering software which blocks access to certain sites and let you set times during which the net can or cannot be used.

12. Telephones

It seems incredible that only a decade or so ago, mobile phones were almost unknown. In little more than a decade, the mobile has cha nged from yuppie toy to a vital piece of kit for 40% of Britons.

13. Case study: The Internet revolution

"We're at the beginning of the Internet revolution", says Brian Greasley, general manager of BT Cellnet's Internet service provider, Genie Internet. He means that mobile phones, rather than the computers we've been using so far, are going to deliver that revolution.

"If you look at the Internet today, it's based on a PC platform of 350 million PC's worldwide. If you roll that figure forward to 2003, there will be around 400-500 million Pc's. But there will be one billion mobile phones, and every one of them will have an Internet browser built in.."

Greasley is referring, at least in part, to new "internet phones". They send information using a new standard called Wireless Application Protocol (WAP).

The new mobile phones will be used not just for talking – We'll use them to send messages, find out the latest news football scores, access information and use services on the Internet.

And, here's the crunch, the amount of "bandwidth" these phones have – the amount of information they can receive or send in a second – will eclipse today's conventional phones. This summer, you could have the equivalent of an expensive ISDN line to your mobile phone. I/n the nea r future, you will quite easily have the kind of power that will make receiving high quality sound and video on the move quite straightforward and rewarding, reshaping the way we get information and entertainment.
Source: Neil McIntosh, The Guardian 27 Jan uary 2000

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14. Facsimile transmission (Fax)

The popularity of fax machines has exploded over the past decade. They are now regarded as indispensable by even the smallest business and have played a large part in speeding up business transactions. A fax machine scans and digitises images (text or graphics) on a page and transmits them in analogue form over a telephone line to another fax machine, which then reproduces a copy of the image on a piece of paper.

15. Voice mail

Voice mail is more sophisticated version of the telephone answering machine. A voice mail system can act as an automated switchboard so that when you dial a company number, you may hear a message along the lines of 'Hello – this is the Customer Service Department of XYZ. If you would like information on new services, press 1. If you have a query about your bill, press 2. For other information, press 3.'

A voice mail system also allows you to leave a recorded message for someone who is absent from the office. The recipient can then save it, delete it or forward it to someone else on another extension.

16. Teleconferencing

Teleconferencing allows people in different physical locations to exchange ideas and information interactively using either the telephone or e-mail. A more advanced form of teleconferencing is videoconferencing, which allows participants to see and hear one another. A videoconferencing system includes video cameras, special microphones, large television monitors and a computer with special device called a *codec* that can convert analogue video images and sound waves into digital signals and compress them for transfer over digital telephone lines. (An ISDN – Integrated Services Digital Network – line with a high bandwidth is required to transmit video.) At the other end, another computer reconverts the digital signals to analogue for displaying on the receiving monitor. Such systems are familiar from television programmes in which people on the other side of the Atlantic are interviewed from a studio in London, for example.

Microcomputer-based desktop videoconferencing systems are also available, where users can see each other and simultaneously work on the same document.

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17.Exercises

1 A multi-national company is considering the use of 'teleconferencing'.
 a) What does the term 'teleconferencing' mean? (3)
 b) List the minimum facilities required to enable 'teleconferencing' to take place. (4)
 c) Discuss **two** advantages and **two** disadvantages to the firm of using 'teleconferencing' as compared to traditional methods. (4)
2 A large company has introduced a communication system, which includes electronic mail. This system will be used for both internal use within the company and for external links to other organisations.
 a) Describe **two** features of an electronic mail system, which may encourage its use for internal communication between colleagues. (2)
 b) Contrast the use of an electronic mail system with each of fax and the telephone. (6)
 c) Describe **two** functions the communication system might have, other than the creation and reception of messages. (4)
3 A company specialises in organising international conferences for doctors. The company has decided to make use of the Internet for advertising and organising the conferences,
 a) State, with reasons, the hardware that the company would need, in addition to their PC and printer, in order to connect to the Internet. (4)
 b) State the purpose of the following software when used for the Internet:
 i) Browser
 ii) Editor
 iii) E-mail software
 c) Explain **three** potential advantages for this company of using the Internet as opposed to conventional mail/ telephone systems.
4 Facsimile and computer based electronic mailing systems are different forms of message systems.
 a) For each of these systems, describe **two** of the facilities offered. (4)
 b) Discuss the relative strengths and weaknesses of each of these systems. (10)