2 Hardware

Hardware describes the physical components of a computer system which can be categorised as input devices, a central processing unit, internal and external memory and output devices (Beynon-Davis, 2009). Input devices are used to capture or enter data into the computer. The central processing unit (CPU) performs processing by carrying out instructions given in the form of computer programs. Internal memory is used as a temporary means of storage data and instructions while external memory provides a means of storing data and programs outside of the computer. Output devices translate the results of processing into a human-readable form. These hardware components will now be described in more detail.

2.1 Input devices

Input devices are used to enter data or instructions from outside the computer into the computer. A mouse and keyboard are examples of input devices. The choice of an input device will often depend upon the quantity of data to be entered. Entering data on a small scale is normally carried out by human operators, using a number of familiar input devices, such as the mouse or keyboard. A computer-based information system will seldom make use of only a single input device. Even a typical personal computer will often feature several different methods for data entry, such as keyboard, mouse, joystick and sound card.

2.2 Central Processing Unit (CPU)

The central processing unit (CPU) or processor accepts instructions and data and executes them storing the results in memory. The increased speed of computers is primarily a result of increasing CPU speeds. The speed of a processor will depend upon a number of different factors. such as the clock speed and bus width. The clock speed determines how many instructions per second the processor can execute. The bus width describes how many pieces of data can be transmitted at one time. In both cases the higher the value, the more powerful the processor. Clock speed and bandwidth values can be helpful when attempting to compare processors in order to select the most appropriate.

2.3 Internal and External Memory

Computer memory is categorised as internal memory (also called main memory or primary memory) which is data held on the computer and external memory (also called external storage) which is data stored on a separate device where the information will be retained even if the machine is switched off. Computer memory is used to store data awaiting processing, instructions loaded from software which are used to process data or control the computer system and data or information that has been processed. Floppy and hard disks are examples of external memory.

2.4 Output devices

Output devices display the results of computer processing. A computer-based information system will make use of a number of output devices as a monitor, printer and sound card.

2.5 Major categories of computers

There are three basic categories of computer: mainframe, minicomputer and microcomputer. We will briefly examine the characteristics of each category, in order to understand more of how industry makes use of computer technology.

2.5.1 Mainframe

Mainframe computers have been traditional associated with large, powerful machines designed for large-scale data-processing activities. The use of mainframe computers in industry, once responsible for the large revenues of companies such as IBM has declined steadily over the past two decades. IBM, Fujitsu and Unisys are current suppliers. Advances in technology have enabled smaller, less expensive systems to compete with mainframes in terms of speed and power. A modern personal computer, for example, could be considered many times more powerful than one of the very earliest mainframe systems. In many organisations, mainframe computers are considered legacy systems, meaning that while managers recognise that the existing system may not be entirely adequate to meet the company's needs, a changeover would be difficult to implement.

2.5.2 Minicomputers

The minicomputer combines some of the characteristics of the mainframe computer and the microcomputer. Today, they are often referred to as servers by companies such as IBM (e.g. the IBM AS/400) and Hewlett-Packard (e.g. HP Alpha). Different types of server may have different functions, such as managing a network or hosting a database.

2.5.3 Microcomputers

The microcomputer makes use of more modern technology to provide relatively powerful computing facilities at low cost. Microcomputers are now often referred to as the 'client' machine which receives services and data from a 'server' machine. Some of the major characteristics of the microcomputer are that they a re small, relatively inexpensive and can be used for a variety of purposes.