

1 Defining Information Systems

This chapter provides a discussion of the nature of information and systems.

1.1 Defining Data and Information

It is important to distinguish between data and information. Data is a raw fact and can take the form of a number or statement such as a date or a measurement. It is necessary for businesses to put in place procedures to ensure data are recorded. For example, to ensure a call centre operator includes the postcode of every customer this can be written into their script and a validation check performed to check these data have been entered into the system.

A common definition of information is that it is data that have been processed so that they are meaningful (Oz and Jones, 2008). This requires a process that is used to produce information which involves collecting data and then subjecting them to a transformation process in order to create information. Some examples of information include a sales forecast or a financial statement.

As stated information is generated through the transformation of data. This can be achieved using a number of different transformation or data processes. Some examples of data processes include aggregating which summarises data by such means as taking an average value of a group of numbers. Classification places data into categories such as on-time and late deliveries. Sorting organises data so that items are placed in a particular order, for example listing orders by delivery date. Calculations can be made on data such as calculating an employee's pay by multiplying the number of hours worked by the hourly rate of pay. Finally data can be chosen based on a set of selection criteria, such as the geographical location of customers.

Although information is an useful resource for individuals and organisations not all information can be considered useful. The differences between 'good' and 'bad' information can be identified by considering whether or not it has some or all of the attributes of information quality. Attributes can be related to the timing, content and form of the information.

Timeliness refers to that the information should be available when needed. If information is provided too early, it may no longer be current when used. If the information is supplied too late, it will be of no use. Also the information should cover the correct time period. A sales forecast, for example, might include information concerning past performance, current performance and predicted performance so that the recipient has a view of past, present and future circumstances.

The content of the information refers to factors such as the accuracy of the information and relevance of the information to a particular situation and user.

The form of the information refers to aspects such as the clarity of the information which should be appropriate to the intended recipient. The recipient should be able to locate specific items quickly and should be able to understand the information easily. The information should also contain the correct level of detail in order to meet the recipient's information needs. For example, in some cases highly detailed information will be required whilst in others only a summary will be necessary.

1.2 Defining Systems

A system can be defined as a collection of components that work together towards a common goal. The objective of a system is to receive inputs and transform these into outputs. In the previous section 'defining data and information' the use of a transformation process was used to explain how data is converted into information. Not every system has a single goal and often a system contains several subsystems with subgoals, all contributing to meeting the overall system goal. For example the finance, operations and marketing areas of an organisation should all have goals which together help to achieve overall corporate objectives. It can be seen that in systems data are used as the input for a process that creates information as an output. In order to monitor the performance of the system, some kind of feedback mechanism is required. In addition, control must be exerted to correct any problems that occur and ensure that the system is fulfilling its purpose. There are thus five components of a generic system in terms of input, process, output, feedback and control.

1.3 Defining Information Systems

The role of the Information systems to provide information to management which will enable them to make decisions which ensure that the organisation is controlled. The organisation will be in control if it is meeting the needs of the environment. In relation to control systems can be classified into open-loop and closed-loop (Bocij et al., 2008).

An open-loop control system is one that has no way of ensuring objectives are met for a process. This means they are unsuitable in an organisational context because of the complexity of the environment in which organisations exist. Thus open-loop systems would only be successful in attaining a system's objectives in cases where we know with certainty the events that would take place during the system's process.

Closed loop systems can have two types of control mechanism referred to as feedback control and feedforward control. Feedback control systems generally provide a way of ensuring a system is under control. Negative feedback is when actions are taken to reverse any differences between desired and actual outputs. The weakness of this approach is the potential for delay between the discrepancy and the action taken to reduce it. Feedforward control systems attempt to overcome the time-delay associated with feedback systems by incorporating a prediction element in the control feedback loop. Feedforward systems are not as common as feedback systems in business settings. Examples include project management plans which are made to meet time, quality and cost objectives over time.

1.4 Business Information Systems

With the previous definitions of information and systems we can now define a business information system as a group of interrelated components that work collectively to carry out input, processing, output, storage and control actions in order to convert data into information products that can be used to support forecasting, planning, control, coordination, decision making and operational activities in an organisation (Laudon and Laudon, 2007). In terms of the components that undertake this activity, they can be classified into five basic resources of people, hardware, software, communications and data. People resources include the users and developers of an information system and those who help maintain and operate the system such as IS managers and technical support staff. Hardware resources include computers and other items such as printers. Software resources refer to computer programs known as software and associated instruction manuals. Communications resources include networks and the hardware and software needed to support them. Data resources cover the data that an organisation has access to such as computer databases and paper files.

In most organisations Business Information Systems (BIS) make extensive use of information technology, such as personal computers. The reasons why computerised BIS have become widespread are evident in their advantages such as speed, accuracy and dependability. They also have a high degree of flexibility due to their ability to be programmed to carry out a wide variety of tasks. There are, however, some disadvantages to BIS such as their lack of creativity that humans possess and the difficulty of incorporating other factors into their decision making such as innovation and intuition.

1.5 Types of business information system

Information systems may be divided into two categories of systems that support an organisation's day-to-day business activities and systems that support managerial decision making. Operations Information Systems (OIS) are generally concerned with process control, transaction processing and communications. Management Information Systems (MIS) are concerned with providing support to managerial decision making. Recently this division of BIS into operational and management systems, although useful for managers reviewing the types of BIS in use, does not now accurately reflect the reality of systems used within an organisation, particularly with the increased use of inter-organisational e-commerce and electronic data interchange (EDI). For example e-business systems and enterprise resource planning systems cut across both operational and management systems to provide businesses with more integrated information systems.