

Mis core concepts 18208 essay



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What is a Management Information System (MIS)? There is no universally accepted definition of an MIS and those that exist reflect the emphasis - and prejudices! - Of the particular writer. The term MIS has become almost synonymous with computer based data processing and indeed many Article with MIS in the title turn out to be exclusively concerned with topics such as systems analysis, filing design and the various other technical facets of computer based systems. This emphasis results in a production-Orientated definition of MIS of which the following by Kelly is a typical example: ‘

Management Information System: The combination of human and computer-based resources that results in the collection, storage, retrieval, communication and use of data for the purpose of efficient management of operations and for business planning.’ This Article emphasize that the means of producing the information - whether by computer or manual methods - is a secondary consideration compared with the importance of ensuring that the correct problems are addressed and that relevant information is available when, where, and in the form required to be usable by management. Then, and only then, should the means of producing the information be considered. This Article takes a decision focus to the design and operation of MIS, which means that the information system is viewed as a means of processing data, i. e. the routine facts and figures of the organization, into information, which is then used for decision-making. It is changes in decision behavior, which distinguish data from information.

Figure 1. 1 summarizes this approach. Figure 1. 1 Decision focus of MIS This means that MIS are qualitatively different from data processing systems and that management involvement and interaction between information specialists and management is the key feature of successful MIS design.

Having regard to the emphasis of this Article an MIS can be defined as: A system to convert data from internal and external sources into information and to communicate that information, in an appropriate form, to managers at all levels in all functions to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible. Problems with MIS There is abundant evidence from numerous surveys both in the UK and the USA that existing MIS, often using advanced computer equipment, have had relatively little success in providing management with the information it needs. The typical reasons discovered for this include the following: · Lack of management involvement with the design of the MIS; · Narrow and I or inappropriate emphasis of the computer system; · Undue concentration on low-level data processing applications particularly in the accounting area; · Lack of management knowledge of computers; · Poor appreciation by information specialists of management's true information requirements and of organizational problems; · Lack of top management support To be successful a MIS must be designed and operated with due regard to organization and behavioral principles as well as technical factors. Management must be informed enough to make an effective contribution to systems design and information specialists (systems analysts, accountants, operations researchers and others) must become more aware of managerial functions and needs so that, jointly, more effective MIS are developed. Management do not always know what information they need and information specialists often do not know enough about management to be able to produce relevant information for the managers they serve. An example given by Professor Kaplan graphically illustrates this point. He reported that a group of American industrialists

visiting Japan found that their counterparts were regularly supplied with information on the proportion of products, which pass through the factory without re-working or rectification. They found that a typical percentage of products that needed no re-working were 92%. The American managers found that this information was not available to them in their factories at home but on investigation it was found that their ratio was 8%. They then worked on this factor for 6 months at which point the ratio had moved up to 66% and, more importantly, productivity was 25% higher. There is no doubt that better communication between management and information specialists, plus a wider knowledge by both groups of MIS principles would greatly facilitate the task of developing relevant and appropriate information systems. There is, unfortunately, no simple checklist of essential features, which, if followed, will automatically produce the perfect MIS. What is required is an awareness and understanding of key principles and function so that the design, implementation and operation of the MIS is the result of informed decisions and judgments rather than haphazard development without regard to real organizational requirements. Knowledge Requirements for MIS By their nature, MIS draw upon a wide and growing range of concepts and techniques and Figure 1/2 shows the major areas of knowledge, which are considered to be the most important in the development and operation of MIS. Figure 1/2 has been drawn not only to show the various areas of knowledge, which are each developed in subsequent chapters of the thesis, but also to show that inter-relationships exist between all the areas. This point is stressed because the knowledge areas are not self-contained, independent entities but interact with, and complement, each other. The understanding of these interactions and cross relationships makes the task

of designing MIS much more difficult but conversely, enhances the likelihood of designing relevant information systems which make a positive contribution to the organization. It will be seen that encircling the core of the diagram is an area entitled ' Behavioral Factors'. This attempts to show in a diagrammatic form the all-pervasive influence and importance of behavioral considerations in the design and operation of MIS. Even within areas which are conventionally deemed to be ' purely quantitative, the reactions, motivations, aspirations and capabilities of the people involved must be considered. Figure 1. 2 Knowledge requirements for the development and operation of MIS An example is the accounting technique of Budgetary Control which is often regarded by accountants as a neutral, technical process but which is viewed by the personnel affected as anything but neutral. Properly designed, such systems may have beneficial motivating effects but all too often are seen by the managers and staff as unwanted impositions which cause resentment and dysfunctional behavior, i. e. behavior which does not contribute to organizational objectives. Because of the overall importance of behavioral considerations they are dealt with throughout the Article in context with the topic under consideration. Each of the knowledge areas shown on Figure 1. 2 is introduced in the following paragraphs. The Nature of Data, Information and Communications The processing of data into information and communicating the resulting information to the user is the very essence of MIS. Data is the term for collections of facts and figures; hours worked, invoice values, part numbers, usage rates, items received etc. These basic facts are stored, analyzed, compared, calculated and generally worked on to produce messages in the form required by the user, i. e. the manager. This outline of the process is

simple and readily understandable but further study will show that information is a more complex and ambiguous concept than so far indicated. From the viewpoint of developing relevant MIS, rather than the routine production of standardized reports, consideration must be given to the source of the information, the means by which it is communicated and, most important of all, the meaning attached to the message received and the use made of it. This final link in the communication chain is clearly of critical importance to both the information system designer and user and again emphasizes the pervasive nature of human and behavioral factors in MIS. A theme that is developed in this Article is that the value of information can only come from the results of decisions and actions based on the information. In Summary data incur costs, information - which is properly communicated and acted upon - can create value. General System Concepts Many of the concepts of Central Systems Theory (CST) have direct applicability to organizations and MIS. CST emphasizes that not only is it necessary to examine and analyze the individual parts of the system or organization but also it is vital that the system is viewed as a totality where the whole is greater than the sum of the parts - known as the holistic approach. Systems are composed of sub-systems, or expressed in commercial terms, organizations consist of departments and sections, and these parts interact and are interdependent. Accordingly it is necessary to consider these inter-relationships otherwise the system or organization as a whole will not function efficiently and will be slower to adapt to changing conditions, which is a primary requisite to survival. The reductionism approach ignores these vital inter-relationships by treating the individual parts as self-contained entities - which they are not. A simple organizational

example of this would be if a stock control system in a firm was to be analyzed in order to make it more efficient and it was decided that no attempt was to be made to consider the linkages which exist between the production control system, the replenishment system and the stock control system itself. In such circumstances even if the stock control system operated at peak efficiency, the overall effect would be less than optimal and a condition of sub-optimality would occur.

Organization Processes and Structures

Organizations are artificially contrived structures with procedures and objectives, which should, and usually do, adapt to changes in the environment. MIS exist in organizations in order to help them achieve objectives, to plan and control their processes and operations, to help deal with uncertainty and to help in adapting to change or, indeed, initiating change. Accordingly it is important for information system designers to be aware of the various influences on organization design. These range from earlier mechanistic concepts, largely stemming from the 'scientific management movement in the early part of this century, to more modern ideas which recognize the social and behavioral characteristics of the members of the organization and the need for adaptation and change to deal with ever more rapidly changing conditions.

Management Functions and Levels

As already stated, the value of information derives from the actions management take as a result of using the information. It follows that information specialists need to know what type of tasks and function management have to perform so that they are able to produce relevant - therefore usable - information. The functions of management can be grouped into five areas: planning, decision-making, organizing and co-ordination, leadership and motivation, and control. Obviously the emphasis

given to each area varies from manager to manager and is especially dependent upon the level of the manager in the organization. In broad terms, three levels of management can be seen in all organizations. Top or strategic management, middle or tactical management and junior or operational management. There are clear differences in information requirements between a manager at the operational or transactional level such as, say, a transport supervisor and a manager at the strategic or top level such as, for example, the marketing director. At the highest level, structured, formal MIS may actually be countered productive, for at these levels informal MIS and external influences become increasingly important. Another factor which affects the tasks a manager has to perform, and hence his information requirements, is the extent of functional authority within the organization. Functional authority is that which do specialist managers and staff throughout the various departments and units of the organisation exercise. Possibly the most common example of this is the Personnel Department which has functional responsibility for many personnel and industrial relation activities throughout the whole organization. Whilst each of the five functional areas, which in total constitute the task of management, need relevant information, three particular areas - planning, decision making and control - make heavy demands on the organization's MIS and thus are given special attention in this thesis. The Nature of Planning and Decision Making and the Techniques Available Planning and decision-making have rightly been called the primary management tasks and these tasks occur at every level of management although, naturally, the type of planning and decision-making will vary between the levels. Planning is the process of deciding in advance what is to be done and how it is to be done.

The planning process results in plans that are pre-determined course of action that reflects organizational objectives and decisions and action implement the plans. Thus, effective planning and decision-making are inextricably linked, for without decisions and actions the planning process is a sterile exercise. In order to provide appropriate information, MIS designers must be aware of the types of decisions made at the various levels of organization. A useful, broad classification is that given by H. A. Simon who classified decisions making into programmed and non-programmed areas. Programmed decisions are those that are routine and repetitive and where the decision rules are known. Conversely, non-programmed decisions are novel and unstructured and the natures of the problem and decision rules are complex and little understood. It follows from these brief descriptions that radically different information and procedures are required for the different decision types, which has obvious implications for MIS design. To create value from information, changes in decision behavior must result and consequently there must be a decision focus to the MIS. This means that the MIS must be designed with due regard to the types of decision, how decisions are taken, how the decision maker relates to the organization, and the nature of the organization, its environments and so on. Acceptance and understanding of this emphasis by both managers and information specialists is the primary requisite to effective MIS design. Managers, and the MIS, which supports them, must distinguish between effectiveness and efficiency. · Effectiveness means doing the right thing i. e. producing the desired results. · Efficiency is a measurement of the use of resources to achieve results. Thus an organization may be producing the wrong output efficiently and is thus an ineffective organization. Good management

concentrates on what must be done before considering how it should be done and the MIS should help them do this. Control Principles - Feedback and Feed forward Control has already been mentioned as one of the main management tasks. Much of the lower and middle management effort, and consequently much of the routine output of MIS, are concerned with control activities. Control is the process of ensuring that operations proceed according to plan and at the most basic level this is done by comparing the actual results or output of the system against a target and using any differences found to adjust the input side of the system so as to bring activities in line with the target. In practice the target may be termed a norm, a budget, a standard, a performance or stock level and so on. The procedure outlined above, i. e. input - process - output - monitor and compare -adjustment, requires what is known as a feedback control loop and such a loop is a common feature of many aspects of MIS, for example, stock control, budgetary control, production control and so on. It will be realized that the basic system described is relatively mechanistic and is therefore not necessarily suitable for all facets of the organization's activities. For example, there is the implicit assumption that the target or plan does not change and that conditions in the next control cycle will be similar to those in the past. Clearly, in volatile and uncertain conditions these assumptions are hardly likely to be correct. Where a self-regulating feedback system is not able to control a process adequately it may be feasible to use feed forward. This is where monitoring at some early stage of a system or process may indicate that an adjustment should be made at a later stage of the process, prior to the final output. Feed forward is not an automatic process and requires management intervention for it to operate successfully and

consequently, it does not have the degree of ' automatic' control inherent in a feedback system. The Influence of Information Technology (IT) IT is a general expression covering computers, telecommunications and electronics and there is little doubt that IT is having a profound influence on all aspects of life, including organizations and MIS. Much of the expenditure on computers and IT incurred by organizations to date has been on relatively routine data processing applications, particularly in the accounting area, and in operational control systems such as stock control. Of course these are vital tasks but of themselves they do not constitute management information systems. These traditional data processing systems, which are often highly sophisticated and complex, perform the essential role of processing the day-to-day transactions and provide much of the data from which management information can be prepared. The rapid growth of technology and the dramatically falling cost of computing capability means that more and more aspects of managerial planning and decision making can be assisted by information technology provided, of course, that the information system is developed in accordance with properly defined objectives and principles. Although there are many overlaps and inter-relationships, it is possible to distinguish three types of systems using information technology: a) Data Processing (or transaction processing). These are computers and electronics based systems for recording, processing and reporting on the day-to-day activities of the organization. Examples include; ledger keeping, payroll, barcode readers, automatic teller machines. b) Office Support Systems. These systems provide day-to-day assistance with the functions of the office. Examples include; word processing, electronic mail, telephones, fax. c) End User Systems. These systems seek to provide management with direct

assistance with their work. Examples include; Decision Support Systems, Expert Systems, Executive Information Systems. Contrary to the impression given by some consultants and computer manufacturers the mere fact of using IT does not of itself automatically bring benefits. If IT is misapplied or installed without sufficient analysis of the real management or organizational problems then no benefits will be gained and money will be wasted.

Examples abound; the ? 48m computer system developed by the Government for use by the Training and Enterprise Councils (TECs) was unused because it did not meet the TEC's needs, the TAURUS system for computerizing the Stock Exchange was finally abandoned in 1992 at a cost of ? 400m because it could not meet the Stock Exchange's requirements, the reversion to manual systems by the manufacturers of Parker Knoll furniture and so on. The Parker Knoll example is of particular interest because it is an example of de-automation producing dramatic efficiency gains. Parker used to monitor the movements of 1700 parts on an inventory control network with 15 shop-floor computer terminals. These have been replaced by a basic manual card system (adapted from the Japanese KANBAN system) whereby a card is placed in each pile of stocks. When stocks fall sufficiently for the card to appear, staff arranges for a further batch to be made. The firm is also replacing modern high technology machine tools by older models. Although the high technology machines were faster and could do several different jobs, set-up times were in hours rather than the minutes required for the older machines. The result of these changes has been a production increase of 20%, fewer mistakes, and lead times reduced from 12 weeks to less than 3 days. The key moral from this example is that automating inefficient methods, as Parker did previously, does not produce benefits. The methods

and systems must be right before any attempt is made to automate them and no IT system should be installed unless it is demonstrably better than the best manual method. The proper, planned use of IT can, of course, be highly beneficial but benefits do not automatically accrue.

Changes Affecting Organizations

A common feature of the environment in which all types of organization operate is the presence of an apparently ever-accelerating rate of change. Management, and the information systems that support them, have to learn to deal with change and to adapt their operations and systems and the organizations themselves in order to survive and prosper. Typical of the changes taking place are the following:

- **More competition:** All types of organizations face greater competitive pressures. These may be Tesco competing with Sainsbury, Asda and Waitrose or it may be competition from the new discount stores from abroad such as Lidl, Aldi, Netto and others. There are similar pressures in the public sector. For example, Trust Hospitals compete for business from fund holders and health authorities, Local Authorities must implement Compulsory Competitive Tendering for an ever-increasing proportion of the services they provide, Government Agencies have to be competitive in pricing and cost control in order to meet targets and so on.
- **Faster pace:** The faster pace of society and business is apparent in many ways. New models of all types of manufactured goods have shorter life cycles, this in turn means that product development must also be speeded up. The knowledge and training that people have rapidly becomes obsolete because of changing requirements. Existing work patterns and practices need to be updated more or less continuously to keep pace, current information rapidly becomes out of date, technology seems to change month by month and so on.
- **Increased globalization:** Because of

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lower trade barriers, faster transport and communications, and the easier flow of capital, effectively there is a world market in manufactured and agricultural products and raw materials such as oil, coal, iron ore etc. In addition, banking and financial services operate on an international scale. The effect of these developments is that there is increased competition for virtually every product, commodity or service. There is a further problem with the global marketplace; that of volatility. Currencies, markets and political environments change continually and often unpredictably. The global marketplace has caused dramatic changes in the location of certain types of manufacturing businesses. Many Western firms have set up manufacturing plants in various parts of Asia and China to take advantage of lower labor and overhead costs with obvious consequences for domestic manufacturers. The process is not just one way. For example, Japanese, Korean and American firms have established factories in the UK making cars, televisions, computers and domestic appliances in order to secure an entry into the lucrative European market. This inward investment has several advantages for the UK. Firstly there are the direct employment and financial effects of the new factories. In addition there are indirect but arguably more important benefits arising from the introduction of more efficient management practices, and higher quality and productivity standards which permeate through to domestic manufacturers. Foreign investment by multi-nationals (i. e. firms which own and control production and I or service facilities outside their home countries) takes place according to a worldwide corporate strategy, which considers; markets, relative costs and revenues, taxation, and political factors. Multi-nationals operate process specialization whenever possible. This means that processes are specialized within

particular factories spread throughout the world. For example, a car manufacturer may locate labor-intensive processes in lower wage countries with the final stages of manufacture located nearer the intended market. Ford Motors are following this policy and have announced that production will be planned globally based on just five centers. The Drive for Productivity and Quality Increased competition and more discerning consumers has meant that all types of organization are striving for greater productivity, whilst maintaining or enhancing quality. This applies to both service and manufacturing organizations. In manufacturing the greatest stimulus has been from the Japanese. The Japanese have developed a total quality approach with the target of zero defects. This has been accompanied by lean production methods that have dramatically increased productivity. A key feature of lean production is the use of Just-in-Time (JIT) systems. The aim of JIT systems is to produce the required items, of high quality, exactly at the time they are required. There is the pursuit of excellence at all stages with a climate of continuous improvement. The key elements of JIT are:

- A move towards zero inventory
- Elimination of non-value added activities
- An emphasis on perfect quality i. e. zero defects
- Short set-ups
- A move towards a batch size of one
- 100% on time deliveries
- A constant drive for improvement
- Demand-pull manufacture

The application of efficient production techniques such as JIT and the use of computers and robots (known as Advanced Manufacturing Technology - AMT) have enabled some manufacturing companies throughout the world to become very successful. Collectively these are known as World Class Manufacturers. The drive for productivity is also apparent in numerous service industries. Improved methods and the use of Information Technology have enabled banks and

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building societies to increase business yet at the same time to reduce the number of staff, whilst British Telecom have reduced staff in each of the years since privatization even though more services are now offered and turnover has increased. The same movement can also be seen in the privatized utilities for electricity, gas and water.

Changing Employment Patterns

A long term seeming inexorable change in employment is taking place in Britain and other developed countries. There are now many more part-time workers or workers on temporary contracts. More women are employed than men and organizations are seeking to gain flexibility and lower costs by shrinking their core work force of full-time employees and employing sufficient part-time or temporary workers to cope with fluctuations in demand. In many firms just-in-time inventory management is now accompanied by just-in-time labor. In addition, changes in manufacturing techniques, the growth in the use of technology and other changes in the work place have increased demand for skilled/educated personnel at the expense of the unskilled. This means that many unskilled workers are now effectively unemployable even in boom times. Although a number of these change no doubt benefit the individual organization when considered in isolation there are wider, social costs. These include; greater stress and insecurity, a growing gap in incomes between those in work and those unemployed, a sense of alienation from society by the long-term unemployed, poorer health, possible increase in crime etc.

Bibliography

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Word Count: 4334