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MANAGEMENT INFORMATION SYSTEM

Models for Decision Making in Information System and
Information Technology

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Table of Contents

Introduction: Purpose of the topic.....	3
Description	4
General Analysis	10
Actualization.....	21
Discussions	23
General Recommendations.....	25
Conclusion: A new perspective	26
References.....	27

Introduction: Purpose of the topic

The main purpose of this topic is to introduce the concepts of information cycle, the levels of management and types of decisions made in Management Information System.

An information system is a computerized system which processes data (facts) and produces information. This process has been defined as an information processing cycle (IPC). While a Management Information System (MIS) comprises computer-based processing and/or manual procedures that provide useful, complete, and timely information. This information must support management decision making in a rapidly changing business environment.

Information is valuable and useful because it can help decision makers. For example, investors are using information to make multi-million-dollar decisions, financial institutions employ information to transfer millions of dollars. Retailers use information to control inventory and process orders. Information technologies are consistently changing our society, our ways of doing business and our lives.

Data must be distinguished from information, and this distinction is clear and important for our purposes. Data are facts and figures that are not currently being used in a decision process, and they usually take the form of historical records that are recorded and filed without immediate intent to retrieve for decision-making. An example would be one of the supporting documents, ledgers and so on, that comprise the source material for profit and loss statements. Such material would only be of historical interest to an external auditor.

Information consists of data that have been retrieved, processed, or otherwise used for informative or inference purposes, arguments, or as a basis for forecasting or decision-making. An example would be any of the supporting documents mentioned above, but in this case the data could be used by an internal auditor, the management services department of an external auditor, or by internal management for profit planning and control, or for other decision-making purposes.

Description

The information processing cycle consists of four operations. They are input, processing, output and storage, below is the description the these terms;

Input is defined as the raw data retrieved from the environment and delivered to the computer.

Processing is the collection of logical and arithmetic operations applied automatically to a group of data with the help of equipment. Processing is also designated as data treatment. In this step the raw data received from the input device is manipulated, refined and organized to produce useful information for end users.

Output is the displayed information to the end users obtained from the result of the manipulation, refinement, and organization of raw data.

Storage has to do with the saving of information for further usage.

All these four process make up the information processing cycle. The input of the IPC is raw data. Raw data consists of raw facts while information is a collection of facts organized or processed in such a way that they have additional value for further usage.

Information itself has value, and commerce often involves the exchange of information, rather than tangible goods. To fully understand what an information system is and its concepts, the components of information system should be first identified. A complete information system should contain the following elements:

COMPUTER HARDWARE

Computer hardware can be classified into five categories: personal computer, servers, minicomputers, mainframes and super computers.

Personal computers

Personal computers are also called microcomputers. Each contains a microprocessor and is designed for individual or personal use.

Classifications within this category include non-portable computers and portable computers.

Servers

Server computers are designed to support a computer network that allows users to share files, applications, and hardware resources. A server computer is normally used to serve other computer in the networks in terms of file storage and resources management, data communications, printing managements, and other computer functions. The characteristics of a server computer follows:

- Communicate with other networks
- Enhance communication speed within the network
- High-end CPU power with a large capacity on the hard drive.
- Some have parallel processing capabilities by employing more than on CPU.
- Large memory capacity.

A server computer could be either a high-end microcomputer or a powerful microcomputer with minicomputer like functions. The prices for server computers are in the \$5,000 to \$150,000 range.

Minicomputers

Minicomputers are more powerful than microcomputers in terms of multiple user environment. In other words, a minicomputer can be used by many users simultaneously. Many businesses and other organizations use minicomputers for their information processing requirements. The cost of minicomputers can be from \$15,000 up to hundred thousand dollars. The most powerful minicomputers are called supermini-computers.

Mainframe Computers

Mainframe computers are large computer systems that can handle hundreds of users, store large amounts of data, and process transactions at a high speed. Mainframe computers use a very sophisticated computer operating system to manage and control the whole system. Mainframes usually require a specialized environment including air conditioning and raised flooring that allows computer cables to be installed underneath.

The price ranges for mainframes is from several hundred thousand to several million dollars.

Supercomputers

Supercomputers are the most powerful category of computers. Typical applications are scientific calculations, engineering design, space exploration and other tasks requiring complicated processing. Supercomputers cost several million dollars.

COMPUTER SOFTWARE

Computer software are instructions called programs written in programming languages by programmers. Software consists of sequences of operations the computer will follow. Before a program can run or be executed, the program must be loaded into the main memory of the computer. After that, programs can be executed to perform certain functions based on how they are designed. For example, the word processing program allows users to enter their typing and edit the contents. A graphical design program is used to perform graphical designs. Most computer programs are written by people with special training. These people, called computer programmers, write the necessary instructions.

Data

Data is usually the input of a Management Information System. After data are processed by MIS, information will be generated. Users can then use information for decision making. Data are normally organized into file tables and files are organized into the database. Users can retrieve data as input of application software and produce information as output. If data are not accurate, the information produced will not be useful. Therefore, the garbage in, garbage out (GIGO) syndrome should be avoided.

Trained Personnel

People who operate MIS should be properly trained. MIS professionals and programmers are responsible for designing and programming MIS, while computer operators and users use them. With adequate training, users can achieve the desired functions designed by MIS professionals. An experienced user can also provide MIS professionals with valuable suggestions or be involved in MIS development.

Producers

MIS producers are designed for users to achieve certain functions. Well-designed procedures guarantee the quality and the security of information processing.

Information systems that are implemented on a computer can be classified into five different systems:

- A. Transaction Processing Systems
- B. Management Reporting Systems
- C. Executive Information Systems/Executive supporting Systems
- D. Decision Support Systems
- E. Office Information Systems

These systems will be fully covered in the general analysis section.

Models for Decision Making

Information systems are not new; only computerization of them is new. Before computers, information system techniques existed to supply information for functional purposes. In order to understand the models of decision making in management, there is a need to clearly comprehend the term MIS. The question rises again, what is the Management Information System (MIS)?

The scope and purpose of MIS is better understood if each element of the term is defined.

Management

Management has been defined in a variety of ways, but for our purposes it comprises the process or activities that describe what managers do in the operation of their organization:

- plan,
- organize,
- coordinate,
- Control operations.

The planning is done by setting strategies and goals and selecting the best course of action to achieve the plan.

Managers organize the tasks necessary for the operational plan, set these tasks up into homogeneous groups, and assign authority delegation to coordinate the tasks.

Finally, they control the performance of the work by setting performance standards and avoiding deviations from standard.

Since *decision-making* is such a functional prerequisite to each of the foregoing processes, the job of an MIS becomes that of facilitating decisions necessary for planning, organizing, and controlling the work and the functions of the business.

In general, the work that management performs can be classified as:

- a) Planning
- b) Organization and coordination
- c) Controlling
- d) Decision-making

Planning. The planning function of management involves the selection of long and short term objectives and the drawing up of strategic plans to achieve those objectives. For example, the vice president of marketing must consider numerous factors when planning short-term and campaigns and promotional activities aimed at opening up new long-term market.

Organizing and coordinating, in performing the organizations and coordination function, management must decide how best to put together the firm's resources in order to carry out established plans. For example, top management must decide on the type and number of divisions and departments in the company and evaluate the effectiveness of the organizational structure. Furthermore, managers must identify the personnel needs of the company and select the personnel, as well as train staff.

Controlling. Controlling entails the implementation of a decision method and the use of feedback so that the firm's goals and specific strategic plans are optimally obtained. This includes supervising, guiding, and counselling employees necessary to keep them motivated and working productively toward the accomplishment of organization objectives.

Decision Making. Decision making is the purposeful selection from a set of alternatives in light of a given objective. Each primary management function involves making decisions, and information is required to make sound decisions. Decisions may be classified as short-term or long-term.

Depending upon the level of management, decisions can be operational, tactical, or strategic.

INFORMATION

According to the Business dictionary.com, information is defined as follows; Data that is (1) accurate and timely, (2) specific and organized for a purpose, (3) presented within a context that gives it meaning and relevance, and (4) can lead to an increase in understanding and decrease in uncertainty.

Information is valuable because it can affect behaviour, a decision, or an outcome. For example, if a manager is told his/her company's net profit decreased in the past month, he/she may use this information as a reason to cut financial spending for the next month. A piece of information is considered valueless if, after receiving it, things remain unchanged.

Information, as we know it today, includes both electronic and physical information. The organizational structure must be capable of managing this information throughout the information lifecycle regardless of source or format (data, paper documents, electronic documents, audio, video, etc.) for delivery through multiple channels that may include cell phones and web interfaces.

SYSTEMS

A system can be described simply as a set of elements joined together for a common objective. A subsystem is part of a larger system. All systems are parts of larger systems. For our purposes the organization is the system and the parts (divisions, departments, functions, units, etc) are the subsystems. While we have achieved a very high degree of automation and joining together of subsystems in scientific, mechanical, and factory manufacturing operations, we have barely scratched the surface of applying systems principles for organizational or business systems. The concept of synergism has not generally been applied to business organizations, particularly as it applies to the integration of the subsystems through information interchange. Marketing, production/operations, and finance are frequently on diverse paths and working at cross-purposes. The systems concept of MIS is therefore one of

optimizing the output of the organization by connecting the operating subsystems through the medium of information exchange.

General Analysis

CLASSIFICATION OF INFORMATION SYSTEM

This section will be used to describe the Information systems that are implemented on a computer, classified in five different systems.

Transaction Processing System (TPS)

Transaction information systems are designed to process the day-to-day transactions of an organization so that many labour-intensive business transactions can be replaced by automated process. These transactions have characteristics of large numbers and routine process. Each process has a very simple data transaction, and TPS is expected to process each one in a very short period of time. Examples are super market grocery check out (billing system) or bank transaction process.

When computers were first used for processing business applications, TPS was the primary system implemented to replace the manual system in use. Typically, a successful TPS can improve transaction efficiency, customer service, and reduce transaction costs. The first TPS was a batch system. A TPS in batch processing implies that all transactions are collected first and at a later time, processed. The disadvantage of batch processing is that information cannot be updated immediately. A TPS with on-line processing updates information when the transaction is entered. In a business where immediate update is required, an on-line TPS is necessary. On-line TPS requires higher fees for operation than batch TPS. Today, most TPS use on-line processing to achieve better customer satisfaction and current information.

MANAGEMENT REPORTING (INFORMATION) SYSTEMS (MRS)

After TPS has implemented, some organizations realized that the results produced by TPS are not suitable for higher level decision making and that the computer's capability to perform rapid calculations and logical functions could be used to produce meaningful information for management. As a result, MRS began to be developed so that managerial reports and summarized data could be produced. These reports helped managers perform their duties as well as provide middle management with statistical or summarized data for tactical level decision making.

In general, MRS is usually used with TPS. TPS processes daily transactions, updates inventory, and keeps customer information while MRS uses the data from TPS to produce daily total sales, inventory ordering lists, and customer list with different criteria. The output from MRS provides middle management with printed reports and inquiry capabilities to help maintain operations and management control of the enterprise. The concept of management reporting systems evolved as managers realized that computer processing could be used for more than just day-to-day transaction processing, it could also be used to produce meaningful information for management.

DECISION SUPPORT SYSTEMS (DSS)

Decision Support Systems are designed to help managers reach a decision by summarizing or comparing data from different resources. They are suitable for semi-structured and unstructured problems. Decision support systems often include query languages, statistical analysis capabilities, spreadsheet, and graphics to help decision makers evaluate the decision. DSS are a type of MIS expressly developed to support the decision making process. DSS facilitate a dialogue between the user, who is considering alternative problem solutions, and the systems, with its built-in models and accessible database. A typical DSS process involves retrieving a model from the model base and allocating proper data from the database.

With a model, users can ask if-then questions by changing one or several variables as the input, the combination of data and model generates the recommendations from a DSS. The database is managed by a Data Base Management System (DBMS) while a model base is managed by a Model Base Management System (MBMS).

OFFICE INFORMATION SYSTEMS (OIS)

OIS is a system designed to support office tasks with information technology. Voice mail, multimedia systems, electronic mail, video conferencing, file transfer and even group decisions can be achieved by Office Information Systems. The final goal for OIS is to have an office environment where no paper is used (paperless environment).

EXECUTIVE INFORMATION SYSTEMS (EIS)

EIS is designed to generate information which is abstract enough to present the whole company operation in a simplified version to satisfy senior management. Characteristically, senior managers employ a great variety of informal sources of information, so that computerized information systems are able to provide only limited assistance. However, the CEO, senior and executive vice presidents, and the board of directors also need to be able to track the performance of their company and of its various units, assess the business environment, and develop strategic directions for the company's future.

MISS TO SOLVES BUSINESS PROBLEMS

The business environment is changing on a daily basis. The competition is everywhere from cost cutting to marketing strategies. To maintain competitiveness, management must improve the efficiency of operation without sacrificing the quality of products and services. In order to achieve this task, making timely and correct decisions is the key to success. Since good decision makings require quality data and timely information, MISS is exactly designed to provide information on a timely basis. MISS also provides different types of information based on users' needs to improve effectiveness and efficiency.

COMPUTER TECHNOLOGIES AVAILABLE FOR BUSINESS

Information systems are used in all business domains. For example, finance uses information to forecast revenues and maximize investment, make selections on stocks and even predict bankruptcies. Accounting uses information systems to record transactions, prepare financial statements, manage cash flow, or predict profit or loss. In marketing,

information systems are used to develop new merchandise and services, customer segmentation, determine the locations for production and distribution facilities (so that the cost can be reduced and more customers will be attracted), formulate price strategies (so they can maximize total profits) and even develop the promotion policies (so that advertising will be more efficient). In manufacturing, information systems are used to process customer orders, develop production schedules, design new products, and test the quality of products.

MANAGING INFORMATION RESOURCES

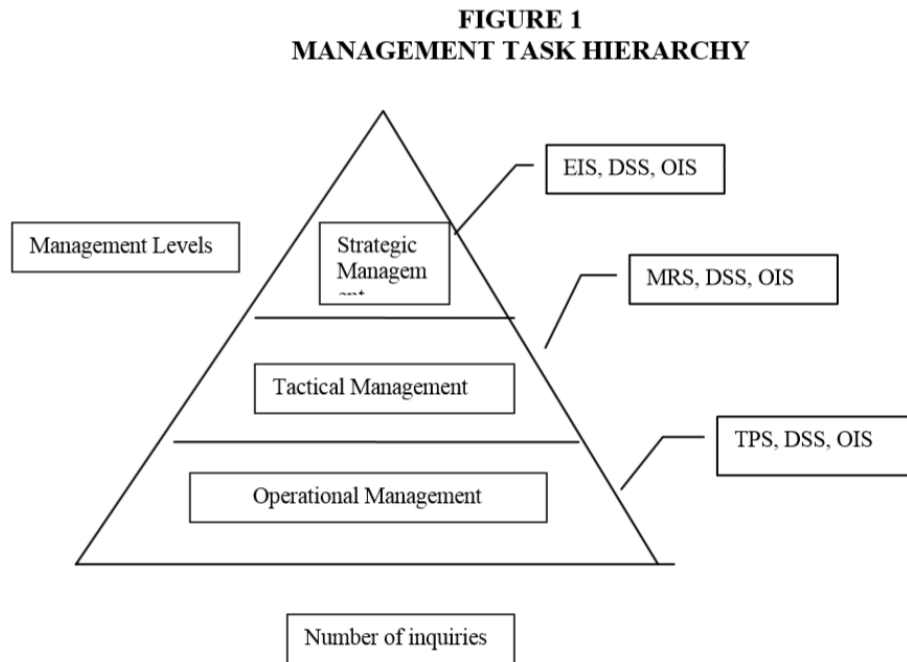
Managing information resources can be a very complicated task due to rapid changes in this field. Generally speaking, there are two options available to managers:

1. In-House Operation
2. Outsourcing

In-house operation requires your own data processing facilities and personnel to operate. This approach allows users to receive MIS services faster and easier. However, it requires the company to use the equipment and employ MIS personnel to assure the facility is fully functional.

Outsourcing deals with subcontracting MIS tasks to professional MIS companies. With professional help, the task can be achieved more efficiently and effectively. However, the response time to acquire services might be a little longer and very often, the communication channels between subcontractor and users might not be well established. Different MISs is designed for different management functions. To understand which MIS will serve specific management needs, we categorize management into three levels (see Figure 1).

FIGURE 1 MANAGEMENT TASK HIERARCHY



- **First level:** Strategic management is the highest level of management. This level contains fewer decision makers but has much power over the whole organization. Therefore, EIS becomes the most appropriate IS available at this level.

- **Second level:** Tactical management is the middle level of management. Managers in this level very often use MRS for summarized information and generate management reports for decision making.

- **Third level:** Operational is the lowest level of management. Foreman and supervisors are in this level. TPS with large routine transaction processing capability is usually used for this management level.

In addition, DSS and OIS are not specifically designed for any management level. They are good for all three levels of management.

AN MIS AND ORGANIZATIONAL LEVELS

An MIS should produce useful, accurate, and timely information to management on three levels: low-level (operational), middle (tactical), and top (strategic). Lower management make day-to-day operational decisions that affect a relatively narrow time frame and that involve details. These decisions are structured. Middle management are involved on more tactical decisions that cover a broader range of time and involve more experience. Middle managers use summary reports, exception reports, periodic reports, on-demand reports, and event-initiated reports to make semi structured decisions. Top management deals with decisions that are strategic and long-term in nature.

LEVELS OF MANAGEMENT: WHAT KINDS OF DECISIONS ARE MADE? Each level of management can be differentiated by the types of decisions made, the time frame considered in the decisions, and the types of report information needed to make decisions. (See Table 1).

TABLE 1
A COMPARISON OF THE MISs
AT THE OPERATIONAL, TACTICAL, AND STRATEGIC LEVELS

<i>Characteristic</i>	<i>Operational</i>	<i>Tactical</i>	<i>Strategic</i>
Frequency (needed)	Regular, repetitive	Mostly regular	Often ad hoc (as needed)
Dependability of results contain	Expected results	Some surprises may occur	Results often surprises
Time period covered	Past	Comparative	Future
Level of data	Very detailed	Summaries of data	Summaries of data
Source of data external	Internal	Internal and external	Internal and
Nature of data unstructured	Highly structured	Some unstructured data	Highly (semistructured)
Accuracy data	Highly accurate data	Some subjective data	Highly subjective
Typical user	First-line supervisors	Middle managers	Top management
Level of decision	Task-oriented	Control and resource allocation oriented	Goal-oriented

Adapted from R. Schultheis and M. Sumner, *Management Information Systems: The Manager's View*, 2nd Edition (Homewood, IL: Richard D. Irwin, 1992) p. 329.

LOWER MANAGEMENT

The largest level of management, lower (operational) management, deals mostly with decisions that cover a relatively narrow time frame. Lower management, also called supervisory management, actualizes the plans of middle management and controls daily operations—the day-to-day activities that keep the organization humming. Examples of a lower-level manager are the warehouse manager in charge of inventory restocking and the materials manager responsible for seeing that all necessary materials are on hand in manufacturing to meet production needs.

Most decisions at this level require easily defined information about current status and activities within the basic business functions—for example, the information needed to decide whether to restock inventory. This information is generally given in detail reports that contain specific information about routine activities. These reports are structured, so their form can usually be predetermined. Daily business operations data is readily available, and its processing can be easily computerized. Managers at this level typically make structured decisions. A structured decision is a predictable decision that can be made by following a well-defined set of predetermined, routine- procedures. For example, a clothing store floor manager's decision to accept your credit card to pay for some new clothes is a structured decision based on several well-defined criteria:

- Does the customer have satisfactory identification?
- Is the card current or expired?
- Is the card number 011 on the store's list of stolen or lost cards?
- Is the amount of purchase under the cardholder's credit limit?

MIDDLE MANAGEMENT

The middle level of management deals with decisions that cover a somewhat broader range of time and involve more experience. Some common titles of middle managers are plant manager, division manager, sales manager, branch manager, and director of personnel.

The information that middle managers need involves review, summarization, and analysis of historical data to help plan and control operations and implement policy that has been formulated by upper management. This information is usually given to middle managers in two forms: (1) summary reports, which show totals and trends—for example, total sales by office, by product, by salesperson, and total overall sales—and (2) exception reports, which show out-of-the-ordinary data—for example, inventory reports that list only those items that number fewer than 10 in stock. These reports may be regularly scheduled (periodic reports), requested on a case-by-case basis (on-demand reports), or generated only when certain conditions exist (event-initiated reports).

Periodic reports are produced at predetermined times—daily, weekly, monthly, quarterly, or annually. These reports commonly include payroll reports, inventory status reports, sales reports, income statements, and balance sheets. On-demand reports are usually requested by a manager when information is needed for a particular problem. For example, if a customer wants to establish a large charge account, a manager might request a special report on the customer's payment and order history. Event-initiated reports usually clear with a change in conditions that requires immediate attention, such as an out-of-stock report or a report on an equipment breakdown.

Managers at the middle level of management are often referred to as tactical decision makers who generally deal with semi structured decisions. A semi structured decision is a decision that includes some structured procedures and some procedures that do not follow a predetermined set of procedures. In most cases, a semi structured decision is complex, requiring detailed analysis and extensive computations. Examples of semi structured decisions include deciding how many units of a specific product should be kept in inventory, whether or not to purchase a larger computer system, from what source to purchase personal computers, and whether to purchase a multiuser minicomputer system. At least some of the information requirements at this level can be met through computer-based data processing.

TOP MANAGEMENT

The top level of management deals with decisions that are the broadest in scope and cover the widest time frame. Typical titles of managers at this level are chief executive officer (CEO), chief operating officer (COO), chief financial officer (CFO), treasurer, controller, chief information officer (CIO), executive vice president, and senior partner. Top managers include only a few powerful people which are in charge of the four basic functions of a business— marketing, accounting and finance, production, and research and development. Decisions made at this level are unpredictable, long-range, and related to the future, not just past and/or current activities. Therefore, they demand the most experience and judgment.

A company's MIS must be able to supply information to top management as needed in periodic reports, event-initiated reports, and on-demand reports. The information must show how all the company's operations and departments are related to and affected by one another. The major decisions made at this level tend to be directed toward (1) strategic planning—for example, how growth should be financed and which new markets should be tackled first; (2) allocation of resources, such as deciding whether to build or lease office space and whether to spend more money on advertising or the hiring of new staff members; and (3) policy formulation, such as determining the company's policy on hiring minorities and providing employee incentives. Managers at this level are often called strategic decision makers. Examples of unstructured decisions include deciding five-year goals for the company, evaluating future financial resources, and deciding how to react to the actions of competitors.

MODELING A REAL LIFE SYSTEM

Many MISs are model-based. The real world is complex, dynamic, and expensive to deal with. For this reason, we use models instead of real life systems. A model is an abstraction of a real life system that is used to simulate reality. Especially in the computing environment we live in, managers and decision makers find use of models easy and less expensive to understand what is happening and to make better decisions.

There are many different types of models. They are:

- a) Narrative*
- b) Physical*
- c) Graphical*
- d) Mathematical*

NARRATIVE MODELS

A narrative model is either written or oral. The narrative represents a topic or subject. In an organization, reports, documents, and conversations concerning a system are all important narratives. Examples

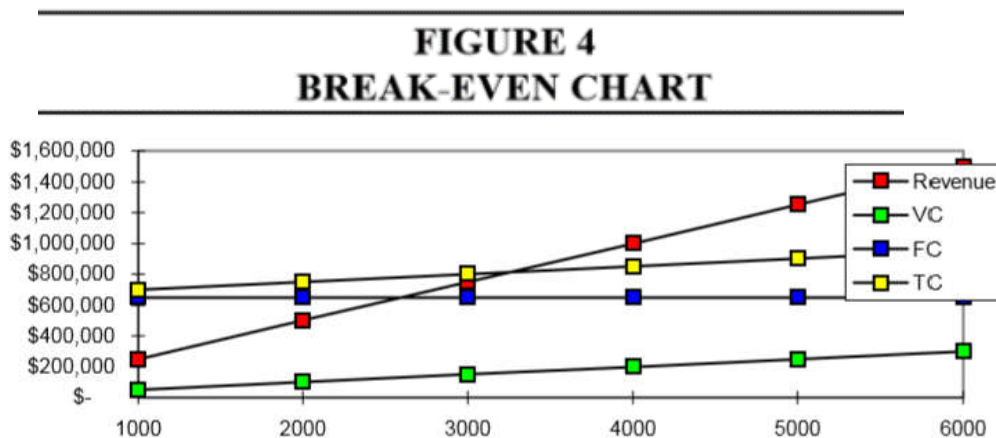
include the following: a salesperson verbally describing a product's competition to a sales manager, and a written report describing the function of a new piece of manufacturing equipment.

PHYSICAL MODELS

The fashion model is an example of physical models, as are dolls and model airplanes. Many physical models are computer designed or constructed. An aerospace engineer may develop a physical model of a shuttle to gain important information about how a large-scale shuttle might perform in space. A marketing department may develop a prototype of a new product.

GRAPHICAL MODELS

A graphical model is a pictorial representation of reality. Lines, charts, figures, diagrams, illustrations, and pictures are all types of graphical models. These are used often in developing computer programs. Flowcharts show how computer programs are to be developed. A graph



that shows budget and financial projections and a break-even chart are good examples of graphic models. The break-even chart depicts the point at which sales revenues and costs are equal, as shown in Figure 4.

Actualization

Case Study: Lúrio University

A management information system (MIS) is a subset of the overall internal controls of a business covering the application of people, documents, technologies, and procedures by management accountants to solve business problems such as costing a product, service or a business-wide strategy. Management information systems are distinct from regular information systems in that they are used to analyze other information systems applied in operational activities in the organization.

This section, Lurio University will be focal point as a case study in the implementation of MIS. The Lurio University (UniLúrio) is a public higher education institution which has its headquarters in the province and city of Nampula, was inaugurated on June 29, 2007.

In the plan of the extension and expansion, after the Faculty of Health Sciences in Nampula, UniLurio opened two new campuses in Pemba with the Faculties of Engineering and Natural Sciences, and Sanga, with the Faculty of Agricultural Sciences in 2008 and 2009 respectively, and in 2010 opened the Faculty of Architecture and Physical Planning, totaling four Faculties and ten courses.

According to the strategic plan 2010 - 2015, UniLurio defined as short-term objective to adopt and consolidate systems of information technology and communication platforms based on modern, safe, and easy access in the work environment, indoors or outdoors as well as in remote locations or points. The main aim of this is to undertake a more dynamic processes of access to information and communication, to both administrative and academic communities of the university.

Looking at the developing countries today, can be observed that industry and technology is away back. In order for these nations to bust up their economy they need to be well informed. The developing countries have enough resources both human and material for their development; the questions then rises: why then they don't develop? We might have many reasons, but one of them might be the lack of sustainable information management system.

Consequently the following question is raised: ***What might be the impact of sustainable management information system in the developing countries?***

Factors that have raised the problem

The problem of lack of management information system in the developing countries is due to the following factors:

- lack of trained personnel in MIS
- lack of hardware to process the data

➤ lack of information in this materials

However, taking the example of Northern Region of Mozambique like most other African countries is beset by an array of problems one of which is communication.

Communication is presently the weakest area of the developing countries. Communication is largely by vehicular transportation. The few functional networks of telephones within these countries are only accessible to few people who are based in the main cities. National and International communications on the other hand are heavily dependent upon regular postal and courier services. This greatly hinders academic and research activities in this age of information technology.

Access to teaching and research materials in form of periodicals journals and books by academic staff is not easy. Similarly, international conferences, workshops and seminars attendance as well as collaborations with other academic or business institutions are also highly limited. The library are largely empty, with only obsolete and few books and journals. Access to current editions of books and international journals is increasingly becoming difficult as a result of limited funds and the weakness of the currency against major international currencies.

Discussions

Somebody said that technology is as much a part of the modern business world as coffee machines and water coolers. Computers are ubiquitous, and procedures such as billing and shipping rely on automation, at least in part. While technology offers an array of benefits to businesses, it also comes with many potential drawbacks. In this section there will be a short discussion of these pros and cons of the development of the Information Technology in the world we are living in.

Technology limits the need for people to be in the same physical location, for example when companies hold a teleconference with several

employees located in different branches or when they allow employees to telecommute from home. In some cases, this can save companies money because they do not have to pay travel expenses. When employees use technology for telecommuting, they can work in the comfort of their home instead of traveling to a workplace.

Technology can decrease the time it takes to accomplish a task, which can ultimately save money and increase productivity. Communication speed also increases. Instead of sending a message by postal mail, using email or fax can deliver it instantaneously. Technology can also speed up various manufacturing processes, as machines and computers can do work that was once performed by humans more quickly and efficiently.

On the downside, the use of technology doesn't always result in greater efficiency. Companies that depend heavily on computer systems to conduct business can come to a virtual standstill if the system breaks down. There is typically a learning curve that accompanies the introduction of a new process, which can lead to a loss in productivity and disgruntled employees. For employees who telecommute and experience computer problems, it may be more difficult to receive timely technical support.

The pros and cons of the impacts of technological advances are heavily debated, especially during election season. The technological capacity of our generation has exceeded and continues to surpass all previous generations combined, providing today's students and prospective employees with competitive advantages rarely held by individuals prior to recent advancements. For example, the widespread utilization of the internet provides immediate access to information and communication simultaneously. Technology provides a variety of employment options, inspired by the success of cultural icons such as Steve Jobs, Mark Zuckerberg and Bill Gates. The impacts of satisfying society's craving for faster, smaller, more gratifying and efficient technology have created numerous ethical dilemmas in an already polarized climate. Consider military weapons advancements such as the nuclear bomb and the ability to remotely perform a complex surgical procedure; the world possesses the ability to improve or destroy itself in a moment's notice. The disparity between the haves and the have-nots has become more apparent as technology advances; there is unparalleled potential to improve or exploit

underprivileged individuals with the use of technology. Technology has also enabled the business sector to overcome cultural, language, and geographical barriers, creating a globalized economy.

Technology can have both a positive and negative effect on your customers. While some customers may enjoy the convenience of paying bills online, others may see this as a possible invasion of their privacy. Some may consider being routed through a phone tree standard operating procedure in modern business, but others may be frustrated when they cannot reach a live person to help them with a problem.

General Recommendations

The Information System is more precious than gold or any other precious stone in the world of the living, however it has to be taken care as an egg.

Therefore there is need of having a well-trained personnel to be always on a standby whenever the technological part of the information system is down.

For instance, the entire northern region of Mozambique is in black out for almost five days and everything in almost all companies including government institutions are on a stand still.

Some technologies contain features that need to be upgraded regularly, which can result in an additional expense for the company. For example, companies may need to change computer software frequently just to keep

up with industry trends. Entire computer systems may also need upgrading every year or two. Companies that employ telecommuters may face the additional expense involved with sending a computer technician to a worker's home to install new equipment or programs.

Conclusion: A new perspective

This course presented a broad introduction to the concepts and purposes of Information System and Technologies related to computers.

There has also been discussed issue of models of decision making in MIS. The real world is complex, dynamic, and expensive to deal with. For this reason, there is a need of implementing a model instead of real life system. Since a model is an abstraction of a real life system that is used to simulate reality. Especially in the computing environment we live in, managers and decision makers find the usage of models easy and less expensive to understand what is happening and to make better decisions.

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