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Lecture Notes 2.1: Impact of IT on Business
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IMPACT OF INFORMATION TECHNOLOGY

EFFECTS OF COMPUTERIZED AUTOMATION ON BUSINESS

General advantages

l Voluminous processing done with great speed
l Complex processing done with ease
l Reduction in chances of error
l Reduction in paper work and filing
l Easy to make corrections / alterations
l Bulky data can be stored efficiently
l High accessibility of information to Management, hence effective decision making
l Head office can keep in touch with the branches
l Better customer services (e.g. credit card inquiry line)
l Reduced need for actual / physical presence of the staff at the office premises

General Disadvantages

l Requires higher and much structured coordination
l Costly
l Requires training
l Technical faults may lead to interruptions

PERSONNEL / DEPARTMENTS INVOLVED IN IS/IT OPERATIONS

IS Director / Manager

l Senior most position with full operational control
l Major role includes:

> Developing IS / IT strategy
> Interaction with external environment (govt, suppliers, new tech, enhancements)
> Interaction with internal environment (other depts., customers)
> Monitoring IT infrastructure (hardware and software)

Steering Committee

l A Committee to oversee IS/IT function. IS director normally report to this Committee
l Committee comprises of senior executives from other depts. of the Organization
l Major role includes:

> Ensuring that IS/IT objectives are met
> Providing leadership at senior level (including decision making)
> Ensuring that resource allocation to IS/IT is effective and efficient
> Monitoring projects

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Database Administrator (DBA)

- Person responsible for the entire electronic data of the Organization
- Strategic tasks includes:
    - Defining Organization's present and future data / information needs
    - Choosing suitable file structure
    - Defining hardware needs to support the database
- Operational tasks includes:

    - Ensuring data integrity
    - Ensuring data security (including access rights to users)
    - Preparation and maintenance of data dictionary
    - Taking backups

System Analysts

- Manages the overall development of new programs / software
- Primarily responsible for designing the new programme / software
- Tasks includes:
    - Analysis - study of the current system
    - Design - designing a system which can achieve the proposed goals
    - Specification - Determining the inputs, file structures, processing methods, output, hardware, cost, level of controls, etc.
    - Documentation - should document the design & specifications
    - Testing - will test the system after the programmer has done his job
    - Implementation - will implement the new software into the live environment
    - Review - 'after implementation' reviews, in coordination with the users

Programmers

- Responsible for writing the programme of the software (programming)
- Tasks includes:
    - Reading the Design & Specification documentation prepared by System Analyst
    - Determining the requirement in greater details
    - Having defined and analyzed , writing the Programme in a programming language
    - Arranging for the Programme to be tested
    - Identifying errors / bugs & debugging them
    - Preparing full documentation of the Programme

Others

- Operations Department (trouble shooting, managing Networking, etc.)
    - Responsible for day to day running of the computer systems, e.g printers are ready
    - Trouble shooting to the equipment
    - Managing the Networking environment

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l   Standards Department

> Defining and maintaining IS / IT standards
> Standards relates to quality of hardware, software, operations, discipline, etc.
> First standards are designed, then implemented and then compliance is monitored

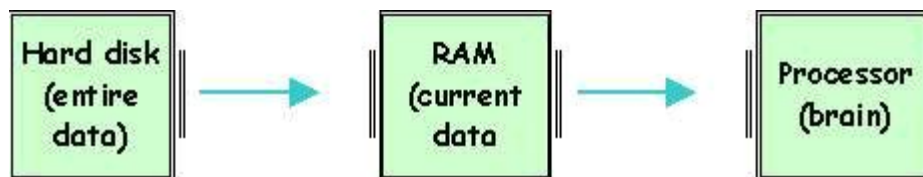l   User Support Department (help desk, etc.)

COMPUTER HARDWARE

What is a computer??

l   A device which will accept input data, process it according to programmed logic,store and give output data
l   Hardware denotes the physical parts of the computer, e.g. hard disk, processor, monitor, etc.

Main Hardware of Computers

l   Major sequence of a computer hardware

l   Processor

> All processing activities are carried out by the processor
> Processor is in a shape of a CHIP, which is plugged on themother board of the computer
> The speed of the computer is substantially dependent on the speed of the processor, e.g. 850 MHz
> Ex. INTEL processors

l   Random Access Memory (RAM)

> It is the memory available to the processor
> It holds data and programmes in current use of the processor
> The speed of the processor is very much dependent on the RAM
> 256 MB RAM

l   Memory or Hard Disk

> Holds the entire programmes and data
> Ex. 40 GB hard disk

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Types of Computers

| Super Computers

>   For very very large data
>   For very very complex calculations
>   For very very high speed processing
>   Ex. nuclear, astronomical & meteorological calculations

| Mainframe Computers

>   Uses a central processor linked with dumb terminals
>   For high speed processing
>   Large data storage capacity
>   Increased security features
>   Normally requires specialist staff to look after the operations
>   Ex. banking operations

| Mini Computers

>   It is somewhere between mainframe and PCs
>   Now getting outdated as PCs are getting powerful

| Micro Computers (PCs)

>   Desktops, laptops, palmtops
>   Relatively cheaper
>   Extra memory and processing power can be added with ease

INPUT DEVICES

Meaning??

| Instruments through which a data can be inputted in a computer (for processing or for storage)

Keyboard

Mouse

Touch Sensitive Monitors

Optical Mark Reader (OMR)

| Reads marks on specific boxes, places. E.g. in multiple choice questions
| E.g. multiple choice questions
| Specimen: | A | B | C | D | E |
| OMR software reads the position of the marks and then interpret it against equivalent pre-feeded data

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l   Pre-requisites for OMR

> Requires a pre-designed data collection sheet
> Boxes should be distinctly and clearly shaded

Scanners & OCRs

l   Scanner takes the image (photo) of the document and uses a software called OCR
l   OCR is a software that converts the image into text (say MS Word file)
l   Pre-requisites for Scanners & OCRs

> Documents must contain clear words
> Poor handwriting could distort the image
> Works best with pre-printed data

Bar Coding

l   Consists of black and white strips, representing a universal product code
l   Mostly found on retail products (at Point of Sale)
l   Used for pre-feeded data
l   Code is read by a bar code scanner, which then displays the pre-feeded product data on the computer
l   Very fast method of capturing the product data on computer
l   Pre-requisites for bar coding

> Product details should be available before packing (e.g. weight, price, etc.)
> Product should have a smooth surface
> Prices should be stable

Magnetic Ink Character Recognition (MICR)

l   Reads characters printed in magnetic (special) ink.
l   It is a very accurate mehtod of input
l   Very expensive method

Magnetic Strip Cards

l   Machine sensible data is stored on thin magnetic strip tape, e.g. credit cards.
l   Normally used for pre-feeded data

Voice Recognition

l   Converts speech into computer sensible form
l   Avoids typing and can be used over telephone for remote locations
l   Pre-requisites for bar coding

> Clear accent and tone has to be used
> The place should not be noisy

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Stylus

l   Used for technical drawings / graphic designs
l   An electronic pen is used to trace the outline of the drawing, and the image is reproduced on the computer

Selection Criteria for Input Devices

l   Economy
l   Accuracy
l   Time required
l   Flexibility
l   Volume of data to be inputted
l   Existing equipment

OUTPUT DEVICES

Meaning??

l   Instruments through which results are communicated to the users

Visual Display Units (VDU) - Monitor

l   Using Graphical User Interface (GUI), which makes the screen presentation simple and user friendly
l   Advantages:

> Online (immediate) output
> Interactive

l   Disadvantage:

> Bad for eyes - ultra violet rays
> Can only show small amount of data at a time

Printers

l   Dot matrix printers, line printers, ink jet printers , laser printers, etc.
l   Advantages:

> Small printers are very cheap
> Handle large amount of data

l   Disadvantages

> Can be noisy
> Can be slow
> Good quality printers are expensive

Microfilm

l   output is directly recorded on a microfilm as a miniature image of the document

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- Image is then read through a special film reading equipment
- Advantageous in cases of huge data is to be saved as a miniature image on a daily basis
- Films (and hence large data) is portable
- Normally used in banks

STORAGE DEVICES

Meaning??

- A device where data can be stored (normally permanently) for future use / reference

Types of Storage Devices

- Hard disk - large capacity (say 20 GB)
- Floppy disk - easy portability but small capacity (say 1.4 MB)
- CD ROM - fast and large capacity
- DVD (digital versatile disk) - fast, accurate and large capacity, normally used for multimedia e.g. movies, etc.
- ZIP cartridge - large capacity (say 100 MB), normally used for backup and uses a special ZIP drive

COMPUTER SOFTWARE

Types of Software

- Operating software
- Application software (bespoke & off-the-shelf)
- Development software (programming tools)
- Utility software

Operating Software

- Provides interface (i.e. coordinates) between

> Hardware
> Other softwares
> User

- Performs the following tasks

> Initial setup of the computer, when switched on
> Checking that all hardware are working properly
> Opening, closing, labeling and managing all files
> Controlling all input and output devices
> Controlling the security of the computer (e.g. passwords)
> Handling interruptions / malfunctions of the computer

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Managing multi tasking (I.e. doing more than one task, e.g. printing word document while working in Excel)

| Examples of Operating software (in sequence of current popularity)

Windows NT
Windows 95, 98, 2000
UNIX

Application Software

| Applications software is designed to meet user's requirements
| Examples include:

Accounting software
Payroll software
Production software
Sales / marketing software
Spreadsheets / word processors

| Difference between OS and AS

OS controls the working of the computer
AS carries out task for the users

General Purpose Software

Spreadsheets (e.g. Excel / Lotus)

| Suitable for calculations and numerical analysis
| Assists in planning and control, I.e. budgeting / actuals analysis, variance, growth, etc.
| Advantage:

It can perform 'what if' function with ease, I.e. you just have to change one cell and everything else will automatically get updated (if the worksheet is linked properly)

| Disadvantage

Chances of badly designed / linked worksheet
No documentation of workings
Complexity of 'Macros' (mini programming within the spreadsheet)
Lack of audit trail

Word Processors (e.g. MS Word)

| Used for text, report writing and correspondence
| Advantage:

Works on the basis of WYSIWYG (what you see is what you get), I.e. bold, italic and other formatting, etc.

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Development Software

l   Software used to write other softwares
l   E.g. Visual Basic, C++, Java

Utility Software

l   Tools to improve the performance of Operating Software
l   E.g. anti viruses, backup procedures, effective file management, etc.

TYPES OF DATA PROCESSING

Batch Processing

l   All data inputted is being saved in a temporary file, and will be processed after the processing' command is given
l   Processing is done normally at the end of the day or in groups, e.g. department wise payroll
l   Processing delays should be acceptable (I.e. response time is not immediate)
l   Allows control and flexibility over the input data, as amendment can be easily made in the temporary files

Real Time / Online Processing

l   Data is processed as soon as it is inputted
l   Terminal communicates interactively with the central processor
l   Very fast response time
l   Inflexibility regarding a wrong input
l   E.g. airline ticketing, ATMs, etc.

TYPES OF INFORMATION SYSTEM

Transaction Processing System (TPS)

l   Records each individual transaction on a daily basis

Management Information Systems (MIS)

l   Converts data into information and communicates to the Management, in the required format

Decision Support System

l   Provides support for making semi-structured or unstructured decisions
l   DSS distinguishes between the structured portion and the un-structured portion in the data, so that effective analysis / decision making can be done

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l   DSS normally consists of:

> Large database of facts
> Problem 'exploring' facility, I.e. users can explore different scenarios using 'what-if' and sensitivity analysis approaches
> Graphical tools to present statistical data

Structured Decisions

l   Based on pre-defined rules or formula
l   Clearly defined method of solving a problem

Un-Structured Decisions

l   Not based on pre-defined rules or formula
l   Involves subjectivity
l   Based on experience, sixth sense or 'educated guess'

Semi-Structured Decisions

l   Combination of structured and un-structured decisions
l   Some portion is objective (I.e. based on pre-defined rules / formula) and some portion is subjective (I.e. based on experience or sixth sense)

Expert Systems

l   Consists of pre-feeded knowledge, facts and reasoning of a human expert
l   Views, experience and decision making patterns of experts are feeded
l   ES focuses more on reasoning, as compared to DSS which focuses more on computation and presentations of facts
l   Normally used in circumstances where there is incomplete information and experts are not available to take an immediate decision
l   ES normally consists of:

> Knowledge database, where the experience, rules, facts are stored
> Reasoning engine, which correlates the problem with the knowledge database and recommends an appropriate decision
> Explanation function, which explains as to how and why the recommended decision was taken by the ES

INTERNET, ETC.

INTERNET

Concepts / Definitions

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l   Internet: a technology through which any computer can communicate / interact with any other computer in the world

l   WWW (world wide web): a multi media facility, providing color screen, sounds, graphics, etc.

l   Website: points within the internet network, created by individuals / companies to provide information, entertainment, etc.

Current Use of Internet

l   Exchange of information

l   Transaction processing (e.g. EFT, ATMs)

l   Relation enhancement

l   Entertainment

What Can a Website Do ??

l   Answers frequently asked questions (FAQs)

l   Keyword search

l   Tells you the status of a particular process (say flight details, DHL parcels)

l   E-mails

l   Bulletin boards / e-groups

Problems With Internet

l   Growing rapidly, without any formal organization / control / law

l   Consumes too much time as it is tempting and hard to resist

l   Exposes the system to various security hazards, e.g. hacking, virus, etc.

INTRANET / EXTRANET

l   Sort of a mini internet of an Organization

l   Intranet is only for insiders, I.e. employees of an organization

l   Extranet can also be used by authorized outsiders, through passwords (e.g. by business partners and suppliers, etc.)

QUALITIES OF GOOD INFORMATION

A   Accurate

C   complete

C   cost beneficial

U   user targeted

R   relevant

A   authentic

T   timely

E   easy to use