

# Chapter 6: Management of Information System

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Date: September 13, 2010



# Management Information System (MIS)

- MIS is a system to convert from internal and external sources into 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.



# Knowledge requirements for MIS

- The nature of Data, Information and Communication
- General System Concepts
  - General Systems Theory
    - reductionist approach and holistic approach
- Organization Processes and Structures
- Management Functions and Levels
  - can be grouped into five areas: planning, decision making, organizing and co-ordinating, leadership and motivation, and control
- The Nature of Planning and Decision Making and the techniques available
- Control Principles : Feedback and Feed forward
- The Influence of Information Technology (IT)



# Advantages/Benefits of MIS

- Provides flexible and speedy access to accurate data
- collects and processes data into meaningful form
- management oriented reporting
- can present detailed/ summarized and exceptional information
- highlights processed data, rather than raw data- speed
- reduces uncertainty for decision making
- uses tactical information for short term decision making



# MIS planning, design and implementation (1)

- MIS is a set of organized procedures which when executed provides information to support decision making
- MISs are defined as systems which provide tools to enable the administrative tasks of the organization to be carried out, provide information to managers to enable them to plan and control their operational area, and provide data to inform strategic planning.
- Areas to be covered include:
  - management information systems development strategy
  - management information systems security policy
  - technical infrastructure strategy;
  - support and services strategy;
  - central administration web publishing strategy



# MIS planning, design and implementation (2)

- Strategic and Project Planning for MIS
- Conceptual System Design
- Detail System Design
- Implementation, Evaluation and Maintenance of MIS



# Implementation, Evaluation and Maintenance of MIS (1)

- Implementation strategy
  - Stages and Methodology
  - Planned Activities
- The first stage of implementation of the MIS involves:
  - Comprehensive survey & analysis of existing information resources
  - Classification of available data banks from the point of view of their future use in meeting the defined objectives.
  - Modification of existing information databases in order to guarantee a unified data storage, data manipulation, updating and use
  - Development and installation of an MIS prototype at the central building
  - Trial testing of the prototype system in a real-time environment.



# Implementation, Evaluation and Maintenance of MIS (2)

- The **second stage** results in expansion of the range of data, alongside with opening to a wider range of users, including major departments in the structure of organization, other interested agents, Local citizens etc.
- In the **final stage**, project sustainability is ensured through commercialization of information services provided on request to third parties and citizens.





# Implementation, Evaluation and Maintenance of MIS (3)

- Planning

- Activities:

- Questionnaire—The purpose of the questionnaire is to
      - assess and analyze the communications needs and existing information resources at different levels of operation, and
      - To ascertain what different information services are needed that could be accommodated on the MIS.
    - Expert working group –A group of 8-10 IT experts
    - Organizational Research
    - Technical Investigation
    - Study visits as per requirement with advanced IT policies and projects
    - Development of an MIS Prototype
    - Trial testing and expert assessment of the MIS prototype



# Implementation, Evaluation and Maintenance of MIS (4)

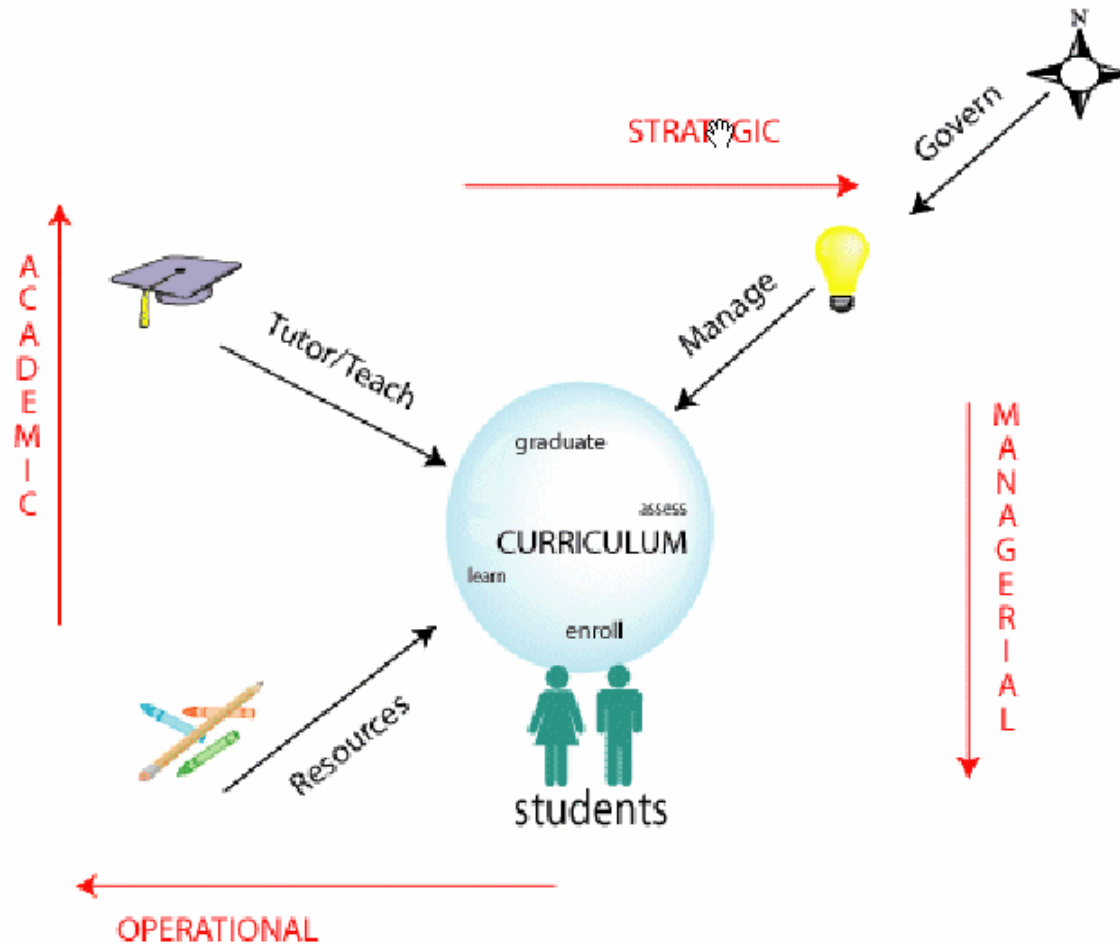


Fig: Components of a university MIS

# IS for Planning, Inventory control, and HRD: Marketing IS (1)

- A well developed IS for marketing can give a competitive dvantage thereby offering better service to customers and better information of market penetration effort.
- Overview of Marketing IS:
  - Sales Information system
    - Sales support
    - Sales analysis
    - Customer analysis
  - Market research and Intelligent IS
    - Customer research
    - Market research
    - Competitor intelligence
  - Promotion and advertising IS
  - New product development IS
  - Sales forecasting IS
  - Product planning IS
  - Product pricing IS
  - Expenditure control IS



# IS for Planning, Inventory control, and HRD: Marketing IS (2)

- Objectives
  - Identify and evaluate potentially profitable sales opportunities
  - React rapidly to changes in market conditions
  - Establish profit maximizing product prices
  - Control marketing cost
  - Deploy sales personnel almost effectively
  - Assist in allocating expenditures of advertising and other forms of promotion



# IS for Planning, Inventory control, and HRD: Marketing IS (3)

- Sources of information
  - Sales invoices and other transaction information
  - Sales persons, customer call reports
  - Sales persons debriefing by marketing managers
  - Sales history file
  - Customer account files
  - Cost accounting system
  - Profit planning/budgeting system
  - Market research and intelligence gathering activities
  - Sales forecast
  - Production schedules
  - Inventory status report



# IS for Planning, Inventory control, and HRD:

## Inventory management and control (1)

- Material management

- Objectives

- To minimize investment in inventory
    - To provide material of specified quality at lowest price
    - To perform functions of material handling so that keeping cost are minimized
    - To cut cost through standardization, value analysis, waste control
    - To improve procedures and to delegate authority and responsibility at various levels of materials management.

- Activity

- Material planning and specification
    - Requirement determination
    - Inventory management
    - Purchasing
    - Production scheduling
    - Stocking
    - Allocation
    - Distribution



# IS for Planning, Inventory control, and HRD: Inventory management and control (1)

- Inventory management

- Objectives

- To minimize the level of inventory/stock in the godown
    - Maximize the cash flow in the bank
    - Maintain linkage with market by means of shipment and oncoming orders

- Advantages

- No missed delivery dates because of last minute inventory shortages
    - No scheduling conflicts on the plant floor because of under or over estimated demand

- Event driven economy ??



# IS for Planning, Inventory control, and HRD: IS for Human Resource Development (1)

- Objectives of implementing IS on HRD
  - Provide right type of man power at the right time at right place to meet the business requirement of organization effectively and efficiently.
  - Identify the training needs of individuals performing assigned task
  - Assure the individual growth and his/her ability
- Major inputs to the system are:
  - Employees' data bank
  - Promotion and recruitment norms
  - Diversification plans
  - Technology upgradation inputs





# IS for Planning, Inventory control, and HRD: IS for Human Resource Development (2)

- Major Modules

- Carrier planning system

- It identifies all the surplus manpower based on forecast for which growth in the same functional areas is not possible.
    - Succession planning system
    - It identifies the key post getting vacant due to diversification, retirement or other business plan.

- Training identification system

- This identifies the employee wise training needs either identified through confidential report stored in employee bio-data bank or due to technology requirement.



# IS for Planning, Inventory control, and HRD: IS for Human Resource Development (3)

- Major Modules (contd..)
  - Deficits and surplus identifications
    - This module generates the level wise skill wise deficits and surplus manpower report
  - Redeployment planning
    - This module give the redeployment of surplus manpower to deficit areas based on additional information provided about job skills in deficit areas.



# Decision support and expert system (1)

- Little (1970) defines DSS as a “ Model-based set of procedures for processing data and judgments to assist a manager in his decision making.”
- DSS as a system
  - Man-Machine System
    - Man part is more open and probabilistic while the machine part is more closed and deterministic.
    - E.g. DSS for deciding PRICE and ADVERTISING levels
  - Closed-loop system with feedback external to system
    - DSS uses feedback to adjust output. Feedback is not internal like an elevator. The user provides judgmental inputs to DSS



# Decision support and expert system (2)

- DSS components

- Database, model base, knowledge base, interface which interact with each other and the user

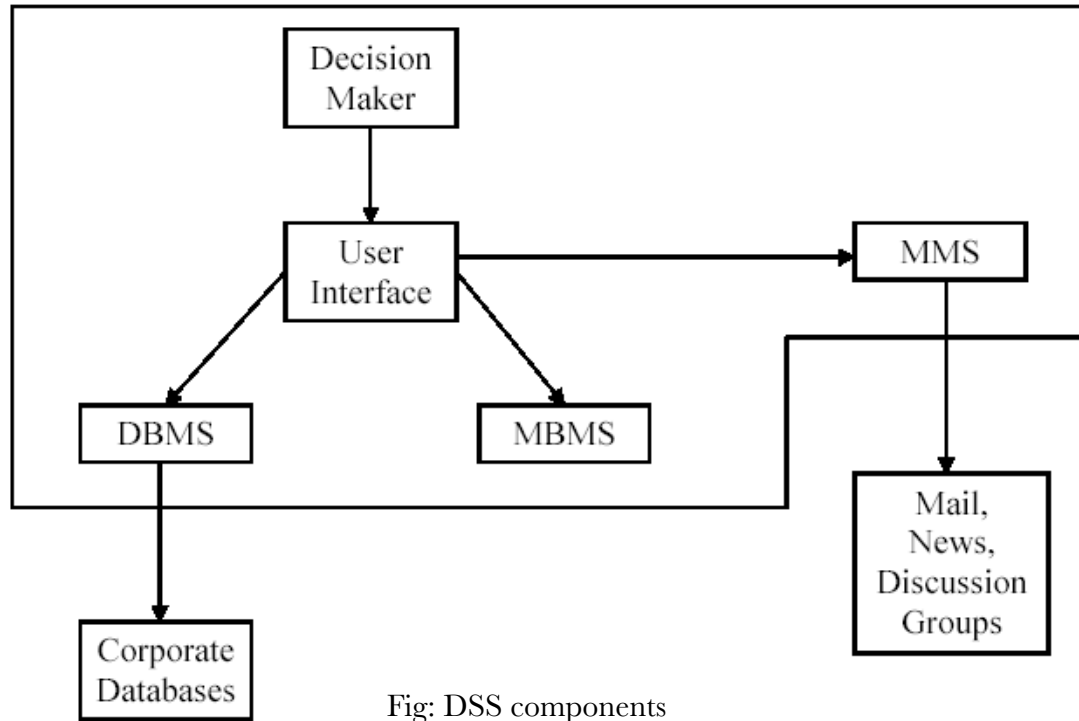


Fig: DSS components

# Decision support and expert system (3)

- DSS components
  - Database, model base, knowledge base, interface which interact with each other and the user
- Benefits of DSS
  - Improving Personal Efficiency
  - Expediting Problem Solving
  - Facilitating Interpersonal Communications
  - Promoting Learning or Training
  - Increasing Organizational Control



# Decision support and expert system (4)

- Characteristics of DSS
  - Provide support in semi-structured and unstructured situations, includes human judgment and computerized information
  - Support for various managerial levels
  - Support to individuals and groups
  - Support to interdependent and/or sequential decisions
  - Support all phases of the decision-making process
  - Support a variety of decision-making processes and styles
  - Are adaptive
  - Have user friendly interfaces
  - Goal: improve effectiveness of decision making
  - The decision maker controls the decision-making process
  - End-users can build simple systems
  - Utilizes models for analysis
  - Provides access to a variety of data sources, formats, and types
  - Decision makers can make better, more consistent decisions in a timely manner



# Decision support and expert system (5)

- Expert system

- A system that uses human knowledge captured in a computer to solve problems that ordinarily require human expertise

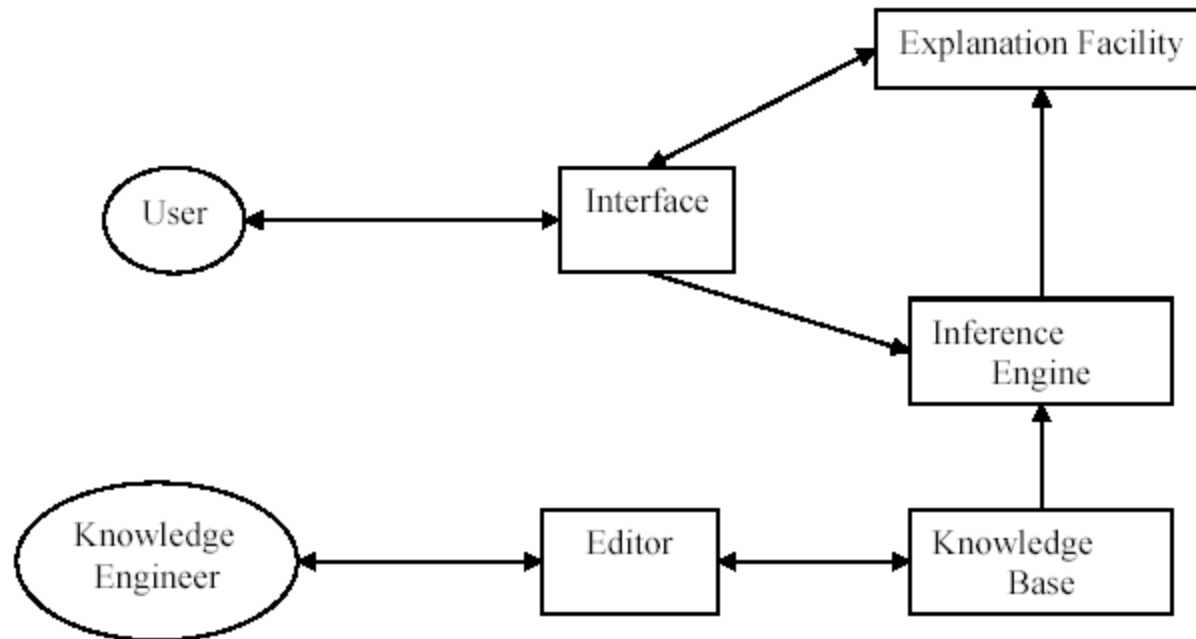


Fig: Architecture of a typical expert system

# Decision support and expert system (6)

- Components of ES
  - Knowledge acquisition subsystem
    - The accumulation, transfer, and transformation of problem solving expertise from experts or documented knowledge sources to a computer program for constructing or expanding the Knowledge base.
    - Sub-parts
      - Knowledge base
      - Inference engine (brain/ control structure)
      - User Interface
  - Blackboard(workplace)
    - Working memory area that records plan(how to attack a problem), agenda(potential actions awaiting execution) and solution (hypothesis and alternative actions)





# Decision support and expert system (7)

- Components of ES
  - Explanation system(justifier)
    - Trace responsibilities for conclusions and explain ES behavior
  - Knowledge refining system
    - Evaluation and feedbacks
  - Users
    - A non expert human who needs advice or training



# Decision support and expert system (8)

- Benefits of ES
  - Increased output and productivity
  - Decreased decision making time
  - Increased process and product quality
  - Reduced downtime (machine failure detect and repair time)
  - Capture of scarce expertise
  - Flexibility
  - Easier equipment operation
  - Elimination of the need for expensive equipment
  - Operations in hazardous environments (no human required.)
  - Ability to work with incomplete or uncertain information
  - Knowledge transfer to remote locations
  - Enhancement of other information systems



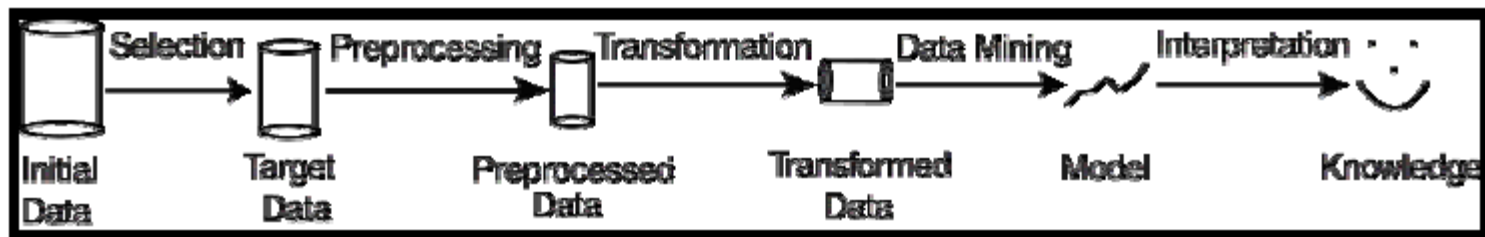
# Basic concepts of data warehousing and data mining (1)

- Data mining
  - Data Mining, or Knowledge Discovery in Databases (KDD) as it is also known, is the nontrivial extraction of implicit, previously unknown, and potentially useful information from data. This encompasses a number of different technical approaches, such as clustering, data summarization, learning classification rules, finding dependency net works, analyzing changes, and detecting anomalies
  - Data mining is the search for relationships and global patterns that exist in large databases but are 'hidden' among the vast amount of data, such as a relationship between patient data and their medical diagnosis. These relationships represent valuable knowledge about the database and the objects in the database and, if the database is a faithful mirror, of the real world registered by the database
  - Data mining refers to "using a variety of techniques to identify nuggets of information or decision-making knowledge in bodies of data, and extracting these in such a way that they can be put to use in the areas such as decision support, prediction, forecasting and estimation. The data is often voluminous, but as it stands of low value as no direct use can be made of it; it is the hidden information in the data that is useful"



# Basic concepts of data warehousing and data mining (2)

- Stages of data mining
  - Selection
  - Preprocessing
  - Transformation
  - Data mining
  - Interpretation



# Basic concepts of data warehousing and data mining (3)

- Data mining models

- Verification model

- The verification model takes an hypothesis from the user and tests the validity of it against the data. The emphasis is with the user who is responsible for formulating the hypothesis and issuing the query on the data to affirm or negate the hypothesis

- Discovery model

- The discovery model differs in its emphasis in that it is the system automatically discovering important information hidden in the data. The data is sifted in search of frequently occurring patterns, trends and generalizations about the data without intervention or guidance from the user. The discovery or data mining tools aim to reveal a large number of facts about the data in as short a time as possible.



# Basic concepts of data warehousing and data mining (4)

- Data mining problems/issues
  - Limited Information
  - Noise and missing values
    - Error in either the values of attributes or class information is known as noise
    - Missing data can be treated by discovery systems in a number of ways such as;
      - simply disregard missing values
      - omit the corresponding records
      - infer missing values from known values
      - treat missing data as a special value to be included additionally in the attribute domain
      - or average over the missing values using Bayesian techniques.
  - Uncertainty
    - Uncertainty refers to the severity of the error and the degree of noise in the data. Data precision is an important consideration in a discovery system
  - Size, updates, and irrelevant fields



# Basic concepts of data warehousing and data mining (5)

## ● Data warehousing

- A data warehouse is a relational database management system (RDMS) designed specifically to meet the needs of transaction processing systems
- It is the logical link between what the managers see in their decision support EIS applications and the company's operational activities
- Characteristics of data warehouse
  - **subject-oriented**
  - **Integrated**
  - **time-variant**
  - **non-volatile**



# Basic concepts of data warehousing and data mining (6)

- Data warehousing
  - Criteria for a data warehouse
    - Load Performance
    - Load Processing
    - Data Quality Management
    - Query Performance
    - Terabyte Scalability
    - Mass User Scalability
    - Networked Data Warehouse
    - Warehouse Administration
    - Integrated Dimensional Analysis
    - Advanced Query Functionality





# Executive support system (1)

- A comprehensive information system at the organizations' strategic level designed to address unstructured decision making through advanced communication, office automation, analysis support, and business intelligence.
- Characteristics of ESS/EIS
  - Quality of Information
    - Is flexible
    - Produces correct information
    - Produces timely information
    - Produces timely information
  - User interface
    - Includes a sophisticated graphical user interface(GUI)
    - Minimizes keyboard use by including infrared controllers, a mouse, touch pads, and a touch screen
    - Includes a user- friendly interface
    - Provides quick retrieval of desired information
    - Has a short response time(timely information)
    - OS accessible from many places
    - Contains a self-help menu
    - Includes a reliable access procedure



# Executive support system (2)

- Characteristics of ESS/EIS (contd...)
  - Technical capability provided
    - access to aggregate(global)information
    - trends, ratios, and deviations are shown
    - access to electronic mail
    - access to historical and most current data is provided
    - extensive use of external data
    - organization around critical success factors
    - written interpretations
    - provides forecasting
    - hypertext and hypermedia
    - information produced at various levels of detail(drill down)
    - Ad hoc analysis
    - filtering, compressing, and tracking of critical data
    - multidimensional presentation and analysis



# Executive support system (3)

- **Benefits of ESS/EIS**

- facilitates the attainment of organization objectives
- increases communication quality
- facilitates access to information
- provides better control in the organization
- allows the user to be more productive
- allows the anticipation of problems and opportunities
- increase the quality of decision making
- allows planning
- allows a search for the cause of a problem
- saves time for the user
- meets the needs of executives



# Workgroup support system (1)

- A system that is designed specifically to improve the performance of team by supporting the sharing and flow of information (i.e. communicating information)
- Characteristics and Benefits
  - It provides learning: Groups are better than individual at understanding problems.
  - People are held accountable for decisions in which they participate.
  - Groups are better than individuals at catching errors.
  - A group has more information than any one member. Groups can combine this knowledge to create new knowledge.
  - It may produce synergy during problem solving.
  - Working in a group may stimulate the creativity of the participants and the process.
  - A group may have better and more precise communication working together.
  - Group members have their egos embedded in the decision , and so they will be committed to the solution
  - Risk propensity is balanced. Groups moderate high risk takes and encourage conservatives.



# Workgroup support system (2)

- The foundation of any WSS is groupware: the popular term for software component that supports the collaborative effect of a team. Groupware supports three functions: *Team dynamics, Document management, Application development*
- Team Dynamics
  - Groupware supports for team dynamics using one or many of the following components
    - Electronic messaging
    - Electronic meeting support
    - Group scheduling
    - Video conferencing
    - Whiteboard



# Workgroup support system (3)

- Document management
  - Group document database- a powerful storage for organizing and managing all documents related to specific teams.
  - contains documents from many teams.
  - supports many level of security.
  - can store information in a variety of forms.
- Application Development
  - a wealth of basic building blocks that you use to create application quickly so that teams can literally get to work.
  - prewritten – commonly performed function
  - programming tools – for creating unique application
  - Workflow automation software – designed to automate the flow of business document in a specific work process and procedure.



# Seven sins of deadly meeting and seven steps to salvation

Sins	Salvation
People don't take meeting seriously	Adopt a mind set that meetings are real work.
Meetings are too long. They should accomplish twice as much as in half the time	Time is money. Track the cost of meetings and use computer enable simultaneity to make them more productivity.
People wander off the topic. Participants spend more time digressing than discussing.	Get serious about agendas. Make sure you have agendas.
Nothing happens once the meeting ends. People don't convert decisions to actions.	Convert form meeting to doing and focus on common documents. Group memory is required. Shared documents must be created.
People don't tell the truth. There's plenty of conversation but not much candor.	Embrace anonymity. People may not feel secure enough to say what they really think.
Meetings are always missing important information, and so they postpone critical decisions.	Get data, not just furniture, into meeting rooms.
Meetings never get better. People make the same mistakes over and over again.	Practice makes man perfect. Don't be fool as in "Everyone makes mistakes but only fools repeat them."