

The Open University of Tanzania
Faculty of Business Management
Master of Business Administration (MBA)
OMI 611: Management Information Systems

Introduction

Organizations are undergoing several changes. These changes are induced by many factors, but one of them is the availability of information systems. The availability of these systems can not automatically be translated as an organizational success. There are several other factors that need to be looked at, a process. Therefore, organization needs to properly manage these systems to their success. The figures produced by studies regarding the implementation of information systems are scaring. Studies indicate that 70% of all implemented systems are evaluated as a failure.

The objective of this course is to make you knowledgeable person in managing information systems, its development and usage. Managers of twenty-first century need to have a substantial knowledge on the managing information systems. Specifically, you are expected to:

1. Demonstrate the understanding of the management foundations of information systems. These include managing information systems development, security issues, international information systems, and others.
2. Develop your own systems using database systems.
3. Participate in systems development as an informed person. These include tools to be used like data flow charts, use of forms, selecting an appropriate programming language for different activities, techniques like end user computing, prototyping and so on.
4. Come out with a researchable topic in different areas of information systems.

Course Prerequisite

All courses covered in first semester will be assumed. The course will make extensive use of OBS603. The course will also make use of several courses that are being covered in this program like accounting and research methodology.

The ability to scholarly articles thoughtfully and intelligently is absolute essential for this course.

Course Contents

Topic 1: Introduction to the Course

Objectives

At the end of this topic the candidate should be able to

- identify management challenges to building, using information systems
- understand system requirements of global business environment
- create information architecture that supports organization's goals

1.1 Definition of terms

- Management
- Information
- Organization
- Organizational strategies
- The concept of culture

1.2 Transformation of organization by information technology

- Flattening
- Decentralization
- Flexibility
- Location independence
- Low transaction costs
- Empowerment
- Collaborative work

1.3 Scope of Information Systems

Information systems can be looked at

- Technical
- Behavioral

1.3 Challenges in developing and maintaining information systems in Tanzania

- Technology
- Manpower
- Lack of resources
- etc

1.4 Organization Theory and IT

- Changes can be emergent or planned
- Changes can be radical or incremental
- Technical as well as non-technical factors may affect the successfulness of the system. Some of these are organisational/national culture, political economy of a country, etc.
- The success of any IS is a multidimensional

Reference

Laudon and Laudon (2004), Chapter 1
Turban et al (1996), Chapter 1
McLeod and Schell (2004), Chapter 1

Topic 2: Systems Concepts

Objectives

- Define the systems concepts
- explain the implications of open systems in studying organizations
- Explain the environment of a system and its implications in developing systems
- Explain different types of information systems

7.1 System

- *Element*: Element is anything that goes to or comes out of the system.
- *Conversion Process*: The process of changing inputs to outputs
- *Environment*: All systems have boundaries
- *Objective of Existence*: All systems have reasons for existence.
- *System's properties*: Every system has its own properties that distinguish it from other systems.

2.2 Environment of a System

- *Structured environment*: Structured environment provides input (the variables of interest) to a system that are constant or at the rate that can be predicted.
- *Semi-structured environment*: This type of environment gives some minor changes that are not predictable.
- *Ill structured environment*: This type of environment is chaotic

2.3 Characteristics of a system

- Open or closed
- deterministic or probabilistic
- mechanic or organic
- the concern for this course is open, probabilistic systems

2.4 Characteristics of a system

- have inputs, throughputs and outputs
- environment awareness
- Boundary
- Interdependence
- Feedback
- Dynamic equilibrium
- Differentiation
- Equifinality
- Negative Entropy

2.5 Implications of Open System to designing Information systems

- A manager plays a role of regulator of coordinator between the environment and a system
- avoid the reductionism
- there are more than one way of achieving the objectives
- Appreciating that changing any part of the system will affect other parts as well
- managers see the consequences of their plans, programs and actions (feedback)
- Equifinality encourages creativity

- that organization is a dynamic learning capable of changing and growth

2.6 Limitations of Open systems

- Abstractness (tells the problem without suggesting solutions)

2.7 Characteristics of Good Information

- Accuracy
- Precision
- Currency
- output timeliness
- reliability
- completeness
- conciseness
- format
- relevance
- understandability
- report usefulness
- sufficiency
- freedom from bias
- comparability
- quantitateness

2.8 Types of Information Systems

- Transaction Processing Systems
- Management Information Systems
- Office Automation Systems
- Decision Support Systems
- Expert Systems
- Executive Support Systems
- Group Support Systems or Group Decision Support Systems
- Neural Networks

Reference

Laudon and Laudon (2004), Chapter 2

Turban et al (1996), Chapter 3

McLeod and Schell (2004), Chapter 2

Topic 3: Tools for Systems Developments

Objectives

To list and explain different tools that can be used in systems

3.1 Example of Tools

- *Data Collection Tools*: Questionnaire, Observation, Forms, Visualisation and Synthesis and others.
- *Financial/Budgeting Tools*: NPV, IRR, Break Even Analysis and others
- *Optimising Tools*: LP, Assignment, Queuing, Simulation, and others.
- *Programming Tools*: Structured Programming, HIPO Charts, Pseudocode, Flowcharts and others.
- *Decision Making Tools*: Decision Tables, Decision Trees, Optimising Tools, Financial Tolls, and others.
- *Documenting the Process Tools*: Data flow diagrams, program flow charts, and others.
- Etc.

3.2 Data Collection Tools

- These are tools used in collection data when the information system is designed/developed or being evaluated.
- Most of these materials will be covered in Business Research Methods.
- This is when one directly or indirectly observes what is happening in the organisation.
- The one who is being observed must be aware that is being observed.
- Good if observing few people and those who are being observed co-operate, but very expensive if many people are observed and/or the one being observed does not co-operate.

3.2.1 Data Collection Tools- Interview

- This is when specific questions are posed to respondent, directly or indirectly.
- Questions can be open-ended or closed ended.
- With the technological development it is possible to have Interview conducted through telephone, chatting, videophone, and others.
- The right person must be chosen, right place, appropriate questioning approach that allows flow of ideas.
- Objective of the interview must be known and interviewer must be objective.
- Brain storming session and Delphi techniques are also forms of Interview.
- *Brainstorming* is a special method of interviewing where a group opens for flow of ideas. *Delphi technique*, the participants are asked for their estimates or their expectations or anticipations regarding the significant variable(s).

3.2.2 Data Collection Tools- Questionnaire

- Questions written and sent to respondents.
- Normally has a low response.
- Good for surveys but poor for documenting process in Information Systems
- Questionnaire should not be too long unless there is incentive for filling it.

3.2.3 Data Collection Tools- Document Analysis

- This is when old records are reviewed like balance sheets, industry performance, and others.
- Be careful with it data may be old or not reliable. You must know why someone prepared that document before.

3.2.4 Data Collection Tools- Others

- Visualisation and Synthesis
- Experimentation
- Written notes and sketches
- Tape recording
- Photographic recording
- Document collection
- Activity sampling
- Synthesis tables
- Charting.

3.3 Financial Analysis Tools

- These include NPV, IRR, Break Even Analysis and others

3.4 Optimizing/Decision Making Tools

- These include LP, Assignment, Transportation, Queuing, Network Analysis, Travelling Salesman Problem, Decision Trees, and others

3.5 Programming Tools

- These tools assist in developing software quickly.
- These include structured programming, HIPO charts, flowcharts, pseudocode, decision tables and others.

3.6 Programming Tools - Structured Programming

- Top down programming is an approach that emphasizes the disciplined use of professionally acceptable programming standards and logic.
- This makes the programming easy to write, easy to understand, easy to check and debug, and easy to maintain.

3.7 Programming Tools - HIPO Charts

- Hierarchy plus input processing output charts is the tool that allows programmers to divide a program into independent modules so as modules are easier to develop and understand.
- Allows the programmers to systematically breakdown the problem into small manageable problems.

3.8 Programming Tools - Pseudocode

- Set of sentences and phrases, appear in the same order in which the actual program will appear, using ordinary language.
- *Question:* Write a pseudocode to find the average of n numbers.

3.9 Programming Tools - Flowchart

- A flow chart is a symbolic diagram that represents the activities and flow of logic in program.
- Special symbols have been developed for that purpose.
- There are four types of charts: blockcharts, systems flow charts, procedure flowcharts and program flow charts.

3.10 Programming Tools - Flowchart

- Block charts shows the sequence of main procedures in a system (the simplest flowchart).
- System flowcharts in details explain the procedure involved in a system. It involves both activities done by computer or by a human being.
- Procedure flowcharts are used to explain existing manual system that is to be computerized.
- Program flowchart shows how the procedures will be carried out by the computer system.

3.11 Programming Tools- Decision Tables and Trees

- This is the process of expressing the process logic, therefore in most cases are used with flowcharts.

3.12 Programming Tools- Decision Tables

- The table indicates the conditions and actions that need to be taken in the program execution.
- It normally contains four sections: condition stub, condition entry, action stub and action entry.

3.13 Tools for Documenting Information Systems

- Data flow diagrams (DFD) provide an effective form in which to represent the movements of data through a system and the associated transformations.
- They are fewer details in comparison to flowcharts.
- DFD use specific symbols like flowcharts.

Reference

Introductory book on Research Methodology
Laudon and Laudon (2004), Chapter 13

Topic 4: Systems Planning

Objectives

- To discuss different concepts associated with Information Systems Planning
- To be able to prepare an IS Masterplan.

4.1 Planning Elements

- To provide the appropriate support to all departments/sections.
- For resource allocation purpose.
- The most important document is Information Systems MasterPlan. It may have several other names too.

4.2 Contents of IS MasterPlan

- Information Systems Goals, Objectives and Architecture
- Inventory of Current Capabilities
- Forecast of Developments that will affect the Plan.
- The Specific Plan.

4.3 IS Goals, Objectives and Architecture

- Organisational Goals, objectives and Strategies.
- External Environment
- Internal Environment
- Assumptions about business risks and potential consequences
- Overall goals, objectives and strategy for Information System
- Architecture of the IS (defines categories and IS subsystems and applications).

4.4 Current Capabilities

- Inventory of Hardware, software and personnel.
- Analysis of expenses, hardware, software and personnel utilisation.
- Status of projects in progress
- Assessment of strength and weaknesses.

4.5 Forecast of Developments Affecting the Plan

- Clearly state how new developments in hardware, software, data communication, and others affecting the plan.
- This is possible if one is following what is happening in the computer industry.

4.5 Specific Plan

- Hardware acquisition schedule
- Software acquisition schedule
- Application development schedule
- Software maintenance and conversion schedule
- Personnel resources required and schedule of hiring and training

- Financial Resources Required

4.6 Planning Techniques

- Top down approach
- Bottom up approach
- Critical success factors (CSF)
- Reengineering

4.7 Critical Success Factors for Information Systems Planning

- .Top management support
- Clear cut cooperate plan to guide information systems plans.
- .Good user -information systems department relationship
- Qualified personnel to do the job.
- .Proper anticipating likely changes that will affect IS plan

4.8 Hints for IS Planning

- Proper fit between organization goals with information systems goals
- A plan is not an end, but a process
- Application development schedule
- Software maintenance and conversion schedule
- Personnel resources required and schedule of hiring and training
- Financial Resources Required

Reference

Turban et al (1996), Chapter 10 and Chapter 11

Topic 5: Systems Development Stages

Objectives

- To discuss different stages involved in systems development.

5.1 Why Systems Development

- To cope with changes in business environment.
- To cope with changes in technology.
- To cope with changes in business objectives/processes.
- Systems follows life cycle concept at one point in time, they collapse.

5.2 Stages of IS Development

- Feasibility Study
- Information Requirements Determination
- Systems Design
- Systems Implementation
- Systems Evaluation
- Systems Maintenance
- These processes are iterative in nature.

5.3 Feasibility Study

- This is the process of checking whether the solution is achievable, given the resources available and constraints limit the process.
- Normally feasibility study incorporates three feasibility tests: technical feasibility, economic feasibility and operational feasibility.
- For a system to be implemented must pass all the feasibility tests.

Feasibility Tests

- Checks whether the proposed solution is achievable given the available hardware, software and technical resources.
- Economic Feasibility determines whether the benefits of the proposed solution outweigh the costs.
- Operational feasibility determines whether the desired solution is within the existing managerial and organisational framework.
- In addition the system indicates whether the problem to be solved is really a problem or a symptom of another problem.
- It checks also to what extent the management is willing to change, willing to commit (resources) etc.
- After feasibility studies a report indicating future directions (do nothing, modify or develop a new system).

5.4 Information Systems Requirements

- Information requirement is a detailed statement of the information needs that a new system must satisfy, who needs that information from where and how the information is needed.

- The information required may be derived from existing information systems, synthesised from characteristics of utilising system or discovering from evolving information systems.
- All data collection techniques discussed in tools for IS development may be used here.

5.5 Information Systems Design

- IS Design details how the system will meet the information requirements as determined by the systems analyst?
- This is a two step process. A conceptual (logical) and detail (physical) design of the system.
- Conceptual design lays out the components of the information system and their relationship to each other, as they would appear to users.
- Detail design is the process of translating the abstract conceptual model into a specific technical design for the system. The detail design produces actual specifications for the hardware, software, physical databases, input/output media and design, manual procedures and specific controls to be instituted.

5.6 Design Specifications

- Output (medium, content and timing)
- Input (origins, flow and data entry)
- User Interface (simple, efficient, logic, feedback, errors, etc)
- Database design (logical, volume, speed)
- Processing (computations, modules, reports, output timing)
- Manual procedures.
- Controls (will be covered later)
- security (will be covered later)
- Documentation (operational, systems and user documentation)
- Conversion strategy
- Training
- Organizational changes.

5.7 Information Systems Implementation

- Programming process of translating the systems specifications during design stage into program codes.
- Testing: checking whether the system produces the desired results
- Buying necessary resources like computers, software, etc.
- Employing/training users
- Conversion
- Conversion is the process of changing from old system to a new system.
- Four strategies (parallel, direct, pilot and phased approach)

Parallel Conversion

- Both old and new systems are run together for some time.
- What are advantages and disadvantages of this method?
- Under what circumstance will you choose this?

Direct Cut-over Conversion

- New system replaces old system directly.

- What are advantages and disadvantages of this method?
- Under what circumstance will you choose this?

Pilot Study Conversion

- Introduces the system into a small area of the organization until it is proven to be fully functional. The model that is being tested is fully functional.
- What are advantages and disadvantages of this method?
- Under what circumstance will you choose this?

Phased Approach Conversion

- Introduces a new system in stages. The organization will just be using a part of the system.
- What are advantages and disadvantages of this method?
- Under what circumstance will you choose this?

5.8 Information Systems Evaluations

- Checks whether the systems meet its anticipated objectives.
- Several models have been tested to that effect. The most common is McLean and DeLone Model, which links six interrelated items.

McLean and DeLone Model in information Systems Evaluations

- Systems Quality is concerned whether there are some bugs in the system or not.
- Information quality deals with issues of characteristics of good information like relevance, timely, etc.
- Information systems use means using the system
- UIS are various consequences of using the system.
- Individual/Organizational impact these are consequences of using information systems.
- The most common used surrogate is UIS

Seddon Model in IS Evaluation

- Other financial and accounting techniques may also be adopted like Payback, ROI, cost benefit analysis, NPV, profitability index, and IRR.

5.8 IS Maintenance

- System needs to be updated in order that to extent its life cycle.
- The most common input is IS evaluation, IS Plan and IS developments occurring around the globe.
- During maintenance a system may be retained as it is, modified or new design might be in place.
- In fact this is a feasibility study.

Reference

Laudon and Laudon (2004), Chapter 12 and 13
 Turban et al (1996), Chapter 12 and 13
 McLeod and Schell (2004), Chapter 7

Topic 6: Techniques of Systems Development

Learning objectives

- Appraise alternatives for building systems

6.1 Prototyping

- Prototyping is systems development approach that exploits the advanced technologies for using trial and error problem solving technique.
- Iterative in nature

Advantages of prototyping

- Easy communication between the information systems experts and would be users.
- User may refine the needs as time goes on.

Disadvantages of prototyping

- It is not easy to use for a large system.
- The methodology may cause to have an endless process of looping.
- For many users, their requirements may conflict and make the process of information systems development difficult.

Applicability of prototyping

- It is good for developing user interfaces.
- It is applicable when the system to be developed is not clear.
- Small number of users.

6.2 Application software packages

- Application packages are suites of programs, with associated documentation, used for a particular type of problem or variety of similar problems.
- Two main types of application packages: application specific or generalized application packages

Advantages of application packages

- It saves programming efforts and expenses as these costs are shared by many users.
- The user benefits by getting a well tried and tested.
- Easy to get training or other third part services.
- Packages take short time to implement.

Disadvantages of application packages

- Individual problems do differ from one organization to another.
- In some case modification/ customization may take substantial resources.
- Some software are made in modular basis. The user needs to combine several modules to use the software.
- Disadvantages of application packages
- Tailoring problems to suit the software requirements.
- The success of it depends to a greater extent on the survival of the service provider.
- Some of these software systems are very expensive with several maintenance costs.

Situation dictating the use of packages

- Costs implications
- Availability of manpower
- Size of organization
- Availability of software and easiness to customize

6.3 End-user development

- The end user computing: the systems development methodology whereby the users of the systems outputs are developing the systems themselves

End-user computing growth reasons

- The availability of fourth generation languages,
- Widespread of micro computers
- Backlog of activities by information systems staffs
- Users perception that the information systems do not care for their tasks
- Knowledgeable managers in the areas of information systems.

End-user computing advantages

- Relieving information systems departments of many tasks
- Improved information requirements determination
- Normally associated with high systems usage and satisfaction

End-user computing disadvantages

- End users may use faulty methodology
- Normally associated with poor documentation
- May encourage private information systems

6.4 Outsourcing

- Leaving a third part to manage your information systems.
- Either forms a subsidiary company or use computer bureau.

Outsourcing advantages

- Financial benefits
- Technical benefits
- Management concentrates on main business activities
- Flexibility in terms of rapid responses to problems
- Quality on the clearly defined service levels.

Outsourcing disadvantages

- Tied up especially for computer bureau arrangements
- May end to advantages to the competitor.

6.5 Object - oriented software development

- Use of objects, which combine data & procedures
- The objects are reusable
- System: classes, objects, relationships
- Reduces development time and cost

6.5 Case tools

- Computer aided software engineering (case) tools provide an automated engineering discipline for automating some stages in systems development especially software development.

Case tools advantages

- Improves productivity
- Easy prototype creation
- Easy to modify the system
- Encourages consistence
- Not technical people can use the tools

Case tools disadvantages

- Expensive
- Kills creativity

Reference

Laudon and Laudon (2004), Chapter 10 and 11

Turban et al (1996), Chapter 16, 17 and 18

Topic 7: Managing Support Systems

Objective of the Topic

At the end of this topic the candidates should be able to:

- Explain how information systems support businesses/managers in decision making.

7.1 Transaction Processing Systems

7.2 Management Information Systems

7.3 Office Automation Systems

7.4 Decision Support Systems

7.5 Expert Systems

7.6 Executive Support Systems

7.7 Group Support Systems or Group Decision Support Systems

7.8 Neural Networks

Reference

Laudon and Laudon (2004), Chapter 10 and 11

Turban et al (1996), Chapter 14, 15, 16, and 17

Topic 8: Information Security and Control

Objectives

At the end of this topic candidates must be able to

- Explain different problems associated with information management and the way to combat them.

1. Introduction
2. Computer Crimes And Ethics
3. Threats To Data Security
4. Controls
 - 4.1 Management Controls
 - 4.2 Application Controls
 - 4.3 Hardware Controls
 - 4.4 Software Controls
 - 4.5 Systems Development Controls
5. Trojan Horses
 - 5.1 Time Or Logic Bombs
 - 5.2 Viruses
 - 5.3 Worms
 - 5.4 Viruses In Action
6. Auditing A Computerized Information System
7. Computer Assisted Auditing Techniques (CAATs)
8. Cryptography
 - 8.1 Data Encryption
 - 8.2 Passwords

Reference

Laudon and Laudon (2004), Chapter 14

Turban et al (1996), Chapter 19

McLeod and Schell (2004), Chapter 9 and 10

Topic 9: Managing International Information Systems

Objectives

At the end of this topic the candidates should be able to

- Explain the problems of implementing international information systems.

9.1 Business drivers for international information systems

9.2 Strategies

- **DOMESTIC EXPORTER:** Centralization in home country
- **MULTINATIONAL:** Central home base; decentralized production, sales, marketing in other countries
- **FRANCHISER:** Product created, initially produced in home country; relies heavily on local workers to produce, market in other countries
- **TRANSNATIONAL:** Truly global firm; no national headquarters; value-added activities managed from global perspective; optimizes supply & demand, taking advantage of local competitive strengths

9.3 Information Systems Strategies

- **CENTRALIZED:** Domestic home base
- **DUPLICATED:** Copies of home system used in foreign locations
- **DECENTRALIZED:** Each unit has unique system
- **NETWORKED:** Integrated & coordinated at all locations

9.4 Developing an International Information Systems

9.5 Challenges of Global Information Systems

Reference

Laudon and Laudon (2004), Chapter 15

Topic 10: Information Systems Research

Objective

At the end of this topic candidates should be able to:

- Write a researchable proposal in the area of information system
-
1. What does it Deal with?
 - Application of IT to support business functions.
 - Process of Systems Development
 - Information Systems Management
 - The organizational Value of IS
 - Societal Impact of Information Systems

 2. Theoretical Foundations
 - Technical Foundations
 - Organizational Theories

 3. Methodological aspects
 - Case Study
 - Field Study
 - Field Experiment
 - Laboratory experiment
 - Conceptual study

 4. IS Article Sources
 - Communications of ACM
 - Decisions Sciences
 - Harvard Business Review
 - IEEE transactions on Engineering Management
 - Information and Management
 - Information Systems Research
 - Journal of Management Information Systems
 - Management Science
 - MIS Quarterly

 5. IS Success Received a Lion Share
 - Information Systems Success other articles
 - <http://cais.isworld.org/articles/0/article.htm>
 - <http://fag.hia.no/kurs/is/is00/artikler/Seddon.pdf>

 6. Constructs
 - Use already tested constructs unless you want to develop yours.
 - Some of these are available at Constructs <http://www.ucalgary.ca/~newsted/constructs.htm>

- This facilitates testing validity and reliability (refer to Baroudi an Olkowiski.pdf in CD)

7. Typical Examples of IS Research

- The usefulness of websites managed in Tanzania.
- The usefulness of DSS in decision making
- Challenges of developing information systems in Tanzania: the Case of....
- Application of ... Theory on Information Systems
- The impact of e mail on information dissemination
- IT/Internet Penetration
- The relationship between user information satisfaction to job satisfaction in the Tanzanian Context
- The relationship between user experience to the satisfaction in Information Systems
- The cost benefit analysis of information systems.
- The link between cultural orientation to adoption of information systems

Course Assessments

One test	20
One report (semester paper)	30
Final Examinations	50
Total	100

Course textbooks

There is no single book in which one will find the all topics covered. Therefore, students are advised to read as many introductory textbooks on information technology/information systems. Most of those books are available in the library.

The main textbooks:

Kenneth C. Laudon and Jane P. Laudon (2004 or better edition). Management Information Systems
Prentice Hall publishers.

Turban, McLean and Wetherbe (1996 or a more recent edition). Information Technology for
Management Eighth Edition published by John Willey and Sons, 1996.

McLeod, Raymond and Schell, George (2004): Management Information Systems, Prentice Hall
Publishers.

Important Journals for the Course

The course will make use of the following journals, and some of these are available in the main library (arranged in alphabetical and not order of importance).

1. Communications of ACM
2. Decisions Sciences
3. Harvard Business Review *available in the main library*
4. IEEE transactions on Engineering Management
5. Information and Management *available in the main library*
6. Information Systems Research
7. Journal of Management Information Systems
8. Management Science
9. MIS Quarterly

Articles to be read

Rai, A.; Lang, S.S., and Welker, R.B. (2002): "Assessing the Validity of Information Systems Success Models: An Empirical Test and Theoretical Analysis", *Information Systems Research*, Vol. 13, No. 1, March, pp.50-69.

Seddon, P.B. (1997): "A Respecification and Extension of DeLone and McClean Model of Information Systems Success," *Information Systems Research*, Vol.8, No.3, p240-253.

DeLone, W. and McLean, E.R. (1992): "Information systems success: The quest for the dependent variable," *Information Systems Research*, Vol.3, No.1 pp.60-95.