UNIT 7

IMPLEMENTATION AND CONTROL OF PROJECTS

Objectives

After going through this unit, you should be able to:

* appreciate different approaches to implementation
* understand the various steps involved in successful implementation of projects
* appreciate the problems of security and control of MIS systems.

Structure

7.1 INTRODUCTION

The activity of MIS Project implementation can start only after a complete and detailed MIS design has been formulated and is available for implementation, for only a detailed design will specify as to what is to be implemented. In its absence one does' t know what to do.

It is also assumed that the design which is available for implementation has been reviewed and tested as to its viability as one of the end-activities in the detailed design stage. This minimises the possibilities of delayed detection of system logic errors and avoids or reduces the need of redesign/change efforts during implementation. Frequent occurrence of such errors adds to cost as well as frustration of implementing team.

7.2 PROJECT IMPLEMENTATION OPTIONS

After review, testing and evaluation of the completed design, the top management authorises the implementation. One or a combination of several approaches to implementation can be considered and chosen. The approaches are:

when the old system does not exist

1) **Install a system in an organisation which is just coming up**. Therefore, the existence and replacement of old system does not arise. In this case more problems of system logic error, debugging and redesign and change in the given detailed design are expected and should form part of implementation effort.

When old system is in existence

2) **Cut off the old system and install the new system**. Because installation is a time-consuming activity which may take days or months depending on the size and complexities of the organisation and the enormity and complexity of the system. Therefore, there is a time lag when the old system is cut off and the new system is not fully operational. During this period no system is in operation. Obviously this

method would be applicable for very small companies or small systems which can be installed in a day or two.

3) **Cut over by segments.** Small parts or subsystems of the new system replace the old system one by one or in groups. So the assumption is that identical or more or less similar parts exist in both the systems. That would lead to the conclusion that the 'new' system is not really new, at best it may be an upgradation of the old one. Another implication is that the parts are independent or interaction among them is restricted.

4) **Operate in parallel and cut over.** The new system is installed without scrapping the old system. For some time both the systems operate simultaneously, the results of the new system are compared with the old system for accuracy and reliability until the new system starts satisfactorily operating and the old system is dropped. The major advantage is that it helps in almost completely checking out the new system through comparison with the old system. But it involves complete duplication of work and as such is comparatively expensive. It is essential where implications of error in the new system can be very costly or highly embarrassing for the long term reputation of the company.

7.3 STEPS IN IMPLEMENTATION

The steps in implementation, which are listed later on, are equally applicable, with minor variations, to any of the above listed options. It is assumed that the design specifications provide general as well as specific details regarding all requirements of the system such as: procedure, forms, database, equipment, personnel facilities etc. The major steps are based on these specifications. It may be noted that the steps are not sequentially exclusive, they usually overlap.

The steps are:

* The Plan
* Space and Layout
* Manpower and Organisation of MIS
* Training for Operators and Users
* Hardware Equipment Installations
* Programme Development,Design of Forms and Files
* Testing and Changeover.

7.3.1 The Plan

This is a pre-implementation activity where identification of all activities required in implementation is done. Their sequence and relation to each other is ascertained. Time and cost estimates for each of the identified acticity is obtained.

For very small projects, plan and the sequence of implementation of activities may be undertaken informally or in text form. But the use of Gantt Charts or network diagrams - CPM or PERT is very valuable in providing visually a clear picture of the total plan. It is helpful later on for control function over actual stages of implementation. An example of network diagram is given below in Figure 7.1

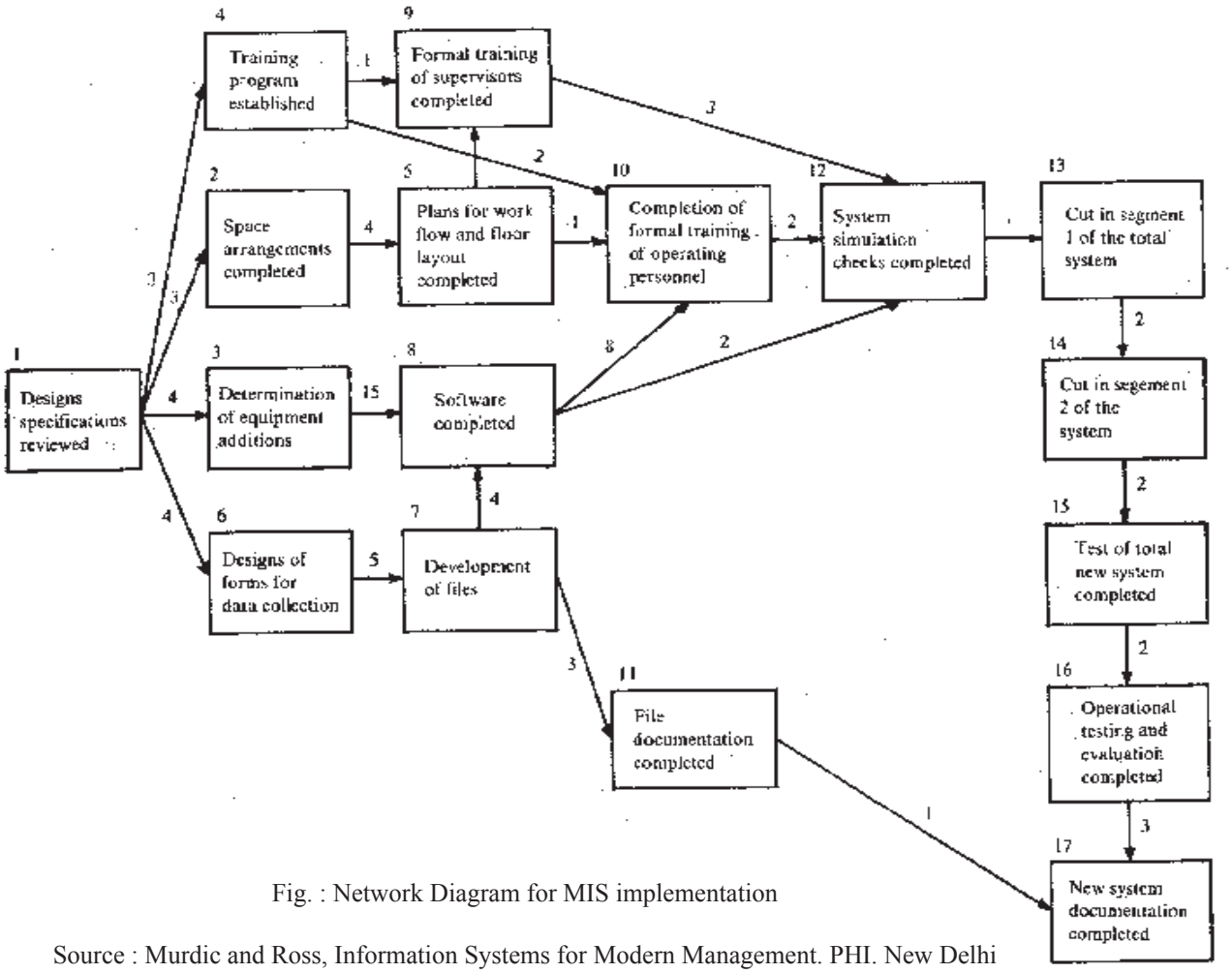

Fig. : Network Diagram for MIS implementation

Source : Murdic and Ross, Information Systems for Modern Management. PHI. New Delhi

7.3.2 Space and Layout

When a new system is to be installed in a completely new company where old system does not exist, floor space and layout is required for housing the people and the facilities. Even in those cases where the old system is to be replaced by a new system, revisions in the existing floor space and layout may be required. In certain cases, these may be major revisions.

The MIS project implementation manager is expected to prepare estimates of floor space requirements and also rough layouts. These would be based on the knowledge and expertise of the project manager and the required specifications available in the detailed system design. In consultation with and approval of the top management, the acquiring or generating/building of specific space is done.

The layout takes into consideration location of facilities in relation to each other e.g. computers, terminals, etc. location of people through partitioning or grouping together or -where required - allocating separate offices and cabins. Movement of people and equipment, storage, air-conditioning, utilities, safety and security factors also affect the layout and location.

7.3.3 Manpower and Organisation of MIS

In the first instance, a project manager who should later on take charge of the whole MIS department should be appointed as its head or somebody from accounts, finance or computer can be deputed as a stop-gap arrangement with full implementation responsibility. This position should be available right after the design work so that implementation plan is taken up by the project manager.

The line manager, line functional and operating personnel must be actively associated with the implementation. They should feel that it is their system. At development and design stage also active involvement through all stages of these personnel (system user) advocated. The systems specialists are assigned to the various phases/parts of implementation and to assist the line people (the users).

The contract/subcontract/assignment may be given to internal or external groups as the work progresses e.g. the work of buliding, painting, electric/air conditioning installation etc.

The other MIS personnel such as systems, managers, analysts, programming people, operating people, data entry people, secretarial and other staff may continue to be engaged as and when needed depending upon the progress of work. A personnel requriement chart showing the number of persons in terms of skill and qualifications should be prepared. It should also show whether they are internally available or recruited from outside, and the date when they would be needed according to implementation plan. But their recruitment and selection is to be plannned before-hand. Whenever old system is being replaced, the old employees must be adjusted at appropriate jobs through restructuring, upgrading etc. If necessary, they may be provided with additional training in the meanwhile.

7.3.4 Training for Operators and Users

The training is required at two ends, the MIS department people (all levels) and the users at different levels engaged in different functional areas.

The training for MIS department people must be arranged with respect to procedures and operations of inputs, formats, processings, outputs, frequencies, destinations, the terminals and equipment operating etc. The training is a must whether an entirely new system is being implemented or an old one is being replaced. All operating and supervisory people, through training, must become completely familiar with their job fuctions and the system of which they are a part. This can be achieved through a judicious mix of theoretical input (discussion and familiarisation with system procedure) and practical training on the equipment in actual use. They must get a chance again when the system is at the last stages of implementation to develop complete familiarity with the installed system and their respective job functions.

Proper user training is an important factor in promoting the acceptance of the new system and making it a success. The training may be for a specific language, or package or general user understanding of the system. The users must know what the system can do for them (in relation to their job functions) on routine as well as on special request basis. How can they use the system? How and when can they make the request? The users should be able to appreciate as to what is available and what can be made available. If some formats are introduced, they should be made familiar with it. When terminals are made available to the users, they must be fully trained to make use of it. The users should understand the changed procedures, the changed codes,pass words etc. If there are changes in the hardware or software, the users should be familiar with it to the extent it is related to them or their job functions.

The usres can be classified differently such as developer versus non-developer, novice versus expert, frequent user versus occasional and primary versus secondary user. These classifications are not necessarily exclusive; or often they are likely to overlap. User training programmes must cater to specific needs of all types of users, The utility of a system is enhanced if users genuinely feel that the system is helpful to them and make active use of the system.

7.3.5 Hardware Equipment Installations

The acquisition of computer related hardware is a complex and specialised subject. Apart from identificatin of specific equipment from a wide range of prices, capabilities and vendors, the question of buying or leasing is also related to it.

The related equipment requirements and estimates are available from detailed design. The purchase orders should have been placed earlier depending upon the estimated supplier time lag. By the time the equipments are received, site preparation work, room layout, air conditioning, electric connections, communications, link lines etc. should be complete or near completion so that not much time is wasted in installation and making the equipment operational. Testing of equipment and training of operating people on new equipment should start as early as possible. At appropriate times, the orders for tapes,disks, paper, filing cabinets etc. should also be placed.

7.3.6 Program Development, Design of Forms and Files

There are two options available for meeting the software requirements - i) obtain software packages or ii) develop software internally. Usually a judicious mix of the two is the best way out. Small companies may purchase most of the software, but usually, some modifications are necessary to fit it to the company's specific requirements. It can also be custom made by many specialised software development agencies.

For large companies, or for organisations with very specialised and complicated requirements, a majority of the requirements may be met through in-house development of the programs.

Forms required for inputs, intermediate stages and for outputs are necessary to ensure that the 'right' information is supplied in a manner that simplifies computer storage, retrieval, processing as well as user utilisation. Even though certain specifications on forms are available in the detailed design, this is the first opoortunity to try out in practice. Necessary changes and modifications, if any, should be made. Standardise forms are a great help to both the end-users as well as system operating personnel. Even when a user is working directly on a terminal, the screen format should reflect the document layout where ever feasible for input, processing, as well as output.

The identification of files and specifications such as file name, maximum number of characters required to record each data element for each file, frequency of access, retention characteristics, updating frequencies, formats etc. are developed at detailed design stage. The conversion of these specificatons into computer programs is the function of computer experts. At the implementation stage this conversion takes place and initial testing is conducted from actual data obtained and recorded. This may be termed as creation and testing of the physical file. Testing is done for range, volume, data validation and file operation procedures including input, retrieval and updating etc.

Master file is the one which contains data used in routine processing. The structure of information is more specific in these files. These are comparatively permanent. In contrast there are transaction files, which are created for specific transaction purposes only and are temporary. There could be some other files which may be used for capturing and storing data about the environment. The structure of informatin in these files may not be as specific.

The porcedures are developed for access to files, input, update and delete frequencies for file and data protection, for input data validation. Indexes retrieval procedures are also developed.

7.3.7 Testing and Changeover

Testing is very important part of the implementation phase. Even though testing is basically a part of each phase, it is critically important at this stage because, here the testing is done under actual operating coditions with real data. It can take up 15 to 50 per cent of the total system development effort depending upon size and complexity.

Usually a hierarchy of testing is advocated at different levels, starting from individual programs to subsystems and finally to the system as a whole.

At the component level - individual components file input forms, programs, output forms, work procedures etc. may be tested using representative or limiting/unusual data for accuracy, range of input and processing, operating conditions reliability etc.

At individual application level - again using the actual data from the present data bank for its functioning logic, input-output etc. each individual application at operation level is to be tested.

At subsystem level - the testing is directed to verification of multiple input, output, complex logic interaction and interfaces of various lower level subsystems which form part of this subsystem.

At any of these testing levels difficulties or errors may be experienced which in turn may require changes in forms designs, logic, sequence, workflow, output formats, procedures, interaction of subprograms etc.

Cutover is an event signifying the actual replacement of the old system by the new system. The old system is completely dropped and the new system is fully operational.

Despite repeated testing at each of the phases and careful testing at the last stage of the implementation phase, ther are still likely to be minor as well as some major problems with the new system when it is fully operational and facing the real world challenge. The appearance of errors is inevitable as the system operates in varying combinations of volume, transactions and conditions which could not have been foreseen. The process of overcoming these difficulties in computer terminology is called 'debugging'. This process of debugging continues for several days to several months depending upon the size and complexity of the system.

When the system becomes operational, it has to be maintained at an efficient level with respect to equipment, processing, ooutput , inputs etc. There have been various estimates and it can be safely concluded that for an average operating system, the maintenance effort is around fifty per cent of the total operating effort. The calss of problems, that are definitely errors and need to be corrected in time, fall in the category of maintenance. Apart from manitenance, the requests for modifications and improvement will also continue to be received over the life of the system.

7.4 PRECAUTIONS IN IMPLEMENTATION

Even though the implementation process has been discussed in fairly great detail, some important aspects are further discussed wihch if overlooked would have been the cause of failure of a large number of MIS projects.

1) **The question of equipment :** The question of equipment should be viewed in terms of organisational information need rather than being limited or created because of equipment.

2) **The Software :** The software and the processing logic should be error-free. A small error at any of the input or process or logic stages can result in very serious blunders. A thorough and repeated planning and review at each stage is a must.

3) **Testing :** Wherever testing is recommended or desired as part of design or implementaton, it must be done meticulously according to standards given. This is one activity where 'Cutting Corners' or carelessness can be very castastrophic.

4) **Controlling :** Many small jobs taken together make a project. The identification of tasks was undertaken in the implementation phase itself. Successful completion of each of these tasks in respect of time, cost and efficiency must be carefully monitored.

5) **User Participation :** One of the most prominent causes of failures of MIS had been non-acceptance by the users. User participation must be intensively encouraged and sought at all phases and more so at the culmination stage of the total development process i.e. implementation.

7.5 SECURITY AND CONTROL

Data and information stored and maintained as part of total MIS activity is a very valuable asset of the company. The physical equipment also is costly and valuable. The problem of security is two pronged-security of physical assets and security of intangible assets i.e. data. There could be three types of security problems: (i) Frauds (ii) Sabotage(iii) Accidents and Disasters.

These security problems can be overcome through:

i) **Control on physical access to equipment:** This can be achieved through usual security procedures i.e. Buliding security, proper locking system, proper entry, restrictions, guards, alarms etc. The problem is slightly more difficult when distributed data processing or networks are in operation. That would mean keeping safeguard control on all the terminals.

ii) **Access to data :** Data availability to unauthorised persons irrespective of the fact whether physical access to equipment is valid or not should be prevented. As such specific identification codes or pass words are used for specific terminals, for specific files and specific working hours.

iii) **Splitting the work:** The critical work packages, like programming efforts, where possibilities of fraud exist, must be split between more than one person.

iv) **Semi- disconnected distributed system :** Provisions in a distributed system should Include procedures for switching/shifting processing to alternate location in case one local facility is not functioning. The capability to continue processing at all sites except the non-functioning one is called 'fail-soft' protection.

v) **Back-up and Recovery :** This is sometimes called 'disaster management'. All systems are required to recover from errors and failures, fire, floods, accidents, natural disasters or deliberate damage to equipment, software and data. Apart from other precautions such as safe locations, fire and smoke detectors, alarms, automatic power off, back-up power supply, insurance etc, following provisions may be incorporated:

- Back up copies of important software and data be stored at alternate sites off the premises.
- Back-up recovery plan.
- Alternative arrangement for stop-gap utilisation of equipment facilities. It could also be done through mutual inter-department or inter-corporation facilities dependence in case of need.
- Back up supply of forms and other supplies.

7.6 SELF- ASSESSMENT EXERCISES

1) How much importance should be accorded to implementation phase as part of the total MIS development activity? Explain.

2) Briefly discuss the various implementation strategies. Under what circumstances are they suitable?

3) Describe the major steps in implementation of MIS design. Are they overlapping or exclusive? Explain.

4) Discuss appropriate measures for security of data.

5) Explain the methods in Back-up and Recovery/Disaster Management. Why is it so important?

6) Discuss the precautions necessary during implementation phase and also explain why?

7) Study the security procedures which are in operation in MIS or Computer Centre of the organisation in which you are working or you are familiar with.

7.7 FURTHER READINGS

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