
UNIT 5 PROCESS OF SYSTEMS PLANNING

| Structure | Page Nos. |
|--|-----------|
| 5.0 Introduction | 5 |
| 5.1 Objectives | 5 |
| 5.2 Fact Finding Techniques | 5 |
| 5.2.1 Interviews | |
| 5.2.2 Group Discussions | |
| 5.2.3 Site Visits | |
| 5.2.4 Presentations | |
| 5.2.5 Questionnaires | |
| 5.3 Issues involved in Feasibility Study | 9 |
| 5.3.1 Technical Feasibility | |
| 5.3.2 Operational Feasibility | |
| 5.3.3 Economic Feasibility | |
| 5.3.4 Legal Feasibility | |
| 5.4 Cost Benefit Analysis | 11 |
| 5.5 Preparing Schedule | 12 |
| 5.6 Gathering Requirements of System | 13 |
| 5.6.1 Joint Application Development | |
| 5.6.2 Prototyping | |
| 5.7 Summary | 15 |
| 5.8 Solutions/Answers | 16 |
| 5.9 Further Readings | 16 |

5.0 INTRODUCTION

In this unit, you will learn the process of planning the development of systems. You will also learn various techniques used in it. Here, you will learn about the various techniques of fact finding and getting appropriate information about system which is currently in place. Based on the information gathered, a list of requirements has been compiled. The same is sent to the customer for his/her review and comments. The topic of feasibility study is discussed in depth in this unit. The process of cost benefit analysis is also discussed in this unit. Lastly, we shall discuss about the Joint Application Development (JAD).

5.1 OBJECTIVES

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

- know the various fact finding techniques and also their advantages and disadvantages;
- identify check points in system life cycle to conduct feasibility study;
- know the process of doing cost benefit analysis of the project;
- know various issues related with system development; and
- learn the process of preparing schedule.

5.2 FACT FINDING TECHNIQUES

To learn the functions of the existing system, systems analyst needs to collect data related to the existing system. Usually, the data related to organization, staff, documents used, formats used in the input and output processes is collected. This information is obtained through interviews, group discussions, site visits, presentations, and questionnaires.

Need for Fact Finding

Normally, each and every business house or any organization has its own rules and procedures to run and manage it. When a system needs to be developed, the systems analyst needs to know the requirements of the system. Depending on these requirements, the system has to be developed.

5.2.1 Interviews

Personal interview is a recognized and most important fact finding technique, where the systems analyst gathers information from individual through face to face interaction. Interviews are used to find the facts, verify facts, clarify facts, get the customer involved, identify the system requirements and know all options. The interview is usually conducted by the systems analyst. To conduct interview, the interviewer must have personality which helps him/her to be social with strangers or different types of people. Always and for all situations, interviews are not appropriate fact finding methods. It has both advantages and disadvantages.

Advantages

- Interviews permit the systems analyst to get individual's views and get the specific problem work wise and operation wise.
- Interviews allow the systems analyst to obtain a better clarity of the problem due to feedback from the interviewees.
- In the process of interviews, the interviewer has time and scope to motivate the interviewee to respond freely and openly.
- Interviews allow the systems analyst to understand the user requirements and to know the problems faced by the user with the current system.
- It is an effective technique to gather information about complex existing systems.

Disadvantages

- Interviews are very time consuming.
- Success of interviews, in most of the cases, depends on the systems analyst's interpersonal relationship skills.
- Some times, interviews may be impractical due to the location of interviewees.

Types of Interviews

There are two types of interviews:

- Structured; and
- Unstructured.

In structured interviews, there is a specific set of questions to be asked to an interviewee. In the case of unstructured interviews, there are few specific questions pertaining to an interviewee. But, you have questions which are common to all interviewees. Unstructured interviews are conducted with only a general goal or subject in mind.

Conducting Interview is an art. The success in interview depends on selecting the individual, preparing for the interview, creating situation in which the answers offered are reliable and creating a situation in which opinion can be given without any fear of being criticized by others.

Arranging Interview

The system analyst should prepare properly for the interview. S/he should select place of interview, time of interview in such a way so that there will be minimal

interruption. Always, it is important to take appointment with the interviewee. Time to be spent during interview varies from project to project. The higher the management level of the interviewee, the less the time to be scheduled for the interview.

Guidelines for conducting interviews :

For a successful interview, the steps to be followed are given below:

Introduction

During introduction, the analyst should introduce himself by focusing on purpose of the interview and the confidential nature of interview. Also, this is the phase wherein first impressions are formed and pave way for the success of the remaining part of the interview.

Asking questions

Questions should be asked exactly as these are worded in case of structured interview. Rewording may modify or bias the response. Always, questions have to be asked in the same sequence as prepared.

Recording the interview

Record of the interview must be kept mentioning the source of the data and its time of collection. Sometimes, the analyst cannot remember the source of the data which may attribute to the invalid sources.

Doing a final check

After the interview has been completed, the deliberations made during the interview should be put in the form of a report. The report of the interview has to be sent to the interviewee for his/her signature. If any discrepancies are found or any modifications are to be done, these can be done at this point of time.

5.2.2 Group Discussions

In this method, a group of staff members are invited who are expected to be well versed in their own wings of the organization. The analysts will have a discussion with the members for their views and responses to various queries posed by them.

In this process, individuals from different sections gather together and will discuss the problem at hand. Ultimately, they come to an optimum solution. In this process, the problems of all sections are taken care of most of the cases, solutions are found which are acceptable to everyone. The main disadvantage of this process is that it is very difficult to get all the concerned people together at a time. But, the major advantage is that a mutually acceptable solution can be found.

5.2.3 Site Visits

The engineers of the development organization visit the sites. Usually, the systems analysts visit sites to get first hand information of the working of the system. In this technique, systems analyst watches the activities of different staff members to learn about the system. When there is confusion about the validity of data collected from other sources, the systems analyst uses the method of site visits. The main objective of site visit is to examine the existing system closely and record the activities of the system.

Advantages

1. The process of recording facts site visits is highly reliable.

2. Sometimes, site visits take place to clear doubts and check the validity of the data.
3. Site visit is inexpensive when compared to other fact finding techniques.
4. In this technique, systems analyst will be able to see the processes in the organization at first hand.
5. The systems analyst can easily understand the complex processes in the organization.

Disadvantages

1. People usually feel uncomfortable when being watched; they may unwillingly perform their work differently when being observed.
2. Due to interruptions in the task being observed, the information that is collected may be inaccurate.
3. Site visits are done during a specific period and during that period, complexities existing in the system may not be experienced.
4. There may be scheduling problems for the systems analysts when the activities take place during odd hours.
5. Sometimes, people may be more careful to adopt the exact procedure which they do not typically follow.

Guidelines for site visit

Site visits are to be conducted where the work load is normal. After studying the work and normal work load, systems analyst can observe the work at peak hours to see the effect caused by increased volumes. The systems analyst should collect the input /output form, documents at the time of his/her visit. The following guidelines need to be followed at the time of observation and site visit:

1. Keep a low profile at the time of site visit.
2. Take necessary permissions from appropriate officials to conduct site visit.
3. Inform the individuals who will be observed at the time of site visit.
4. Take notes of the study of site visit immediately.
5. Do not make any assumptions.

5.2.4 Presentations

It is another way of finding the facts and collecting data. Presentation is the way by which the systems analyst gathers first hand knowledge of the project. The customer makes a presentation of the existing system or about the organization. Participants in the meeting are representatives from the IT company and key personnel of the client organization. When a company needs to develop a software project, it may present its requirements for IOE (interest of expression) from the interested IT Company. In that case, the client presents his/her requirements. Based on the requirements, the IT companies make prototype and show the demo of the prototype. It is very difficult to obtain information in detail from a presentation. But, information available through presentation is sufficient to develop a prototype. Presentation is made by the concerned department in consultation from other departments and senior officials.

5.2.5 Questionnaires

Questionnaires are special purpose documents that allow the analyst to collect information and opinion from respondents. By using questionnaires, it is possible to collect responses or opinion from a large number of people. This is the only way to get response from a large audience.

Advantages

1. It is an inexpensive means of collecting the data from a large group of individuals.
2. It requires less skill and experience to administer questionnaires.

3. Proper formulation and interaction with respondents leads to unbiased response from the customers.
4. Customers can complete it at their convenience.
5. Responses can be tabulated and analyzed quickly.

Disadvantages

1. Sometimes, the number of respondents is low.
2. There is no guarantee that the respondents will answer all the questions.
3. Sometimes, the individual may misunderstand the question. In that situation, the analyst may not get correct answer.

Types of questionnaires

There are two types of questionnaires:

- **Free formed questionnaires** are questionnaires where questions are mentioned along with blank spaces for response.
- **Fixed formed questionnaires** are questionnaires which consist of multiple choices and the respondent can select only from the choices provided.

The following are various types of Fixed format questions:

1. True / False or yes/no type questions.
2. Questions whose response will be one of the choices: strongly agree, agree, disagree..
3. Ranking type questions (ranking items in order of importance).
4. Multiple choice questions (select one response or all the relevant responses).

Check Your Progress 1

1. and are two types of interviews.
2. are special purpose documents that allow the analyst to collect information and opinion from respondents.
3. The engineers of the organization make site visits.

5.3 ISSUES INVOLVED IN FEASIBILITY STUDY

Feasibility study consists of activities which determine the existence of scope of developing an information system to the organization. This study should be done throughout the life cycle. In a project, at one point of time, it may seem that the project is feasible. But, after proceeding one or two phases, it may become infeasible. So, it is necessary to evaluate the feasibility of a project at the earliest possible time. Months or years of efforts, huge finances could be saved if an infeasible system is recognized at earlier stage.

Feasibility study starts from the preliminary investigation phase. At this stage, the analyst estimates the urgency of the project and estimates the development cost.

The next check point is problem analysis. At this stage, the analyst studies current system. S/he does it to understand the problem in the better way. It helps him/her to make better estimates of development cost, and also to find out the benefits to be obtained from the new system. In feasibility analysis, we have to study the following:

- Technical feasibility,
- Operational feasibility,
- Economic feasibility, and
- Legal Feasibility.

5.3.1 Technical Feasibility

Technical feasibility is concerned with the availability of hardware and software required for the development of the system, to see compatibility and maturity of the technology proposed to be used and to see the availability of the required technical manpower to develop the system. These three issues are addressed during this study.

Is the proposed technology proven and practical? At this stage, the analyst has to see or identify the proposed technology, its maturity, its ability or scope of solving the problem. If the technology is mature, if it has large customer base, it will be preferable to use as large customer base already exists and problems that stem from its usage may be less when compared to other technologies which don't have a significant customer base. Some companies want to use the state of art new technology irrespective of the size of customer base.

The next question is: does the firm possess the necessary technology it needs. Here, we have to ensure that the required technology is practical, and available. Now, does it have the required hardware, and software? For example, we need ERP software, and hardware which can support ERP. Now, if our answer is no for either of the questions, then the possibility of acquiring the technology should be explored.

The last issue related to technical feasibility is the availability of technical expertise. In this case, Software and Hardware are available. But, it may be difficult to find skilled manpower. The company might be equipped with ERP software, but the existing manpower might not have the expertise in it. So, the manpower should be trained in the ERP software. This may lead to slippage in the delivery schedules.

5.3.2 Operational Feasibility

Operational feasibility is all about problems that may arise during operations. There are two aspects related with this issue:

- What is the probability that the solution developed may not be put to use or may not work?
- What is the inclination of the management and end users towards the solution? Though, there is very least possibility of management being averse to the solution, there is a significant probability that the end users may not be interested in using the solution due to lack of training, insight, etc.

Also, there are other issues related with operational feasibility.

Information

The system needs to provide adequate, timely, accurate and useful information. It should be able to supply all the useful and required information to all levels and categories of users.

Response time

It needs to study the response time of the system in term of throughput. It should be fast enough to give the required output to the users.

Accuracy

A software system must operate accurately. It means that it should provide value to its users. Accuracy is the degree to which the software performs its required functions and gives desired output correctly.

Security

There should be adequate security to information and data. It should be able to protect itself from fraud.

Services

The system needs to be able to provide desirable and reliable services to its users.

Efficiency

The system needs to be able to use maximum of the available resources in an efficient manner so that there are no delays in execution of jobs.

5.3.3 Economic Feasibility

It is the measure of cost effectiveness of the project. The economic feasibility is nothing but judging whether the possible benefit of solving the problems is worthwhile or not. At the feasibility study level, it is impossible to estimate the cost because customer's requirements and alternative solutions have not been identified at this stage. However, when the specific requirements and solutions have been identified, the analyst weighs the cost and benefits of all solutions, this is called "cost benefit analysis". This is discussed below. A project which is expensive when compared to the savings that can be made from its usage, then this project may be treated as economically infeasible.

5.3.4 Legal Feasibility

Legal feasibility studies issues arising out of the need to the development of the system. The possible consideration might include copyright law, labour law, antitrust legislation, foreign trade, regulation, etc. Contractual obligation may include the number of users who will be able to use the software. There may be multiple user's licences, single user licences, etc. Legal feasibility plays a major role in formulating contracts between vendors and users. If the ownership of the code is not given to the user, it will be difficult to install it without proper permission to other systems. Another important legal aspect is that whenever an IT company and the user company do not belong to the same country then the tax laws, foreign currency transfer regulations, etc., have to be taken care of.

5.4 COST BENEFIT ANALYSIS

In economic feasibility, cost benefit analysis will be done. There are two types of costs associated with a project: The costs involved with development of the system and costs associated with operation and maintenance of the system. System development cost can be estimated at the time of planning of the system and it should be refined in different phases of the project. Maintenance and operation costs are to be estimated before hand. At the same time, these estimations are bound to change as the requirements change during the development process. After the implementation, these costs may increase or decrease depending on the nature of updations done to the system. System development cost is one time cost, but maintenance and operating costs are recurring costs. Different costs are:

Cost of human resources

It includes the salaries of system analysts, software engineers, programmers, data entry operators, operational, and clerical staff. In other words, the amount that is going to be spent on all the people involved.

Cost of infrastructure

The cost of infrastructure including those of computers, cables, software, etc., comes under this head.

Cost of training

Both the developing staff and operating staff need to be trained for new technologies and new system. So, the training cost has to be considered for calculating the cost of the system.

There are two components in economic feasibility: **costs and benefits**. The cost consists of tangible hardware, software costs, cost of human resources and some intangible costs. Tangible costs are saved by the usage of the system. Intangible costs are saved by the quality of the system. Also, application of system should lead to efficiency. When the quality of the system is high, the effectiveness of the services provided by the organizations increase. If a choice has to be made between efficiency and effectiveness then it is better to do the right thing inefficiently than to do wrong thing efficiently. The tangible benefits are those which can be quantified easily. They can be measured in terms of savings or profits. On the other hand, in the case of intangible benefits, it is difficult to quantify. Examples of intangible benefits are improving company goodwill, improving employee moral, better decision making, etc.

We may consider the case of an insurance company's branch office. There are 15 employees in the office which include one manager, two business development officers, one accounts officer, one administrative officer, seven clerical staffs, two security guards, one peon. If the branch is converted to a fully computerized branch, the total hardware and software cost will be Rs.10 lakhs. Training of the existing manpower will be Rs.50,000. Total investment is 10.5 lakhs. Total maintenance cost of software and hardware is Rs.1.5 lakhs per year. Interest of the investment is Rs.1,26,000 per year. So, the total expenditure is increased by Rs.2, 76,000 per year. But the branch can reduce the clerical staff. Now it needs two clerical staffs and two data entry operators. Total cost saving by reducing 3 staffs will be Rs.4.5 lakhs per year. Here, it is clear that the tangible benefit is more than the expenditure. Besides, the tangible benefit also improves the customer's satisfaction. So, it is clear that the project is feasible.

Check Your Progress 2

1. consists of activities which determine the existence of scope of developing an information system to the organization.
2. is all about problems that may arise during operations.
3. and are two components of economic feasibility.

5.5 PREPARING SCHEDULE

A system development process scheduling is an activity that distributes estimated effort according to the planned project duration by allocating the effort to specific software engineering tasks. But, at the early stage of the project, macroscopic schedule is developed. This schedule identifies all major activities of the project. As the project progresses, each entity of macroscopic schedule is refined into a detailed schedule. For a systems development, scheduling is meant for setting an end date to the project(s).

Now, the feasibility of following the schedule is directly related to the time table made. Systems analysts have to take care of schedule feasibility of the system. The

purpose of schedule feasibility is to understand the time frames and dates of completion of different phases of the project. It means that the project can be completed and be operational so that it will meet the needs of the user requirements.

In most cases, missing the deadline may invite penalties. A systems analyst has to remember the schedule feasibility at the time before entering into any agreement with client regarding the delivery schedules. At the project planning stage, feasibility of conforming to the schedule will be studied by the analyst. To take a decision, factors such as expected team size, availability of resources, sub-contracting or outsourcing of activities have to be considered. Scheduling feasibility will be reassessed during the commencement of each phase.

5.6 GATHERING REQUIREMENTS OF SYSTEM

Finalizing the requirements of the system to be built forms the backbone for the ultimate success of the project. It not only includes ascertaining the functions, but also the constraints of the system. The later part is very important as the customer needs to be very clear about the services that are going to be offered by the system. This will avoid any conflicts during the delivery or intermediate meetings with the client as the client assumes that the system provides those functions which are actually constraints of the system.

When the requirements of the system are inaccurate, it may lead to the following problems:

1. Delivery schedules may be slipped.
2. Developed system may be rejected by the client leading to the loss of reputation and amount spent on the project.
3. System developed may be unreliable.
4. Overall cost of the project may exceed the estimates.

There are different ways of finding the system requirements. Two of them are joint application development and prototyping.

5.6.1 Joint Application Development

It is a process in which group meetings are held to analyze the problem and define the requirements of the desired system. In the process of Joint Application Development (JAD), each participant is expected to attend and actively participate. The group includes: sponsor, the facilitator, the user manager and IT staff. When JAD technique is used to find the requirements, it is known as Joint Requirements Planning.

Participants of Joint Application Development

The following are the various participants of Joint Application Development:

Sponsor is a person in top management. The sponsor plays a vital role in the process of JAD. S/he works closely with JAD leader to plan the session by identifying individuals from the user community.

Facilitator is a single individual who plays an important role as leader. S/he leads all the session that held for system development. S/he must have good communication skill, negotiation skill, ability to remove group conflicts, possess good knowledge of business, has strong organising power, quick and impartial decision making capability. The facilitator plans session for JAD, conducts the session and follows the decision of the session.

Representatives of the Clients will also attend the JAD session. They are chosen by the project sponsor based on their knowledge of the business system. The role of the

representatives of the clients is to communicate the business rules and the requirements of the desired system.

Scribe records proceedings of the meeting. The proceedings are published and demonstrated to the attendees immediately after the meeting. Scribes need to have a good knowledge of systems analysis. Systems analysts frequently play this role.

IT staff such as programmer also participate in the session. IT staff listen and take notes regarding issues and requirements mentioned by the clients and analysts. They can contribute their ideas related to technical limitations of the current system.

JAD session spans from 3-7 days, but in special cases, it may continue up to two weeks. Success of JAD session depends upon proper planning. For a successful JAD session, all the participants should be informed about the schedule of the session before hand and they should come prepared. The analyst must work closely with the sponsor to determine the scope of the issues that will be discussed in JAD session. There are three steps that are to be followed for a successful JAD session:

- Selection of a location for JAD session.
- Selection of JAD participants.
- Preparation of agenda items for JAD session.

JAD sessions are usually held in a location different from the work place. The meeting room should be equipped with white board, overhead projector, data projector, laptop, printer, scanner, etc. There should be name tags for all the participants.

Preparation of the agenda is the key for the success of JAD session. Agenda must be brief, should mention the objective of the session. It must mention the item to be discussed in each session and time allotted to each item. Agenda contains three parts namely, the opening, the body and conclusion.

Process of conducting a JAD session successfully

For successful session, the facilitator should adhere to the following guidelines:

1. Agenda should be followed strictly.
2. Topic should be completed within allotted time.
3. Ensure that the scribe is able to take notes.
4. Avoid the use of technical jargon unless essential.
5. Try to get group consensus.
6. Ensure that the participants follow the rules.

Disadvantages of Joint Application Development (JAD)

- Since it is a meeting of many people, there may not be sufficient time for everyone to speak.
- Only a few people may dominate the discussion. So, the outcome of the meeting will be the view of those who spoke most during the meeting.
- The problem with such meetings is that some people are afraid to speak out for fear that they may be criticised.

5.6.2 Prototyping

Designing and building a scaled down, but functional version of a desired system is known as prototype. In other words, it is the model of the software to be built. It can be developed using appropriate software such as 3GL, 4GL with query, screen, report, form, etc. The analyst builds a prototype as per the preliminary or basic requirements of the user. Whenever the prototype is displayed to the clients, they give their suggestions regarding improvement of features, etc., or they may accept it. Of course,

there is every possibility of rejection also. Based on the user feedback, the analyst improves the prototype and makes a new version of the prototype. This process continues till the client is satisfied and fulfils his/her needs. In some cases, prototypes are further scaled upwards to become full fledged software to be delivered to the customer. This model is useful for determining requirements for the software to be built in the following situations:

1. Requirements are not clear.
2. For any complex systems, prototypes are more useful.
3. In the cases where communication problems exist between customer and analysts, this model is useful.
4. Tools and data are readily available for building the working system.

There are some disadvantages of the prototype model:

1. In case of prototyping, formal documentation is avoided.
2. Usually, prototypes are stand alone systems. Building prototypes is difficult in cases where data has to be shared.
3. Important issues, such as security and validation, are not given importance

Check Your Progress 3

1. is nothing but a model of the software to be built.
2. In most of the projects, missing the delivery schedules will lead to
3. is a process in which group meetings are held to analyse the problem and define the requirements of the desired system.

5.7 SUMMARY

The process of systems planning is a critical activity in the life of a project. Here, we have focused on determination of requirements, gathering of information about the existing system. There are many techniques for requirements determination which include interviews, questionnaires, group discussions, site visits, and presentations. One or more of the above techniques are used to gather adequate information about the current system. Each technique has its own advantages and disadvantages. In personal interview, the systems analyst gathers information through face to face interaction. It is very common and simple method of fact finding. In a group discussion, a group of individuals is called from different work groups. In this method, problems of all the sections are discussed and a suitable and acceptable solution is arrived at. In the process of site visits, the systems analyst watches the activities and learns about the system. Questionnaires are special type of documents which allow the system analyst to collect information from the respondent.

In this unit, the process of study of feasibility of developing the system is examined. In feasibility study, it is stated whether the project assessment can be accepted for development or is to be rejected for its infeasibility. The key activity in the project planning is the assessment of different feasibility issues associated with the project. It includes economic, technical, operational and legal issues. The economic feasibility judges the cost effectiveness of the project. There are two types of costs involved in a project:

- System Development Costs.
- Operation and Maintenance Costs.

The benefit consists of saving the tangible costs by using the system and the intangible costs by improving the quality of service. In operational feasibility, systems analyst assesses the degree to which the proposed system solves business problem or takes advantage of business opportunity. The legal issues to be considered are copyright law, antitrust legislation, foreign trade legislation, etc.

There are several modern information gathering techniques used by the systems analyst. Some of them are: Joint Application Development (JAD) and Prototyping. JAD is a structured process in which users, managers, and analysts work together through a series of meetings to specify system requirements.

5.8 SOLUTIONS/ANSWERS

Check Your Progress 1

1. Structured interviews, Unstructured interviews.
2. Questionnaires.
3. Development.

Check Your Progress 2

1. Feasibility Study.
2. Operational Feasibility.
3. Costs and benefits.

Check Your Progress 3

1. Prototype.
2. Penalties.
3. Joint Application Development.

5.9 FURTHER READINGS

- Jeffrey A.Hoffer, Joey F.George and Joseph S.Valacich; *Modern Systems Analysis and Design*; Pearson Education; Third Edition; 2002.
- Jeffrey L. Whitten, Lonnie D. Bentley, Kevin C. Dittman; *Systems Analysis and Design Methods*; Tata McGraw Hill; Fifth Edition;2001.
- Elias M. Awad; *Systems Analysis and Design*; Galgotia Publications; Second Edition; 1994.
- Perry Edwards; *Systems Analysis and Design*;McGraw Hill Publication;1993.

Reference Websites

<http://www.rspa.com>

<http://www.cbpa.csusb.edu/flin/info609/sysplan>