**PHASE 2 :**

**SYSTEM ANALSYSI**

**LESSON 6**

FEASIBILITY ANALYSIS AND THE SYSTEM PROPOSAL

**INTRODUCTION**

In the previous lesson we have completed three main activities involved during system analysis phase; requirement gathering, data and process modeling. Next, in this lesson Six, the system development team should perform the feasibility analysis to make a decision either to continue or cancel the project. The final decision on which solution to select would be made by the steering committee that was overseeing the project. This lesson consists of six sections:

* overview of feasibility and the system proposal
* tests for feasibility
* cost-benefits analysis techniques
* techniques for assessing economic feasibility
* feasibility analysis of candidate system
* the system proposal

**LEARNING OUTCOMES**

At the end of this lesson, students should be able to :

* identify and explain three feasibility checkpoints in the system’s life cycle
* differentiate six types of feasibility testing
* perform various cost-benefit analyses
* use the techniques to assess the economic feasibility
* analyze the candidate system
* write suitable system proposal reports and plan for formal presentation

**TERMINOLOGY**

|  |  |  |
| --- | --- | --- |
| **No** | **Word** | **Definition** |
| 1 | Cultural feasibility | A measure of how the end users feel about the proposed system |
| 2 | Economic Feasibility | A measure of the cost-effectiveness of a project |
| 3 | Feasibility | The measure of how beneficial or practical is the system |
| 4 | Legal Feasibility | A measure of how well a solution can be implemented within existing legal and contractual obligations |
| 5 | Net present value | A technique that compares the annual costs and benefits of alternative solutions |
| 6 | Operational Feasibility | A measure of how well a solution meets the identified system to the organization to solve the problems requirements |
| 7 | Pay back analysis | A technique is a popular technique for determining if and when an investment will pay for itself. |
| 8 | Return on investment | An analysis technique compares the lifetime profitability of alternative solutions |
| 9 | Schedule Feasibility | A measure of how reasonable a project timetable is |
| 10 | System proposal | A report or presentation of a recommend system |
| 11 | Technical Feasibility | A measure of practicality of a technical solution and the availability of technical resources and expertise |

* 1. **OVERVIEW OF FEASIBILITY AND THE SYSTEM PROPOSAL**

Feasibility analysis should be conducted during the analysis phase before the decision is made by the top management. Feasibility is a measure of how beneficial or practical an information system will be to the organization. There are three feasibility checkpoints during the system analysis phase of the system development life cycle. At the end of this checkpoints, the decision will be made either the system development works will be continued or cancelled. In every checkpoint, there are six tests that can be used for feasibility analysis; operational feasibility, cultural feasibility, technical feasibility, schedule feasibility and economic feasibility.

*Scope definition checkpoint*

The first feasibility checkpoint where a measurement is more on answering questions such as; do the problems and opportunity warrant the cost of a detailed study of current system? At this checkpoint, the problems and opportunities are measured in terms of accuracy. This feasibility is not focus from the aspects of development costs, time and other. After estimating the real problems and opportunities, then, the system analyst will estimates the development cost.

*Problem analysis checkpoint*

The second feasibility checkpoint where occurs after the detailed measurement on problem analysis of the current system. After the problems and opportunities are defined, it’s easy for the system analyst to come out with good development cost estimation. At this stage, the minimum development cost is equal with solving the problems. But the real development cost is done did the requirement analysis.

*Decision analysis checkpoint*

The third feasibility checkpoint where major feasibility analysis will be conducted after completing the user requirements. At this point, several alternative solutions are available and define its input/output methods, data storage, software and hardware requirements and other. This checkpoint is where all the detailed estimation of development cost is available.

**6.2 SIX TESTS FOR FEASIBILITY**

Feasibility can be viewed from different perspectives. During the system planning phase, we have identified six types of feasibility; operational feasibility, technical feasibility, economic feasibility, schedule feasibility, cultural feasibility and legal feasibility. We will explain more details all this feasibility in this sub topic.

* + 1. **Operational Feasibility**

Operational Feasibility is feasibility that measure of how well a solution meets the system requirements in order to solve the problems and take advantage from the opportunities identified during the scope definition and analysis activity. It measure on how it satisfies the system requirements that have been identified in the requirements analysis activity. It’s also concerns on what is the current problem and with cost of the solution provided; either the problem is still there or not.

* + 1. **Technical Feasibility**

Technical feasibility is a measure of the practically of a technical solution and the availability of technical resources and expertise. Normally, technical feasibility addresses three major issues :

* Are the proposed system and the technology used practical enough?
* Do we currently posses the necessary technology?
* Do we have the necessary technical expertise?
  + 1. **Economic Feasibility**

Economic feasibility is a measure to identify the financial benefits and costs related with the development project. Lots of people focus more on economic feasibility. At the early stage of system development project, the cost analysis amount is too little. It’s impossible to estimate the cost at the early stage of the system development because the system requirement has not been identified and the development did not started yet. Normally, the cost estimation should be worth it with the benefits got from the system. However, as soon as specific requirement and the proposed system have identified, the system analyst can weigh the cost and benefits of each alternative. This is referred to cost-benefit analysis.

* + 1. **Schedule Feasibility**

Schedule feasibility measure of how reasonable a project timetable is. We ask the technical expertise, is the project can be completed within the deadlines? During the schedule feasibility analysis, it’s important to define the deadlines for every phase if there is any.

* + 1. **Cultural Feasibility**

Cultural feasibility also refers as political feasibility. This is related with operational feasibility. But, the operational feasibility deals more on how well the solution meets the system requirement but the cultural feasibility deals with how the end users feel about the proposed system. We can say that operational feasibility concerns with whether the system can work in solving the problem and cultural feasibility concerns with whether the system can be adapted in the organizational environment.

The following questions can help the team when doing cultural feasibility :

* Does the management support the system?
* How do the end users feel about their role in the proposed system?
* What end users or managers may resist or not use the system?
* How will the working environment of the end users can change with the proposed system?
  + 1. **Legal Feasibility**

Information system has a legal impact. Legal feasibility is a measure of how well a solution can be implemented within existing legal and organization’s policy. It’s also regarding copyright issues. For example, if we need certain software in develop the system; we have to make sure that we use the licensed software.

* + 1. **Exercises**

*Answer TRUE or for FALSE for each of the questions below.*

1. Feasibility is the measure of how beneficial or practical the development of an information system will be to an organization. **TRUE**
2. Operational feasibility is a measure of how well a solution meets the identified system requirements. **TRUE**
3. Cultural feasibility is a measure of how well the solution will be accepted in the organizational surroundings. **TRUE**
4. Operational feasibility is a measure of the practically of a technical solution and the availability of technical resources and expertise. **FALSE**
5. Schedule flexibility is a measure of how reasonable a project timetable is. **true**
   1. **COST-BENEFITS ANALYSIS TECHNIQUES**

Economic feasibility has been defined as a cost benefit analysis. It’s a way to estimate the benefits and costs in the system development. In order to determine this, we need to do a comparison between this.

* + 1. **Costs**

An information system can have tangible costs and intangible costs. Tangible costs refer to items that you can easily measure in terms of money and with certainty. During the system development, tangible cost includes hardware costs, labor costs, and others. Intangible costs refers to cost derived from the system, but it can’t be measured in terms of money and with certainty. Examples of intangible costs are loss of customer goodwill, and employee morale.

In system development life cycle, there are two types of costs; costs of developing the system and costs of operating the system. The cost of developing the system refers to one time costs which it will not recur after the project has been completed. Several categories of costs that need to be considered such as :

* Personnel costs – salaries for the person involved such as system analyst, programmer, system designer, data entry personnel, manager and others.
* Computer usage – computer time for the activities such as programming, installation, data loading, storage and others.
* Training – the cost of training that will be provided for users who will use the system.
* Supply, duplication and equipment costs
* New hardware and software costs

There are two types of costs, fixed cost and variable cost. Fixed cost is a cost that occurs at a regular interval and at a relatively fixed rate such as salaries. Variable cost is a cost that occurs in proportion to some usage factors such as printer toner, paper and others.

* + 1. **Benefits**

Similar with costs, an information system can provide a lot of benefits to an organization. It can be divided as tangible benefits and intangible benefits. A tangible benefit refers to benefits that can be measured in terms of money and with certainty. An example of tangible benefits are reduces the cost, increase the profits. An intangible benefit refers to benefits derived from the system, but it can’t be measured in terms of money and with certainty. An example of intangible benefits are competitive necessity, improved the organizational reputation, faster decision making. Normally, benefits can increase the organizations’ profit and can decrease the costs, either in short term or long term.

* + 1. **Exercises**

*Answer TRUE or for FALSE for each of the questions below.*

1. A cost-benefit analysis is a way to estimate and compare the benefits and costs in the system development. **TRUE**
2. Purchasing a new hardware is a tangible cost. **TRUE**
3. The cost of printer paper is not a variable cost. **FALSE**
4. When estimating the system development costs, the cost of buying computer cannot be included. **FALSE**
5. An example of intangible benefits is improving the organizational reputation. **TRUE**
   1. **TECHNIQUES FOR ASSESSING ECONOMIC FEASIBILITY**

There are three popular techniques can be used for assessing the economic feasibility; payback analysis, return on investment and net present value. We will discuss these three techniques in this following section.

* + 1. **Payback Analysis**

Payback analysis technique is a popular technique for determining if and when an investment will pay for itself. As mentioned earlier, system development needs more costs during the earlier phases we need more time to get the benefits to overtake the costs. At the early phases of system development, most of the costs spend on analysis, design and implementation. After implementation, the cost is needed for the operating expenses that must be recovered. Payback analysis determines how much time needed before benefits overtake the costs needed. This period is refer payback period. Figure 6-1 shows that before entered the year three, the benefits can overtake the costs spend.



**Figure 6-1: Payback Analysis**

* + 1. **Return On Investment**

Return on Investment (ROI) analysis technique compares the lifetime profitability of alternative solutions. The ROI of the solution is a percentage rate that measures the relationship between the amounts the business get back from the investment and the amount invested.

Lifetime ROI = (Estimated lifetime benefits – Estimated lifetime costs)/ Estimated lifetime costs

As for example from Figure 6-1 above:

22000 – 13000 = 9000

Therefore the lifetime ROI is

Lifetime ROI = 9000/13000 = .692 = 70%

* + 1. **Net Present Value**

Net present value is a technique that compares the annual costs and benefits of alternative solutions. We define the costs and benefits for each years of the system’s lifetime. Using a same example as Figure 6-1, we can determine the net present value as in Figure 6-2 below.



**Figure 6-2: Net Present Value**

* + 1. **Exercises**

*Answer TRUE or for FALSE for each of the questions below.*

1. Payback analysis is a technique used for determining if and when an investment will pay for itself. **TRUE**
2. In payback analysis the period of time determine how much time needed before benefits overtake the costs needed is refer to payback period. **TRUE**
3. It’s abnormal if the costs spend during the early phases is more than the late phase. **FALSE**
4. Return on investment is a measurement of calculation computes a percentage. **TRUE**
5. Net present value is a technique that compares the annual costs and benefits of alternative solutions. **TRUE**

**6.5 FEASIBILITY ANALYSIS OF CANDIDATE SYSTEM**

At the third checkpoint of the feasibility analysis, the team identifies all candidate system solutions and then analyzes each of them. We do a comparison for each of the candidate to choose which candidate is the best solution to be applied. There are two can be used to make a comparison and make a recommendation. These two matrices are candidate system matrix and feasibility analysis matrix.

* + 1. **Candidate System Matrix**

Candidate system matrix allows us to make a comparison between all the candidate systems that available. It is a tool used to compare the similarities and differences between candidate systems based on certain characteristic. Table 6-1 shows an example of candidate systems matrix.

**Table 6-1: Candidate Systems Matrix Template**

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristics | Candidate 1 | Candidate 2 | Candidate 3 |
| Portion of the system |  |  |  |
| Benefits |  |  |  |
| Software needed |  |  |  |
| Input devices |  |  |  |
| Output devices |  |  |  |

* + 1. **Feasibility Analysis Matrix**

Feasibility analysis matrix is similar with candidate system matrix, but the different is it comes with an analysis and ranking of the candidate systems. It has same columns as in candidate system matrix with an additional column named ranking column. Table 6-2 shows an example of feasibility analysis matrix.

**Table 6-2: Feasibility Analysis Matrix Template**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Weighting | Candidate 1 | Candidate 2 | Candidate 3 |
| Description |  |  |  |  |
| Operational Feasibility |  |  |  |  |
| Technical Feasibility |  |  |  |  |
| Economic Feasibility |  |  |  |  |
| Schedule Feasibility |  |  |  |  |
| Legal Feasibility |  |  |  |  |
| Cultural Feasibility |  |  |  |  |
| Weighted score |  |  |  |  |

* + 1. **Exercises**

*Answer TRUE or for FALSE for each of the questions below.*

* 1. At the third checkpoint of the feasibility analysis, the team identifies all candidate system solutions and then analyzes each of them. **TRUE**
  2. Each of the candidate systems can be compared using two tools; candidate systems matrix and feasibility analysis matrix. **TRUE**
  3. Feasibility analysis matrix a tool used to compare the similarities and differences between candidate systems based on certain characteristic. **FALSE**
  4. Candidate system matrix allows us to make a comparison between all the candidate systems that available. **TRUE**
  5. The feasibility analysis matrix is a tool used to rank candidate systems. **TRUE**
  6. **THE SYSTEM PROPOSAL**

Notice that during this decision analysis task, it involves identifying all candidate solutions, analyzing all candidate solutions using the matrix discussed earlier, ended up with selecting the best candidate to be implemented. Next, the team will continue with the preparing the system proposal. System proposal can be in a format of a report or a formal presentation of a recommended solution. Normally, both methods; report and formal presentation will be used.

* + 1. **Report**

A report about the recommended system is prepared by the team to the several categories of audiences such as top management, clerk, manager and end users. The report consists of both primary and secondary elements. Primary element is the actual information that the report is intended to convey while secondary elements is information about the recommended system. Main basic and important element in this report is introduction, methods and procedures and conclusion. It’s important to write the report in a proper way, well organized, using simple but meaningful words, so that it can deliver effectively to the target audience.

* + 1. **Formal Presentation**

Formal presentation is another way in how the team presents the findings of the recommended system to solve the problem to the audience. The way how to conduct the presentation will effect the audience’ confident towards the system. Effective and successful presentation requires significant preparation. Using presentation is good because the audience can respond during the session, and a good body language will convey the message which is difficult to show in written report. Visual aids can be used to support and convey the ideas.

* + 1. **Exercises**

*Answer TRUE or for FALSE for each of the questions below.*

* 1. System proposal is a time when top management decides either to proceed or cancelled the project. **TRUE**
  2. The team must choose either to write a report or present the system proposal. **FALSE**
  3. When writing a system proposal we should include less information for higher-level management. **TRUE**
  4. The systems proposal is a deliverable that is usually a formal written report or oral presentation intended for system users. **TRUE**
  5. During the presentation, using visual aids is important in order to support the presentation. **TRUE**

**SUMMARY**

This is the end of lesson Six. In this lesson, we have learned :

* feasibility and the system proposal
* tests for feasibility
* cost-benefits analysis techniques
* techniques for assessing economic feasibility
* feasibility analysis of candidate system
* the system proposal

In the next lesson, we will discuss several types of development strategies that should be considered in the system development.

**SELF ASSESSMENT**

*Fill in with the correct answer*

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the measure of how beneficial or practical the development of an information system will be to an organization. **Feasibility**
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a measure of how well a solution meets the identified system requirements. **Operational feasibility**
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a measure of how well a proposed system solves the problems and takes advantages of the opportunities envisioned for the system. **Technical feasibility**
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ feasibility is a measure of how reasonable the project timetable is
5. The three techniques for assessing economic feasibility are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **payback analysis, return on investment, net present value**
6. In \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the period of time that will elapse before accrued benefits overtake accrued and continuing costs is called the payback period. **payback analysis**
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are those benefits believed to be difficult or impossible to quantify. **Intangible benefits**
8. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ calculation computes a percentage. **return-on-investment**
9. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ complements the feasibility analysis matrix with an analysis and ranking of the candidate systems. **candidate systems matrix**
10. When writing a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ you should include less information for higher-level management. **system proposal**