

MODULE 4

FEASIBILITY ANALYSIS

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FEASIBILITY ANALYSIS

MOTIVATION

Before a management decides to implement a computer based system they should know the goals which will be met by the system. These goals should primarily be quantitative goals so that when the system is implemented it is possible to compare quantitatively the achievements with the original goals set. Analysts should be able to estimate what hardware and human resources will be needed to implement a system to meet the goals. Analyst must examine alternative methods to implement the system and their resource needs. A cost-benefit analysis should be carried out for each alternative and given to the management. This analysis will be essential for a management to decide which solution they would like to implement. Feasibility of meeting goals with available technology and human resource and cost/benefit are important parameters for informed management decision-making.

LEARNING GOALS

At the end of this module you will know

- How to formulate the goals to be met by the information system to be designed
- How to quantify the goals
- How to obtain alternative solutions to satisfy the goals
- How to assess the feasibility of implementing alternative solutions.
- How to compute cost vs benefits of each alternative feasible solution
- How to prepare a system proposal for the potential users of the system

LEARNING UNIT 1

How to formulate project goals and quantify them

STEPS IN FEASIBILITY ANALYSIS

- Note down deficiencies in current system found while preparing SRS Document
- Set goals to remove deficiencies
- Quantify Goals
- Find alternative solutions to meet goals
- Evaluate feasibility of alternative solutions taking into account constraints on resources.
- Rank order alternatives and discuss with user.
- Prepare a system proposal for management approval
 - Quantify the goals and sub-goals from the verbal statement of goalFor example: Send bill soon after month end
Quantified statement of the same goal:
Send bill within 5 days of month end
 - Find out whether it is possible to meet these goals.
 - Determine the cost of meeting each goal
 - Find cost benefit if quantified

GUIDELINES FOR SEARCHING GOALS

Identify the deficiency by pinpointing missing functions, unsatisfactory performance and excessive cost of operations. Set Goals to remove deficiency and provide competitive advantage

CHARACTERSTICS OF A GOAL

Must be quantified, realizable with the constraints of the organization and the system, broken down into Sub-Goals, agreeable to all concerned, in general goals must not only remove deficiency but also give a system which is superior to those of the competitors of the organization.

CASE STUDY-HOSTEL INFORMATION SYSTEM

(For details of this Case Study see Chapter 5 page 46-58 of book “Analysis and design of Information Systems”, Prentice Hall of India, New Delhi,2002 by V.Rajaraman)

MISSING FUNCTIONS

- 1.1 Stores requirement not forecast
- 1.2 Purchases not consolidated
- 1.3 Daily rate calculation not frequently updated
- 1.4 Menu not planned for balanced nutrition and low cost

UNSATISFACTORY PERFORMANCE

- 2.1 Billing not accurate and prompt
- 2.3 Student bills not itemized
- 2.3 Stores issue to cooks arbitrary
- 2.4 Payments to vendors not prompt
- 2.5 Large variations in mess bills every month

DEFICIENCIES (HIGH OPERATIONAL COST)

- 3.1 Unpaid and long outstanding bills from students
- 3.2 Extras and rebates not reflected in stores issues
- 3.3 Frequent small purchases at high cost
- 3.4 High transport cost due to not consolidating stores requirements

FORMULATION OF GOALS

MAIN GOALS

- M1 . Send bill to students within 5 days of the end of month
- M2. Control inventory of items in stores & issues to cooks to bring down mess bill by 10%
- M3. Balance menu to meet nutritional requirements
- M4. Cost of new menu not to exceed current cost

FORMULATION OF SUB-GOALS

- S1.1 Itemize bills showing extras and rebates with dates
- S1.2 Ensure less than 5% variations of bills from month to month
- SI.3 Bills not paid within 10 days of issue brought to the attention of chief warden
- S1.4 Update daily rates every day

Main goals M1 and sub-goals S1.1,S1.2,S1.3 remove deficiencies
1.3,2.1,1.2.2,2.5,3.1

- S2.1 Ensure payment to vendors within five days of supply of items
- S2.2 Maximum 4 trips per month for purchases. Cartage less than 1% of item cost
- S2.3 Reduce inventory level. Level not more than 10% of requirements in a month
- S2.4 Issue to cooks every day not to exceed 5% of calculated values

Main goals M1& sub-goals above remove deficiencies
1.1,1.2,2.3,2.4,3.2,3.3,3.4

LEARNING UNIT 2

Examining alternative solutions and evaluating proposed solutions

EXAMINING ALTERNATIVE SOLUTIONS

HOSTEL INFORMATION SYSTEM

ALTERNATIVE SOLUTIONS

A: Improve manual system

B: Use PC based periodic update system

C: An on-line system with server and several clients

SOLUTION A: MANUAL SYSTEM

Keep up-to-date running total of extras and rebates for each student, use look up table to find material needed each day based on number of extras, calculate standard quantities needed and use for vendor order, track student payments to find overdue payments. Solution does not ensure reduction in bill variations and prompt payment to vendors, solution not scalable to large student population

SOLUTION B: USE PC BASED PERIODIC UPDATE SYSTEM

Use a single PC to prepare students bills and to itemize bills, prepare a list of number of members who will eat for next two days, alert warden when bill is not paid within 10 days of issue. Use a PC to generate Vendor order, Inventory control of store and Menu planning.

The PC configuration needed based on data base sizes is:

PC with 20 MB disk, 1.2 MB floppy is sufficient. However minimum configuration available today(2004) is PC with 128 MB main memory, 40 GB disk 1.2MB floppy & CD R/W costs Rs. 25,000. Systems software (Windows XP, MSOffice, anti-virus) will cost around Rs.25,000.

So, the Total cost is Rs 50,000.

But a PC with printer and uninterrupted power supply costs Rs. 70,000

SOLUTION C: AN ON-LINE SYSTEM WITH SERVER AND SEVERAL CLIENTS

Use a server which is accessed by 3 clients one each in the mess, the stores and the accounts sections; perform on-line transaction processing. The advantage is up to the minute status can be found

EVALUATING ALTERNATIVE SOLUTIONS

Determine Technical feasibility of each solution, in other words is technology mature to implement a solution. Determine Operational feasibility of each solution. In other words, for a given organizational structure will the solution fit in. Will it provide right information at the right time to users? Determine Economic feasibility of each solution. In other words, are finances available to implement system? Will it be cost effective? Will the money spent be recovered by savings or by better services to users.

TECHNICAL AND OPERATIONAL FEASIBILITY

Solution B is rejected, as it does not meet most of the requirements. Solution C is rejected, as it is a high cost solution.

Solution B is selected for further consideration. It is technically feasible as PC of necessary configuration is easily available. It is also operationally feasible as clerks in hostel office can be easily trained to use a PC. System analyst/ programmer hired for this purpose will write the necessary problems.

LEARNING UNIT 3

Cost benefit analysis. Documenting feasibility report.

COST-BENEFIT ANALYSIS

This is done to find economic feasibility of proposed solution and to find whether returns by implementing a system justify the cost. This is found by listing direct and indirect costs

Direct cost- Cost of computer, software, space, human resource, material, travel, training etc.

Indirect cost- Time spent by persons and data gathering

BENEFITS

Tangible benefits are measurable.

Direct benefits are savings due to reduced inventory, early collection of outstanding payments, reduced wastage, faster production, increased production.

Indirect benefit is increased work done with same human resource.

Intangible benefits are like better service to customers, superior product quality, accurate, reliable, timely and up-to-date strategic, tactical and operational information to management

COST BENEFIT ANALYSIS

CASE STUDY OF HOSTEL INFORMATION SYSTEM

COST : PC,UPS,Printer+Systems analyst+programmer

Capital 70,000 +60,000 =1,30,000

Cost(Recurring) : Stationery, maintenance,floppy etc.

Rs. 2000 per month

Benefits : - Inventory reduction 5% of mess bill of 400 students

Daily rate=Rs 45

Savings= $45 \times 0.05 \times 30 \times 400 = \text{Rs } 27,000$

- Transport cost saving=Rs 800 per month

- Savings due to early payment

=material cost*1.2%= $37.5 \times 400 \times 30 \times 0.012 = \text{Rs } 5400$

- Savings due to early collection = $40 \times 1350 \times 0.01 = \text{Rs } 540$

Direct saving=33740

Indirect benefit : student satisfaction due to itemized bill,
predictable daily rate, better menu

Net Direct Saving per month= $33740 - 2000$

= 31740

Total capital cost=1,30,000

PAY BACK PERIOD

SIMPLE: Cost 1,30,000

Saving 31,740 per month

Cost recovered in $130000/31740 = 4.1$ months

Using interest on capital:

Monthly interest= $0.015 \times 1,30,000 = \text{Rs } 1950$ per month

Saving per month= $31740 - 1950 = 29790$

Cost recovered in $130000/29790 = 4.4$ months

PRESENT VALUE METHOD

Accounts for the fact that a benefit accruing **n** months later will be lower today as the money if available today would have earned interest

If **r** = Interest rate in % per month.

n = number of months

x = benefit

Present value of benefit accruing **n** months later is:

Present value = $x/(1+r)^n$

COST-BENEFIT

Present Value method

This accounts for the fact that benefits each month will also earn interest

Month	Cost	Net-Benefit	present value of Benefit	cumulative Benefit
0	1,30,000	0	0	
1		31,740	31271	31271
2		31,740	30809	62080
3		31,740	30354	92434
4		31,740	29905	122339
5		31,740	29463	151802

This also give us less than 5 months as pay back period

STRUCTURE OF EXECUTIVE SUMMARY

Feasibility report

- What the proposed system will achieve
- Who will be involved in operating the system
- Organizational changes to implement system
- List of benefits of the system
- Cost of system - Capital +Recurring
- Cost-benefit analysis

SYSTEM PROPOSAL STRUCTURE

- Introduction with outline of proposal
- Data flow diagram of existing system
- Modified DFD of proposed system
- Discuss alternative solutions
- List new equipment to be installed (if any)
- Technical,operational feasibility of analysis
- Cost- Benefit analysis
- New procedures, human resources and training needed
- Anticipated problems
- Implementation plan

REFERENCES

1. This module is based on Chapter 6, “Feasibility Analysis”, of the book Analysis and Design of Information Systems by V.Rajaraman, Prentice Hall of India. Parts of the the book have been used in case studies.

2. J.E.Kandall and J.E.Kandall, Systems Analysis and Design, 5th Edition, Pearson Education (Asia) 2003. Part of Chapter 3 pp.55-63 deal with feasibility analysis. It is reasonably well treated but does not have any quantitative examples.
3. R.Schultheis and Mary Summer, Management Information Systems, Tata McGraw Hill, 1999. Very short treatment of feasibility analysis as part of system Life Cycle (pp.544-545).
4. S.Alter, Information Systems, 4th Edition, Pearson Education Asia, New Delhi, 2002. A brief discussion of feasibility analysis presented on pp.481 as part of traditional life cycle method. In the same chapter there is a brief discussion of prototype method which is used when users are not able to state their requirements clearly.
5. K.C.Laudon and J.P.Laudon, Management Information Systems, Pearson Education Asia, New Delhi, 2004. Very brief discussion (one para only) on p.390)
6. J.A.Hoffer, J.F.George and J.S.Valacich, Modern Systems Analysis and Design, Pearson Education Asia, New Delhi 2002. Has a good discussion of feasibility. study on pp.168 to 181. Besides Technical, operational and Economic feasibility they also include other parameters which are schedule, legal/contractual and political feasibility which arise when one tries to develop a system.