Software Engineering and Information System

Lecture 03: FEASIBILITY ANALYSIS

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FEASIBILITY ANALYSIS

Learning Units

4.1 How to formulate project goals and quantify them

4.2 Examining alternative solutions and evaluating proposed solutions

a) Technical feasibility

b) Operational feasibility

c) Economic feasibility

4.3 Cost benefit analysis.Documenting feasibility report.

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 also be able to estimate what hardware and human resources will be needed to implement a system to meet the goals

MOTIVATION

- 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

- 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

FEASIBILITY ANALYSIS

The following are the results of the Information gathering phase:

- Deficiency of the current system are found
- Consensus is arrived at on requirements
- SRS Document is prepared

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

FEASIBILITY ANALYSIS

- Define the goals and sub-goals of the proposed system
- Quantify the goals and sub-goals from the verbal statement of goal

For 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

  -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

(Detailed description of case is given in module3)

DEFICIENCIES OF CURRENT SYSTEM IDENTIFIED

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

CASE STUDY-HOSTEL INFORMATION SYSTEM

DEFICIENCIES (BAD PERFORMANCE)
UNSATISFACTORY PERFORMANCE

2.1 Billing not accurate and prompt

2.2 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

CASE STUDY-HOSTEL INFORMATION SYSTEM

DEFICIENCIES (HIGH OPERATIONAL COST)

3.1Unpaid 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

CASE STUDY-HOSTEL INFORMATION SYSTEM

FORMULATIOIN OF GOALS

MAIN GOALS

Ml . 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

CASE STUDY-HOSTEL INFORMATION SYSTEM

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

CASE STUDY-HOSTEL INFORMATION SYSTEM

FORMULATIOIN OF SUB-GOALS

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

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

Manual System may be improved as follows

- 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
- Cost each day's issue and keep running total
- 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 a single PC to

- Prepare students bills-itemize bills
- Prepare number of members who will eat for next two days
- Alert warden when bill not paid within 10 days of issue
- Vendor order generation
- Inventory control of store
- Menu planning

SOLUTION B

PC configuration needed based on data base sizes

PC with 20 MB disk, 1.2 MB floppy 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.

Total cost=Rs 50,000

Need PC+ printer+uninterrupted power supply cost Rs. 70,000

SOLUTION C

- 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.
- Advantage: Up to the minute status can be found
- Number of transactions small and does not justify 4 computers
- Solution unnecessarily expensive and rejected

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 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. The necessary problems will be written by system analyst/ programmer hired for this purpose.

COST-BENEFIT ANALYSIS

- Needed to find economic feasibility of proposed solution
- Objective to find whether returns by implementing a system justify the cost
- Found by listing all costs direct and indirect
- Direct cost- Cost of computer, software, space, human resource, material,travel, training etc.
- Indirect cost- Time spent by persons and data gathering
- Benefit- Tangible- measurable

  Intangible- better management

  -better user satisfaction

BENEFITS

Direct - Savings due to reduced inventory, early collection of outstanding payments, reduced wastage,faster production, increased production

Indirect –Increased work done with same human resource

Intangible - better service to customers

- superior product quality

- accurate,reliable,timely and up-to-date strategic,tactical and operational information to management

COST – BENEFITS 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*0.05*30*400=Rs 27,000

- Transport cost saving=Rs 800 per month

- Savings due to early payment

=material cost*1.2%=37.5*400*30*0.012=Rs 5400

- Savings due to early collection =40*1350*0.01=Rs 540

COST – BENEFITS ANALYSIS

Direct saving=33740

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

Net Direct Saving per month= 33740-2000

=R31740

Total capital cost=l,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* 1,30,000

=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 account 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 EXCUTIVE 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