CSE 4016 Software Project Management

Project Evaluation and Programme Management

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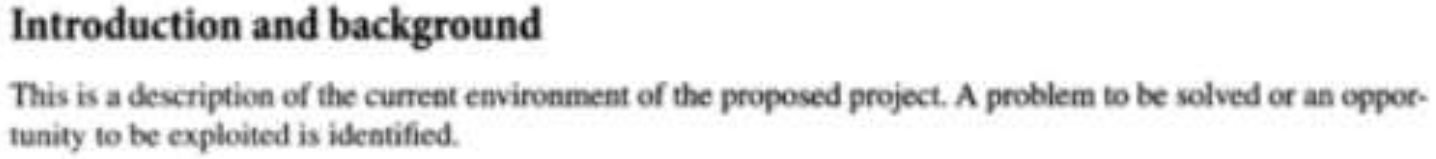
Objectives

- describe the contents of a typical business plan;
- explain project portfolio management;
- carry out an evaluation and selection of projects against strategic, technical and economic criteria;
- use a variety of cost–benefit evaluation techniques for choosing among competing project proposals;
- evaluate the business risk involved in a project;
- explain how individual projects can be grouped into programmes;
- explain how the implementation of programmes and projects can be managed so that the planned benefits are achieved.

Business plan/Case

Business plan is a concrete plan and documentation of one project from feasibility study to maintenance and also provide a benefits of the project. This documentation contains the following points.



Introduction and background

This is a description of the current environment of the proposed project. A problem to be solved or an opportunity to be exploited is identified.

Proposed Project: A brief outline of proposed project is provided.

Market: Market survey for newly created proposal, its demand, competitors.

Organizational and operational infrastructure: How structure of the organization will be effected by implementing the project.

Benefits: Discuss benefits from different aspects.

Outline implementation Plan: activities like promotion, marketing, operational and maintenance infrastructure need to be consider, responsibilities for tasks.

Costs: Schedule expected cost for each activity.

Financial Case: Incoming and outgoing cost analysis.

Risk: Risk analysis should be recorded in every activity and should be reduced.

Project Portfolio Management

Provides an overview of all projects that an organization is undertaking or considering. It prioritize the recourses of projects and decides which project should consider and which project should dropped. Three key aspects of Project Portfolio Management are-

Project Portfolio Definition: Organization should record all current project into one repository and gives one clear cut idea about NPD or renewal/extension of old project.

Project Portfolio Management: More detail costing and its analysis can be recorded for each project. These data can be used by project manager on current project or screen for new project.

Project Portfolio optimization: performance of portfolio can be tracked by high label manager on regular basis. Better balanced project may be achieved. EX: project returns good profit but have high risk should be rejected.

Evaluation of Individual Project

Technical Assessment

Cost benefit analysis:

Identify all of the costs and benefits of carrying out the project and operating the delivered application.

Express these costs and benefits in common unit.

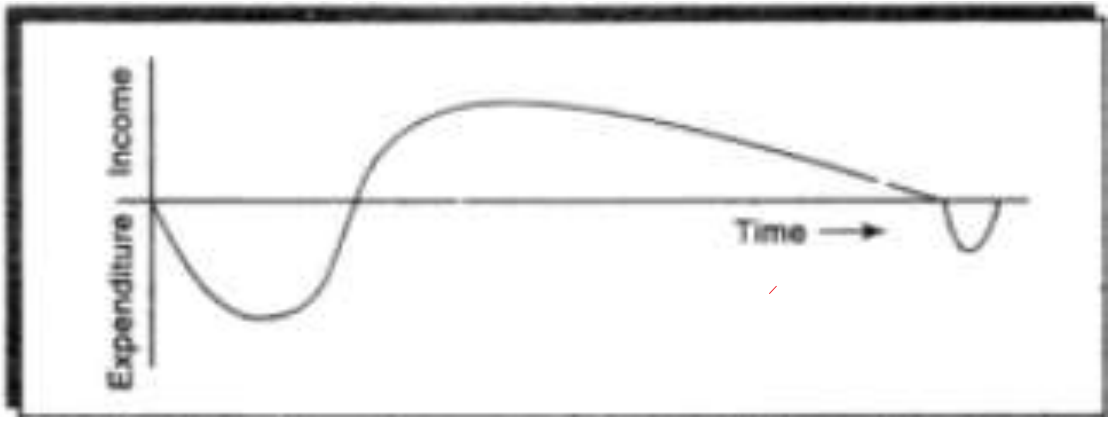
Development Cost

Installation Cost

Operational Cost

Cash flow forecasting

Estimating overall cost and benefits of a project is produce a cash flow forecast. It indicates when expenditure and income will take place.



Cost benefits evaluation Technique

Year	Project 1	Project 2	Project 3	Project 4
0	-100,000	-1,000,000	-100,000	-120,000
1	10,000	200,000	30,000	30,000
2	10,000	200,000	30,000	30,000
3	10,000	200,000	30,000	30,000
4	20,000	200,000	30,000	30,000
5	100,000	300,000	30,000	75,000
Net profit	50,000	100,000	50,000	75,000

- **Payback Period:** time taken to break even or time taken to return investment.
- **Return on Investment: (ROI)** $= \frac{\text{Average annual profit}}{\text{total investment}} * 100$
- Some time ROI also known as ARR (Accounting rate of return)

NPV(Net Present Value): It is a project evaluation technique that takes into account the profitability of a project and the timing of the cash flows that are produced.

Present value =(value in year t)/$(1 + r)^t$ where r is a discount rate and t is time.

Year	Project 1 cash flow (£)	Discount factor @ 10%	Discounted cash flow (£)
0	-100,000	1.0000	-100,000
1	10,000	0.9091	9,091
2	10,000	0.8264	8,264
3	10,000	0.7513	7,513
4	20,000	0.6830	13,660
5	100,000	0.6209	62,090
Net Profit:	£50,000	NPV: £618	

Calculate the NPV for each project A, B, C shown in table with discount rate 8%, 10%, 12%. Find net profit, payback period, ROI of each project.

Year	Project A	Project B	Project C
0	-8000	-8000	-10000
1	4000	1000	2000
2	4000	2000	2000
3	2000	4000	6000
4	1000	3000	2000
5	500	9000	2000
6	500	-6000	2000

IRR (Internal Rate of Return) :-

Discount rate for which NPV is zero

PI		5%		γ%	DC
			DF		
0	−5000		1		−5000
1	2000		$\frac{1}{1+\gamma}$		$\frac{2000}{1+\gamma}$
2	4000		$\frac{1}{(1+\gamma)^2}$		$\frac{4000}{(1+\gamma)^2}$
Net profit = 1000			NPV = 0		

$\gamma = +$

$\gamma = +$

$\gamma = -$

$$-5000 + \frac{2000}{1+\gamma} + \frac{4000}{(1+\gamma)^2} = 0$$

NPV > 0

Tutorial 1

Year	Project 1	5
0	-15000	
1	1000	
2	7000	
3	4000	
4	3000	
5	1000	
6	5000	

Find Net profit, payback period, ROI of the above project. Calculate the NPV for the project with discount rate 4%.

Risk Evaluation

Risk Identification and Ranking:

Risk	Importance	Likelihood
Client rejects proposed look and feel of site	H	—
Competitors undercut prices	H	M
Warehouse unable to deal with increased demand	M	L
Online payment has security problems	M	M
Maintenance costs higher than estimated	L	L
Response times deter purchasers	M	M

Risk and net present value:

Relatively risky project should use higher discount rate. Set additional 2% to 5% discount rate depends on risk.

BuyRight, a software house, is considering developing a payroll application for use in academic institutions and is currently engaged in a cost–benefit analysis. Study of the market has shown that, if BuyRight can target it efficiently and no competing products become available, it will obtain a high level of sales generating an annual income of £800,000. It estimates that there is a 1 in 10 chances of this happening. However, a competitor might launch a competing application before its own launch date and then sales might generate only £100,000 per year. It estimates that there is a 30% chance of this happening. The most likely outcome, it believes, is somewhere in between these two extremes – it will gain a market lead by launching before any competing product becomes available and achieve an annual income of £650,000. BuyRight has therefore calculated its expected sales income as in Table

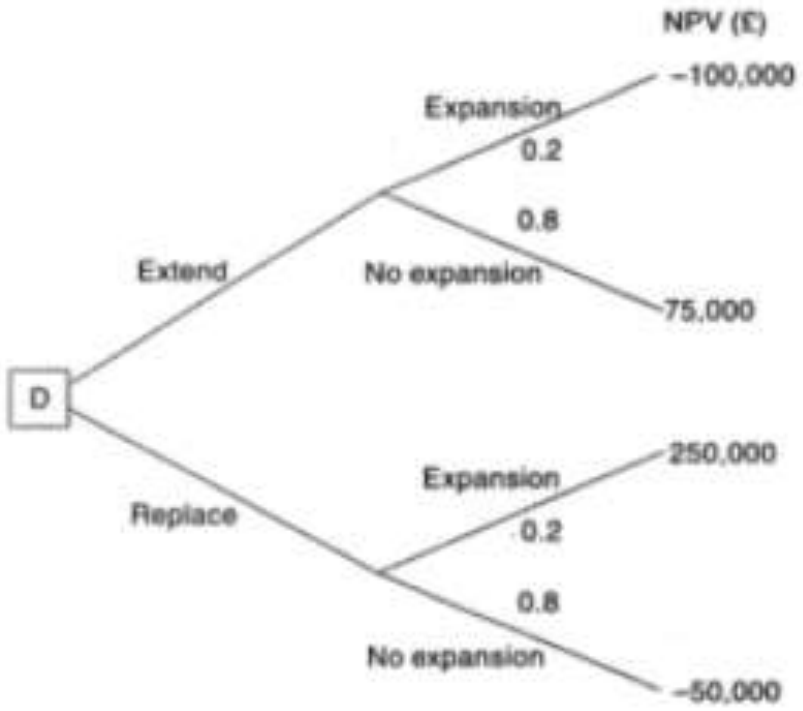
BuyRight's income forecasts

Sales	Annual sales income (£) i	Probability p	Expected value (£) $i \times p$
High	800,000	0.1	80,000
Medium	650,000	0.6	390,000
Low	100,000	0.3	30,000
Expected Income			500,000

Risk Profile Analysis

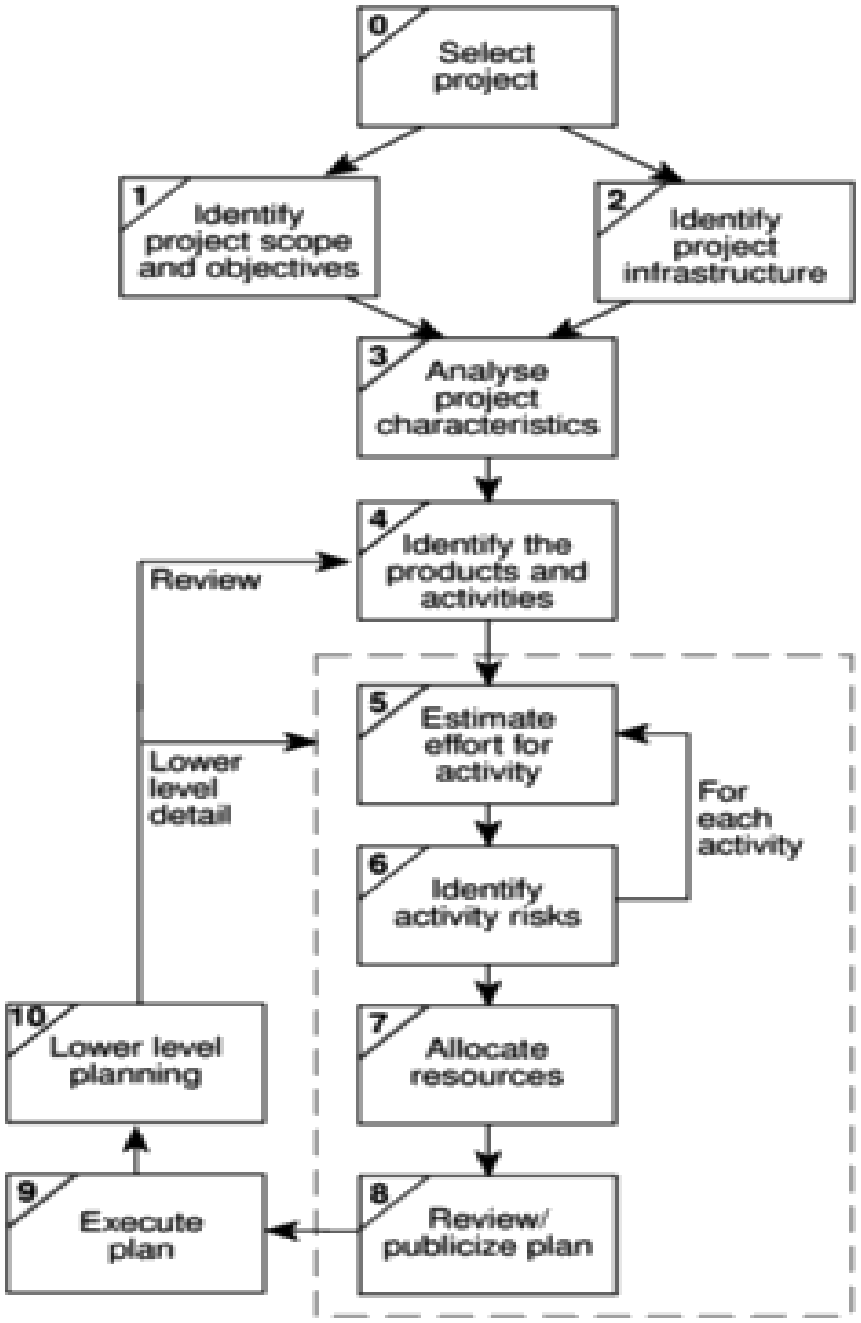
Decision Tree:

- Reject risky project and choose those with the best risk profile.
- A successful company is considering when to replace its sales ordering system.
  - Rate at which business expands if market share significantly increases


NPV (£)
−100,000
Expansion
0.2
0.8
Extend
No expansion
75,000
D
250,000
Expansion
Replace
0.2
0.8
No expansion
−50,000

Step Wise: an overview of project planning

- approach project planning in an organized step-by-step manner;
- see where the techniques described in other chapters fit into an overall planning approach;
- repeat the planning process in more detail for sets of activities within a project as the time comes to execute them.


0
Select project
1
Identify project scope and objectives
2
Identify project infrastructure
3
Analyse project characteristics
4
Identify the products and activities
Review
5
Estimate effort for activity
Lower level detail
For each activity
6
Identify activity risks
10
Lower level planning
7
Allocate resources
9
Execute plan
8
Review/ publicize plan

- Step 0: Select Project
- Step 1: identify project Scope and objective

Identify objectives and measures of effectiveness in meeting them
Establish a project authority
Identify all stakeholders in the project and their interests
Modify objectives in the light of stakeholder analysis
Establish methods of communications with all parties

- Step 2: Identify Project Infrastructure

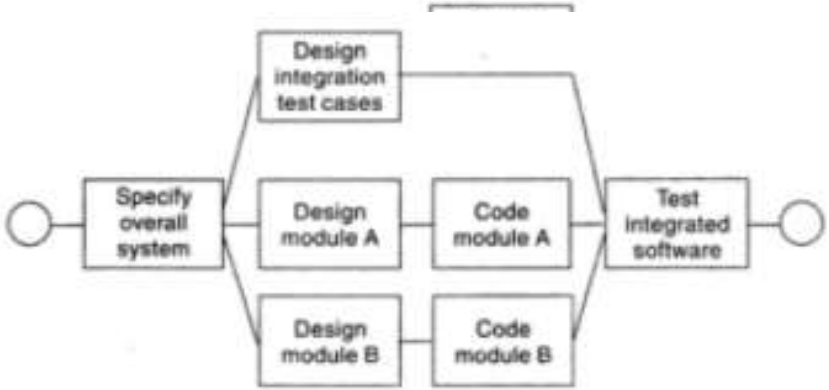
Establish relationship between project and strategic planning
Identify installation standards and procedures
Identify project team organization

- Step 3: Analyse Project Characteristics

Distinguish the project as either objective- or product-driven
Analyse other project characteristics
Identify high level project risks
Take into account user requirements concerning implementation
Select general lifecycle approach
Review overall resource estimates

- Step 4: Identify project products and Activities

Identify and describe project products (or deliverables)
Document generic product flows
Recognize product instances
Produce ideal activity network
Modify ideal to take into account need for stages and check



An example of an activity network

of a Product Flow Diagram (PFD) for a software development task

- Step 5: Estimate Effort

Carry out bottom-up estimates
Revise plan to create controllable activities

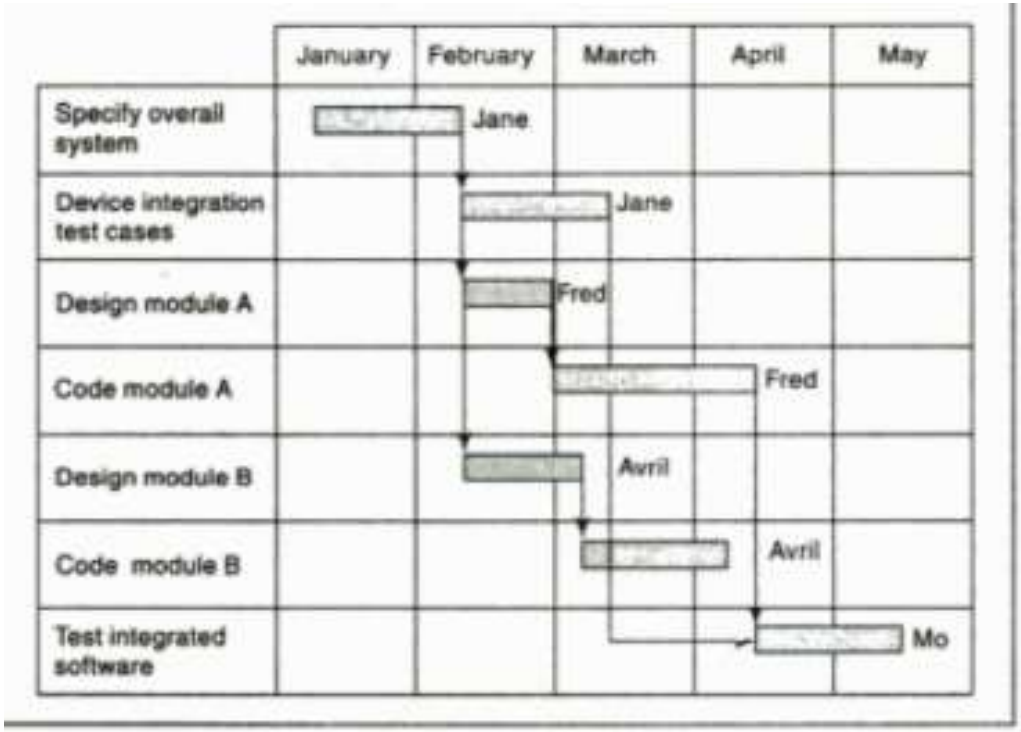
- Step 6: Identify Risk

Identify and quantify activity-based risks
Plan risk reduction and contingency measures where appropr
Adjust plans and estimates to take account of risks

- Step 7: Recourse Allocation

Identify and allocate resources
Revise plans and estimates to account for resource constraints

Step 8: Review/ Publicizing Plan



Gantt chart showing when staff will be carrying out tasks

Example A: A Brightmouth College Payroll

Brigette has been working for the Management Services department of a local authority when she sees an advertisement for the position of Information Systems Development Officer at Brightmouth College. She is attracted to the idea of being her own boss, working in a relatively small organization and helping them to set up appropriate information systems from scratch. She applies for the job and gets it. One of the first tasks that confronts her is the implementation of independent payroll processing.