



NSCET E-LEARNING PRESENTATION

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COMPUTER SCIENCE AND ENGINEERING

IV YEAR / VIII SEMESTER

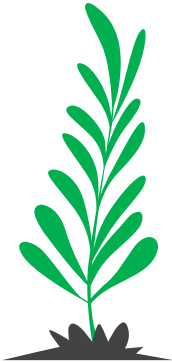
MG6088 – SOFTWARE PROJECT MANAGEMENT

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**PROJECT EVALPROJECT
EVALUATION
SIZE AND COST ESTIMATION**



Introduction - Different level of Estimation

Before decision to do a project

- The estimation is coarse.
- The estimation is in high level terms.
- Profit? Good to the organization? etc.

After decision to go ahead

- More detailed size .
- cost estimations are required.

The image features a white background with a stylized landscape. At the top, there are three orange, rounded shapes representing hills or clouds. In the center, the text "PROJECT EVALUATION" is written in a bold, black, serif font. Below the text, there is a large, wide orange shape representing a range of hills. At the bottom, there are two black silhouettes of leafy branches, one on the left and one on the right, appearing to grow from the base of the hills.

PROJECT EVALUATION

Project Evaluation

A high level assessment of the project

- To see whether it is worthwhile to proceed with the project.
- To see whether the project will fit in the strategic planning of the whole Organization.

Project Evaluation - Why

- ✓ Want to decide whether a project can proceed before it is too late
- ✓ Want to decide which of the several alternative projects has a better success rate, a higher turnover, a higher .
- ✓ Is it desirable to carry out the development and operation of the software system?

Project Evaluation - Who

'Similar, but with the following characteristics:

- Senior management
- Project manager/coordinator
- Team leader

Therefore, software projects are more difficult to build.

Project Evaluation - When

‘Similar, but with the following characteristics:

- Usually at the beginning of the project.
- e.g. Step 0 of Step Wise Framework.

Project Evaluation - What

- Strategic assessment.
- Technical assessment.
- Economic assessment.

These are the following assessment for the project evaluation.

Project Evaluation - How

- Cost-benefit analysis
- Cash flow forecasting
- Cost-benefit evaluation techniques
- Risk analysis



Topic

Software Projects Assessments



Strategic planning

- It is an organization's process of defining its strategy or direction, and making decisions on allocating its resources to pursue this strategy.
- To control mechanisms for guiding the implementation of the strategy.
- It is executed by strategic planners or strategists, who involve many parties and research sources in their analysis of the organization and its relationship to the environment in which it competes.

Strategic Assessment

- Used to assess whether project fits in the long term goal of the organization
- Usually carried out by senior management
- Needs a strategic plan that clearly defines the objectives of the organization
- Evaluates individual projects against the strategic plan or the overall business objectives

Strategic Assessment (cont'd)

➤ Programme management

- ✓ Suitable for projects developed for use in the organization

➤ Portfolio management

- ✓ Suitable for project developed for other companies by software

SA – Programme Management

➤ Individual projects as components of a programme within the organization
on programme as

“A group of projects that are managed in a coordinated way to gain benefits that would not be possible were the projects to be managed independently”

by D.C. Ferns Journal of Project Management , Aug. 1991

SA – Programme Management Issues

➤ Objectives.

- How does the project contribute to the long-term goal of the organization?
- Will the product increase the market share? By how much?

SA – Programme Management Issues (cont'd)

➤ Personnel.

- What are the staff implications?
- What are the impacts on the overall policy on staff development?

➤ Image.

- How does the product affect the image of the organization?



PORT FOLIO MANAGEMENT



Project Portfolio Management

- (PPM) is the centralized management of processes, methods, and technologies used by project managers and project management offices analyze and collectively manage current or proposed projects based on numerous key characteristics.
- The objectives of PPM are to determine the optimal resource mix for delivery and to schedule activities to best achieve an organization's operational and financial goals – while honoring constraints imposed by customers, strategic objectives, or external real-world factors.

SA – Portfolio Management

- Suitable for product developed by a software company for an organization.
- Need to carry out strategic assessment for the providing software company
- May need to assess the product for the client organization.
 - Programme management issues apply

SA – Portfolio Management Issues

- Long-term goal of the software company.
- The effects of the project on the portfolio of the company.
(synergies and conflicts)
- Any added-value to the overall portfolio of the company.

Technical Assessment

- Functionality against hardware and software
- The strategic IS plan of the organization any constraints imposed by the IS plan

Economic Assessment

Why?

- Consider whether the project is the best among other options
- Prioritize the projects so that the resources can be allocated effectively if several projects are underway

Economic Assessment (cont'd)

How?

- Cost-benefit analysis.
- Cash flow forecasting.
- Various cost-benefit evaluation techniques :
 - ✓ NPV and IRR

EA – Cost-benefit Analysis

A standard way to assess the economic benefits

Two steps

- Identify and estimate all the costs and benefits of carrying out the project
- Express the costs and benefits in a common unit for easy comparison (e.g. \$)

EA – Cost-benefit Analysis (cont'd)

Costs

- Development costs.
- Setup costs .
- Operational costs.

EA – Cost-benefit Analysis (cont'd)

Benefits

- Direct benefits.
- Assessable indirect benefits.
- Intangible benefits.



SIZE ESTIMATION



Size Estimation

- Problems related to size estimation.
- Size Estimation Model.
 - Function Point Analysis (FPA).

Problems related to size estimation

- Nature of software.
- Novel application of software.
- Fast changing technology.
- Lack of homogeneity of project experience.
- Subjective nature of estimation.
- Political implications within the organization.



COST ESTIMATION



Cost Estimation

Cost Estimation Model

➤ COCOMO II

Constructive Cost Model II (COCOMO II)

➤ A parametric cost model.

- Important aspects of software projects are characterized by variables (or parameters)
- Once the value of the parameters are determined, the cost can be computed from an equation

COCOMO II

➤ A family of models

- Uses different models in 3 different stages of the project

➤ 3 stages: application composition, early design and post architecture

- Supports estimation early in the process.

- Allows further detailed estimation after the system architecture has been defined.

COCOMO II (cont'd)

- The basic model equation
 - $\text{Effort} = \text{Constant} \times (\text{Size})^{\text{scale factor}} \times \text{Effort Multiplier}$.
- Effort in terms of person-months.
- Constant: 2.45 in 1998.
- Size: Estimated Size in KSLOC.
- Scale Factor: combined process factors.
- Effort Multiplier (EM): combined effort factors.

The Application Composition Stage

- Estimation at the early stage.
- Corresponding to exploratory work such as prototyping.
- Uses object points to estimate the size of the product.

The Early Design Stage

- Estimate after the requirements specification is completed and possibly with some design.
- Use the basic model equation.
- Estimate the size by FPs (preferred) or KSLOC.
- Estimate scale factor and effort multiplier.

The Early Design Stage – Scale Factor

- Estimation of the scale factor.
 - A combined effect of 5 parameters
- Application precedentedness
- Process flexibility
- Architecture risk resolution
- Team cohesion
- Process maturity

The Early Design Stage – Scale Factor (cont'd)

Parameter	Very Low (0.05)	Low (0.04)	Nominal (0.03)	High (0.02)	Very High (0.01)	Extra High (0.00)
Precedentedness	Thoroughly unprecedented	Largely unprecedented	Somewhat unprecedented	Generally familiar	Largely familiar	Thoroughly familiar
Development flexibility	Rigorous	Occasional relaxation	Some relaxation	General conformity	Some conformity	General goals
Architecture risk resolution	Little 20%	Some 40%	Often 60%	Generally 75%	Mostly 90%	Full 100%
Team cohesion	Very difficult interactions	Some difficult interactions	Basically cooperative	Largely cooperative	Highly Cooperative	Seamless interactions
Process maturity	Level 1	Level 2	Level 2+	Level 3	Level 4	Level 5

The Early Design Stage – Scale Factor (Cont'd)

- Calculate the scale factor based on the equation
 - Scale factor = $1.01 + \text{sum of the values.}$



EFFORT MULTIPLIER



The Early Design Stage – Effort Multiplier

7 factors in Effort Multiplier

- Product Reliability and ComPleXity (RCPX)
- Required reusability (RUSE)
- Platform DIfficulty (PDIF)
- PERSonnel capability (PERS)
- PeRsonnel EXperience (PREX)
- FaCILities available (FCIL)
- SChEDule pressure (SCED)

The Early Design Stage – Effort Multiplier (cont'd)

- Assess each factor by
 - Very low, low, nominal, high, very high, and extra high.
- Assign each factor using a value between 0.5 and 1.5 (inclusive).
- EM is the product of all these values.

The Post-architecture Stage – Effort Multiplier

17 factors in 4 different categories

- Product attributes.
- Platform attributes.
- Personnel attributes.
- Project attributes.

The Post-architecture Stage – Effort Multiplier

➤ Product attributes

- Required reliability (RELY)*
- Database size (DATA)
- Product complexity (CPLX)*
- Required reuse (RUSE)**
- Documentation (DOCU)

*Relate to RCPX in early design stage

The Post-architecture Stage – EAF (Cont'd)

Platform attributes

- execution TIME constraint (TIME)*
- main STORAge constraint (STOR)*
- Platform VOLatility (PVOL)*

*Related to Platform DIFficulty (PDIF) in early design stage

The Post-architecture Stage – EAF (Cont'd)

- Personnel attributes
- Analyst CAPabilities (ACAP)^
- Application EXPerience (AEXP)*
- Programmer CAPabilities (PCAP)^
- Personnel EXPerience (PEXP)*
- programming Language/Tool EXperience (LTEX)*
- Personnel CONtinuity (PCON)^

The Post-architecture Stage – EAF (Cont'd)

➤ Project attributes

- use of software TOOLS (TOOL)*
- multiSITE development team communications (SITE)*

*Relate to FCIL in early design model

COCOMO II (cont'd)

- Advantages
 - Good improvement over COCOMO
 - Good match for iterative development, modern technology, and management process
- Disadvantages
 - Still immature, diverse projects in database
 - Hard to believe that it will be any more reliable than the original COCOMO model