ENGR3450 – Project Management

Lecture 2

Project Environment

Project Selection Models

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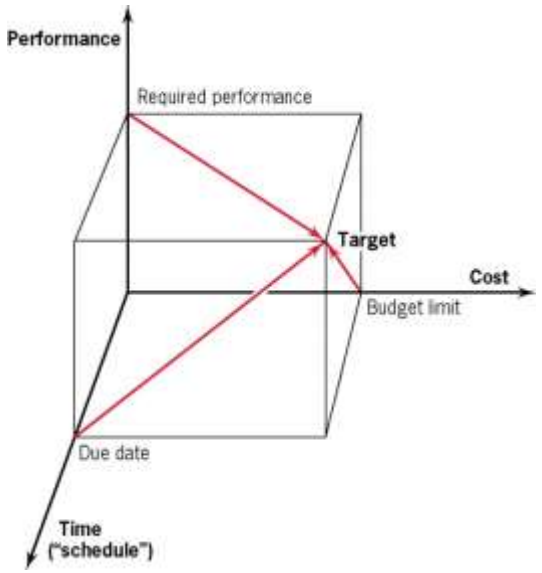


YAŞAR ÜNİVERSİTESİ
Mühendislik Fakültesi

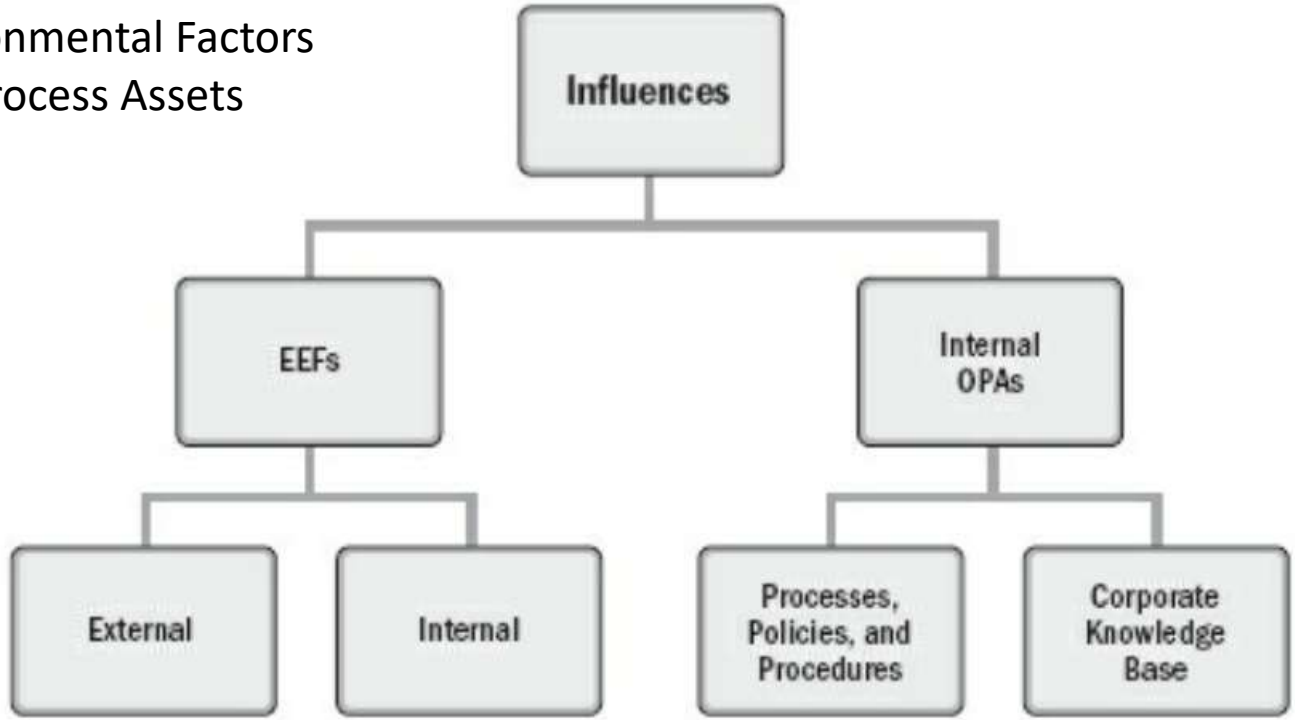
Agenda today

- Environmental factors
  - Organizational Process Assets
  - Organizational Systems
  - Project Initiation Context
- Project Selection Models
  - Non Numeric Models
  - Numeric Models
- Problem solutions

- Workshop & quiz

Environmental Factors

- Enterprise Environmental Factors
- Organizational Process Assets



EEFs

Internal to the organization

- Organizational culture, structure, and governance.
- Geographic distribution of facilities and resources.
- Infrastructure.
- Information technology software.
- Resource availability.
- Employee capability.

EEFs

External to the organization

- Marketplace conditions.
- Social and cultural influences and issues.
- Legal restrictions.
- Commercial databases.
- Academic research.
- Government or industry standards.
- Financial considerations.
- Physical environmental elements.

Organizational Process Assets

Internal

- Processes, policies, and procedures;

- Organizational knowledge bases.

If your organization do not have them;
You should write them as Policies or guides and send a summary to Board Of Directors for approval.
They may call you for presentation too.

(It is a hard job but you will be great at the end)

Organizational Process Assets

Processes – Policies – Procedures (Includes but are not limited to)

- Initiating Planning Phase
  - Guidelines and criteria for tailoring the organization's set of standard processes and procedures to satisfy the specific needs of the project;
  - Specific organizational standards such as policies
  - Product and project life cycles, and methods and procedures
  - Templates
  - Preapproved supplier lists and various types of contractual agreements

Organizational Process Assets

Processes – Policies – Procedures (Includes but are not limited to)

- Executing Monitoring and Controlling
  - Change control procedures, including the steps by which performing organization standards, policies, plans, and procedures or any project documents will be modified, and how any changes will be approved and validated;
  - Traceability matrices;
  - Financial controls procedures;
  - Issue and defect management procedures;
  - Resource availability control and assignment management;
  - Organizational communication requirements;
  - Procedures for prioritizing, approving, and issuing work authorizations;
  - Templates;
  - Standardized guidelines, work instructions, proposal evaluation criteria, and performance measurement criteria;
  - Product, service, or result verification and validation procedures.

Organizational Process Assets

Processes – Policies – Procedures (Includes but are not limited to)

- Close Up
  - Closing. Project closure guidelines or requirements (e.g., final project audits, project evaluations, deliverable acceptance, contract closure, resource reassignment, and knowledge transfer to production and/or operations).

Organizational Process Assets

Organizational knowledge bases

- Organizational knowledge bases
  - Configuration Management Knowledge Base
  - Finanical Data Base
  - Historical Information and Lessons Learned Knowledge Base
  - Issue and Defect Management Data Base
  - Project Files from Previous Projects

Organizational Systems

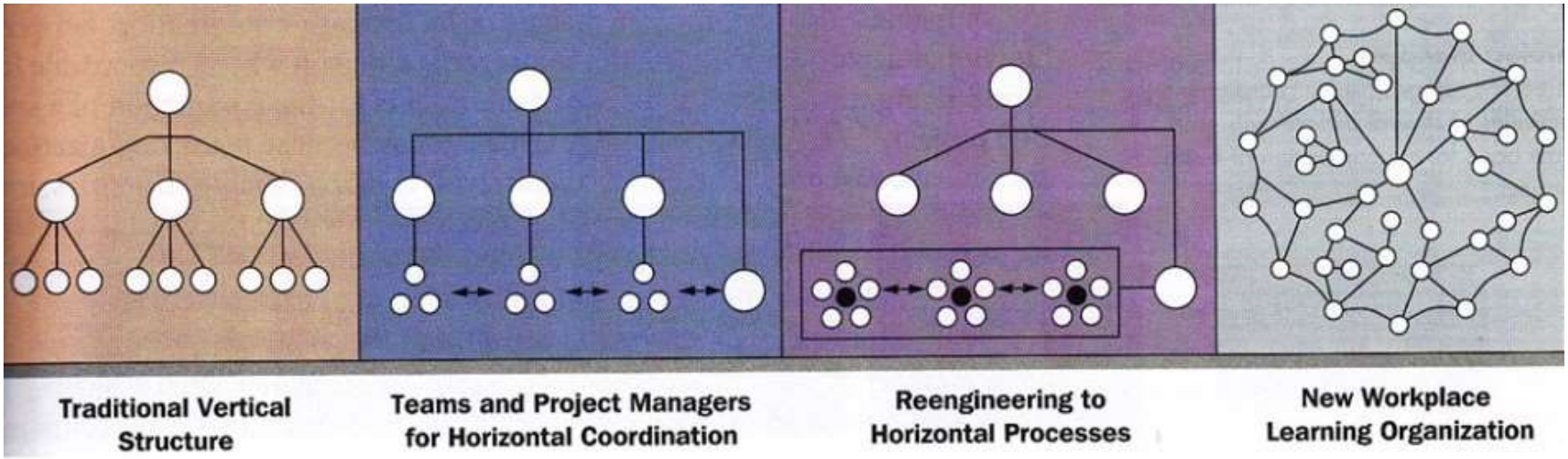
- Systems are dynamic,
- Systems can be optimized,
- System components can be optimized,
- Systems and their components cannot be optimized at the same time, and Systems are nonlinear in responsiveness
  - A change in the input does not produce a predictable change in the output.

Organizational Systems

- Organizational Structure Types
- Governance Frameworks
- Management Elements

Organizational Systems

Structure



Organizational Systems
Governance Framework

- Rules,
- Policies,
- Procedures,
- Norms,
- Relationships,
- Systems,
- Processes.

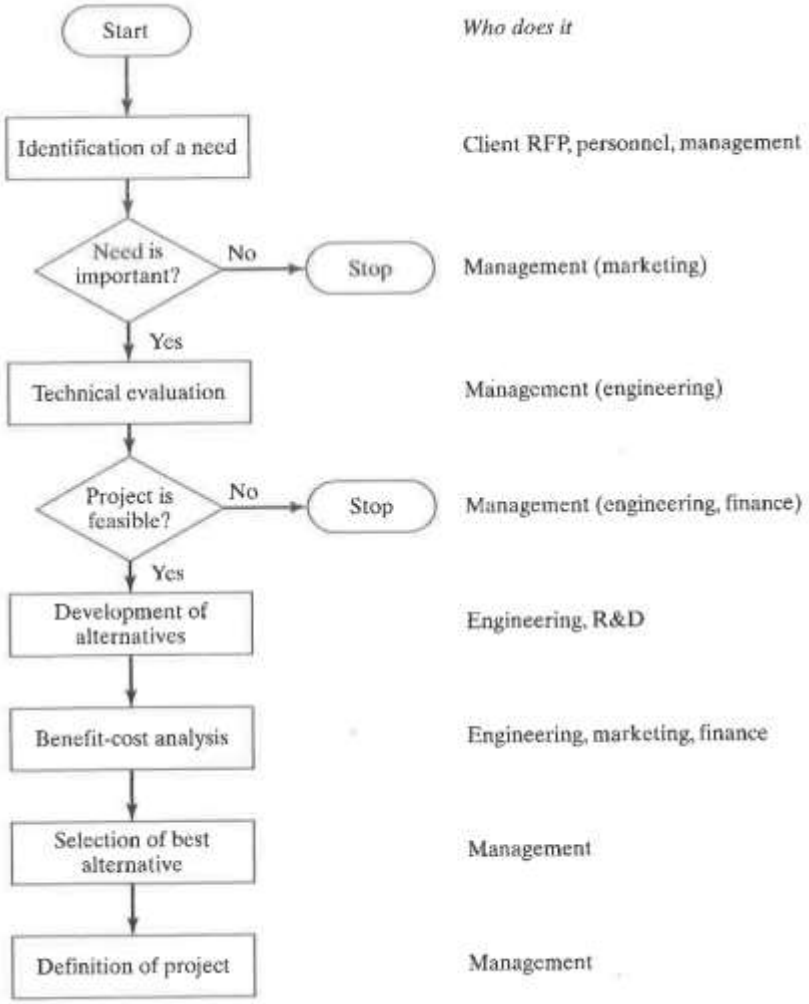
This framework influences how:
Objectives of the organization are set and achieved,
Risk is monitored and assessed,
and Performance is optimized.

Organizational Systems

Management Elements

- Division of work using specialized skills and availability to perform work;
- Authority given to perform work;
- Responsibility to perform work appropriately assigned based on such attributes as skill and experience;
- Discipline of action (e.g., respect for authority, people, and rules);
- Unity of command (e.g., only one person gives orders for any action or activity);
- Unity of direction (e.g., one plan and one head for a group of activities)
- General goals of the organization take precedence over individual goals;
- Paid fairly for work performed;
- Optimal use of resources;
- Clear communication channels;
- Right materials to the right person for the right job at the right time;
- Fair and equal treatment of people in the workplace;
- Clear security of work positions;
- Safety of people in the workplace;
- Open contribution to planning and execution by each person;
- Optimal morale.

Project Initiation Context



Need is translated into technical specifications

Feasibility Analysis
(Market, economic, technical, environmental,... appraisal)

- Estimation of costs and returns
- Project Selection
- Keep the scope under control!

Project Initiation Context

How to Make Boss(es) Believe

- Good analysis of present situation
- Being analytical with numbers
  - Show opportunities first threads later
- Presenting the future idea
  - In less than 20 minutes (best is one second)
  - In half page summary with full analysis document
- Use of tools like
  - Spreadsheet – presentation – etc.

Project Selection Models

- Nonnumeric models
- Numeric models

Project Selection Models

Non Numeric Models

- Sacred Cow
  - A project, often suggested **by top management**,
- Operating Necessity
  - To keep the company in operation.
- Competitive Necessity
  - To maintain the company's position in the marketplace.
- Product Line Extension
  - A new product in the same product line of an existing brand.
- Comparative Benefit
  - Projects are subjectively rank ordered based on their perceived benefit.
- Sustainability
  - Carbon footprint is a measurable fact in some countries.

Project Selection Models

Scoring

1. Profit/profitability
2. Scoring

Project Selection Models

Profit /Profitability Models

- Models that look at costs and revenues
  1. Payback period
  2. Discounted cash flow (NPV)
  3. Internal rate of return (IRR)
  4. Profitability index

- NPV and IRR are the most common ones

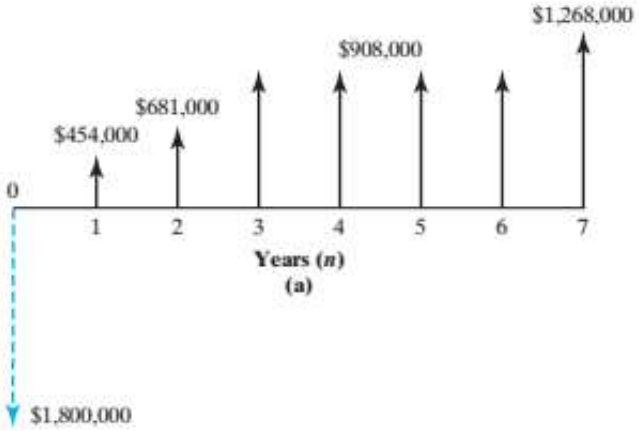
  (Engineering Economics)

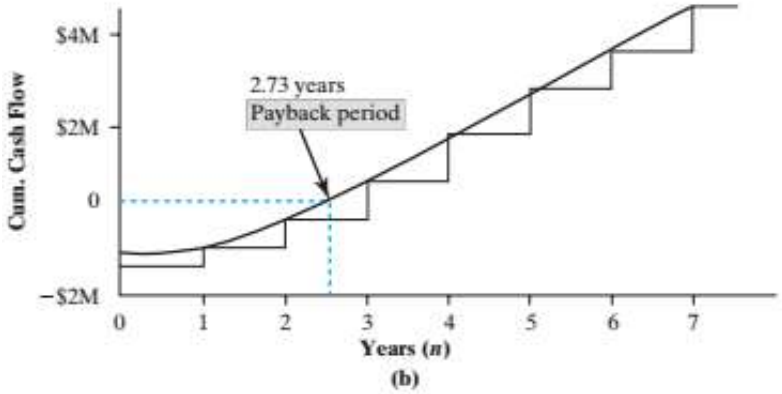
Project Selection Models

Payback Period (Rough but fast calculation)

Period	Cash Flow	Cumulative Cash Flow
0	–$1,800,000	–$1,800,000
1	454,000	–1,346,000
2	681,000	–665,000
3	908,000	243,000
4	908,000	1,151,000
5	908,000	2,059,000
6	908,000	2,967,000
7	1,268,000	4,235,000

	Current Cost (% Saved)	Savings
Setup	$335,000 (70%)	$234,500
Scrap/Rework	58,530 (85%)	49,750
Operators	220,000 (100%)	220,000
Fixturing	185,000 (85%)	157,250
Programming Time	80,000 (60%)	48,000
Floor Space	35,000 (65%)	22,750
Maintenance	45,000 (60%)	27,000
Coolant	15,000 (50%)	7,500
Inspection	120,000 (100%)	120,000
Documentation	5,000 (50%)	2,500
Expediting	25,000 (75%)	18,750
	Total Annual Savings	**$908,000**

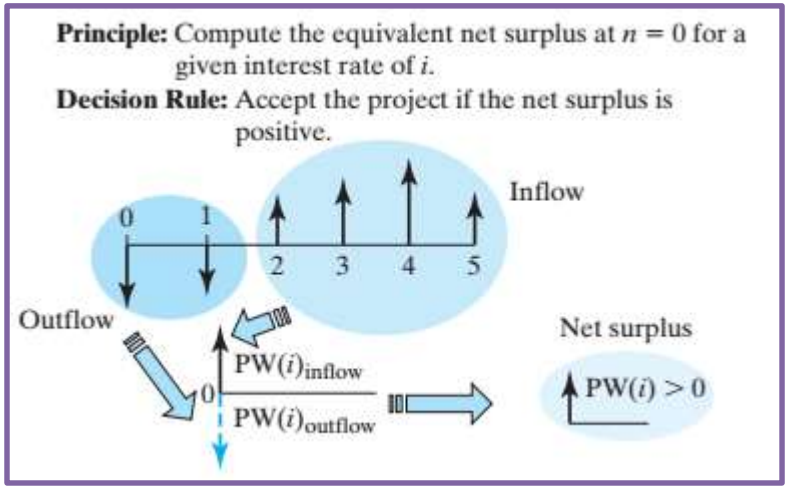


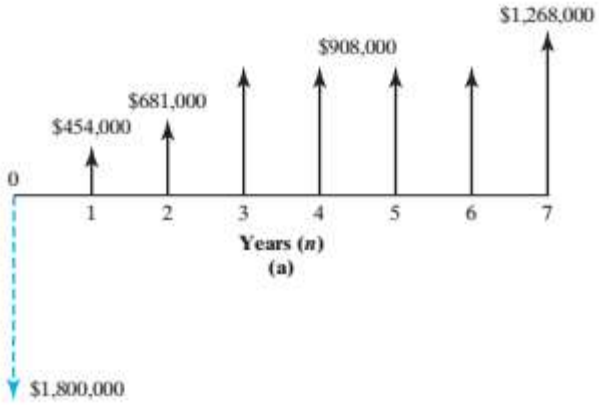


Project Selection Models

Profit/Profitability - NPV Method

$$PW(i) = \frac{A_0}{(1+i)^0} + \frac{A_1}{(1+i)^1} + \frac{A_2}{(1+i)^2} + \cdots + \frac{A_N}{(1+i)^N}$$
$$= \sum_{n=0}^{N} \frac{A_n}{(1+i)^n}$$
$$= \sum_{n=0}^{N} A_n(P/F, i, n).$$





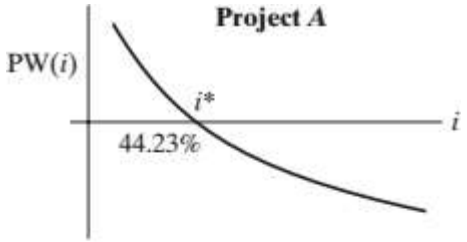
$$PW(15\%) = -\$1{,}800{,}000 + \$454{,}000(P/F, 15\%, 1)$$
$$+ \$681{,}000\,(P/F, 15\%, 2)$$
$$+ \$908{,}000(P/A, 15\%, 4)(P/F, 15\%, 2)$$
$$+ \$1{,}268{,}000(P/F, 15\%, 7)$$
$$= \$1{,}546{,}571.$$

Project Selection Models

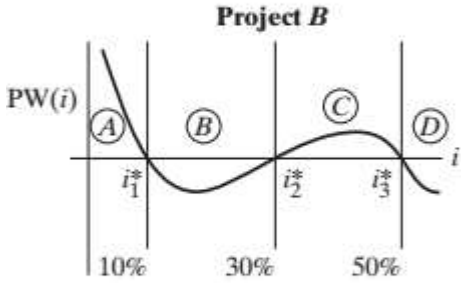
Profit/Profitability - IRR Method

$$\mathrm{PW}(i^*) = \frac{A_0}{(1+i^*)^0} + \frac{A_1}{(1+i^*)^1} + \cdots + \frac{A_N}{(1+i^*)^N} = 0$$

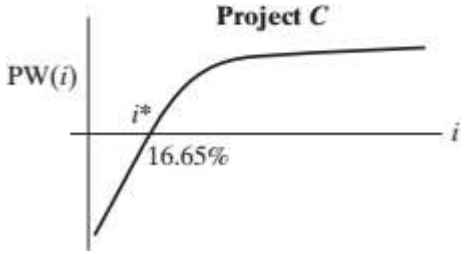
Solve for NPV=0



You may need to use trial-error for i sometimes



Sign change in cash flow may cause complex



Project Selection Models

Profit/Profitability - IRR Method

- **Direct-solution** method from the formula (not so easy over second degree)
- **Trial-and-error** method (you may use simulation if you are a good SW guy)
- **Excel** method (Best but may not work correctly over complex cash flows)

You may do comparison of projects too but you may need to get an **Engineering Economics** class.

	A	B	C	D
1	Example 7.10 - Comparing Unequal-Service-Life Problems			
2				
3		Option 1	Option 2	Incremental
4		Conveyor Systems	Lift Trucks	Option 1 – Option 2
5				
6	0	$ (68,000)	$ (40,000)	$ (28,000)
7	1	$ (13,000)	$ (15,000)	$ 2,000
8	2	$ (13,000)	$ (15,000)	$ 2,000
9	3	$ (13,000)	$ (15,000)	$ 2,000
10	4	$ (13,000)	$ (15,000)	$ 2,000
11	5	$ (13,000)	$ (15,000)	$ 2,000
12	6	$ (13,000)	$ (19,000)	$ 6,000
13	7	$ (13,000)	$ (23,000)	$ 10,000
14	8	$ (31,000)	$ (23,000)	$ (8,000)
15	9	$ (13,000)	$ (23,000)	$ 10,000
16	10	$ (7,000)	$ (15,000)	$ 8,000
17				
18			Incremental IRR	3.90%
19				
20			=IRR(D6:D16,15%)	
21				

=NPV is available in Excel too.

Project Selection Models

Profability Index

Also known as the benefit–cost ratio, the profitability index is the net present value of all future expected cash flows divided by the initial cash investment.
(Some firms do not discount the cash flows in making this calculation.) If this ratio is greater than
1.0, the project may be accepted.

Project Selection Models

Scoring

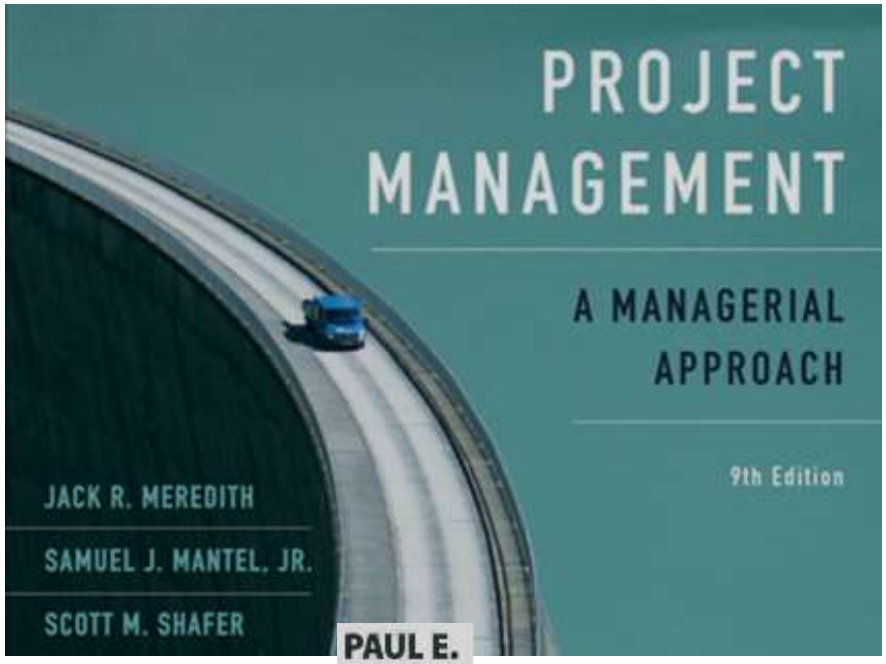
- Mimics how managers actually evaluate investments
- Uses multiple criteria
  - Can utilize both monetary and qualitative factor
- Weighted factor scoring model

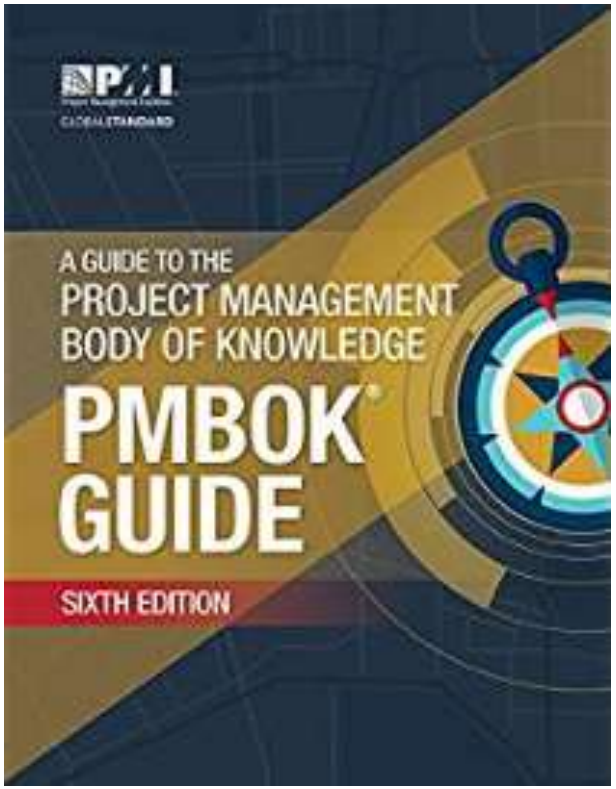
Project Selection Models

Weighted Factor Scoring Model

- Each factor is weighted relative to its importance
  - Weighting allows important factors to stand out
- A good way to include nonnumeric data in the analysis
- Factors need to sum to one
- All weights must be set up, so higher values mean more desirable
- Small differences in totals are not meaningful

Course resources





Solve Questions For the exam

PROBLEMS

1. Two new Internet site projects are proposed to a young start-up company. Project A will cost $250,000 to implement and is expected to have annual net cash flows of $75,000. Project B will cost $150,000 to implement and should generate annual net cash flows of $52,000. The company is very concerned about their cash flow. Using the payback period, which project is better, from a cash flow standpoint?
2. Sean, a new graduate at a telecommunications firm, faces the following problem his first day at the firm: What is the average rate of return for a project that costs $200,000 to implement and has an average annual profit of $30,000?
3. A four-year financial project has net cash flows of $20,000; $25,000; $30,000; and $50,000 in the next 4 years. It will cost $75,000 to implement the project. If the required rate of return is 0.2, conduct a discounted cash flow calculation to determine the NPV.
4. What would happen to the NPV of the above project if the inflation rate was expected to be 4 percent in each of the next 4 years?
5. Calculate the profitability index for Problem 3. For Problem 4.
6. A 4-year financial project has estimates of net cash flows shown in the following table:

Year	Net Cash Flow
1	$20,000
2	25,000
3	30,000
4	35,000

It will cost $65,000 to implement the project, all of which must be invested at the beginning of the project. After the fourth year, the project will have no residual value.

Using the most likely estimates of cash flows, conduct a discounted cash flow calculation assuming a 20 percent hurdle rate with no inflation. (You may use either Excel® or a paper-and-pencil calculation.) What is the discounted profitability index of the project?

7. Use a weighted score model to choose between three methods (A, B, C) of financing the acquisition of a major competitor. The relative weights for each criterion are shown in the following table as are the scores for each location on each criterion. A score of 1 represents unfavorable, 2 satisfactory, and 3 favorable.

		Method		
Category	Weight	A	B	C
Consulting costs	20	1	2	3
Acquisition time	20	2	3	1
Disruption	10	2	1	3
Cultural differences	10	3	3	2
Skill redundancies	10	2	1	1
Implementation risks	25	1	2	3
Infrastructure	10	2	2	2

End Of Chapter: Problems 1 to 7

Available on Palme bookstore

Workshop and quiz

Download pdf format of WorkShop01 from Lectures. No Grade

This work shop is only to prepare your MS-Project for future works.

Do the quiz on-line from lectures.yasar.edu.tr 5pts.

Questions

hp@quiztechnology.com

NEXT WEEK:	The Project Manager	Ch 3
	Managing Conflicts	Ch 4
	Integration Management	PMBOK Ch 4
	The Project in Organizational Structures	Ch 5

Workshop	5 pts
On-Line quiz	5 pts