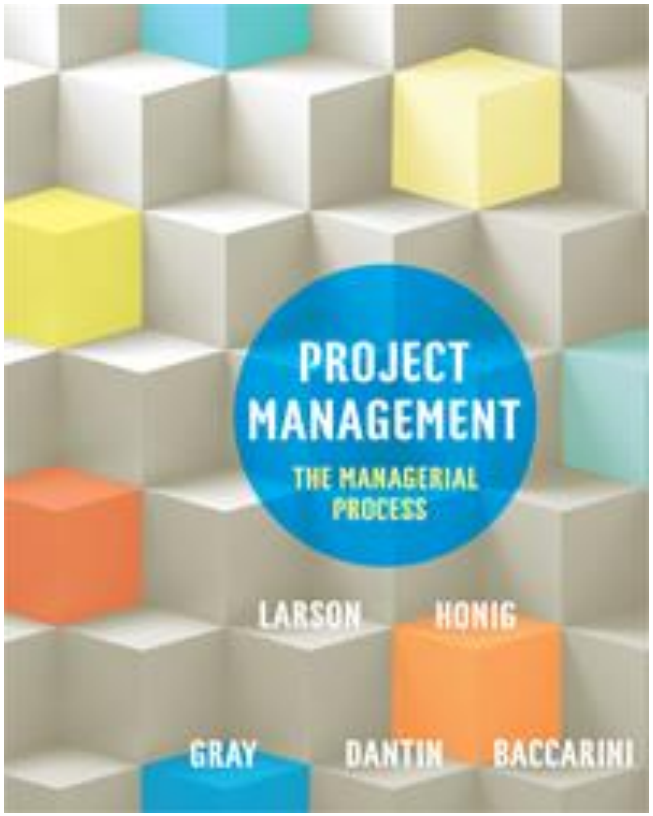
Larson
Project Management



Chapter 2
Modern project management

Last Week and This Week

- Last week Ch1 & CH17
  - Important factors in project success
  - Portfolio Management
  - Communication (eg Team M3B)
  - PM's alignment to Organisational Strategy
  - Traditional vs. Agile methods
- This Week Ch2
  - Organisation Strategy
    - Implementation through Projects and the importance of Projects supporting it
  - Project Selection

Strategy

- Is basically deciding how an organisation will compete
  - Projects are the implementation of strategy
  - Projects therefore must support organisational strategic goals
  - The Strategy/Project alignment is difficult to maintain
    - Project manager should think and act strategically
    - Requires attention from middle and senior management

The importance of strategy

- Changes in the organisation's mission and strategy:
  - Project managers must respond to changes with appropriate decisions about future projects and adjustments to current projects.
  - Project managers who understand their organisation's strategy can become effective advocates of projects aligned with the firm's mission.

Projects and strategy

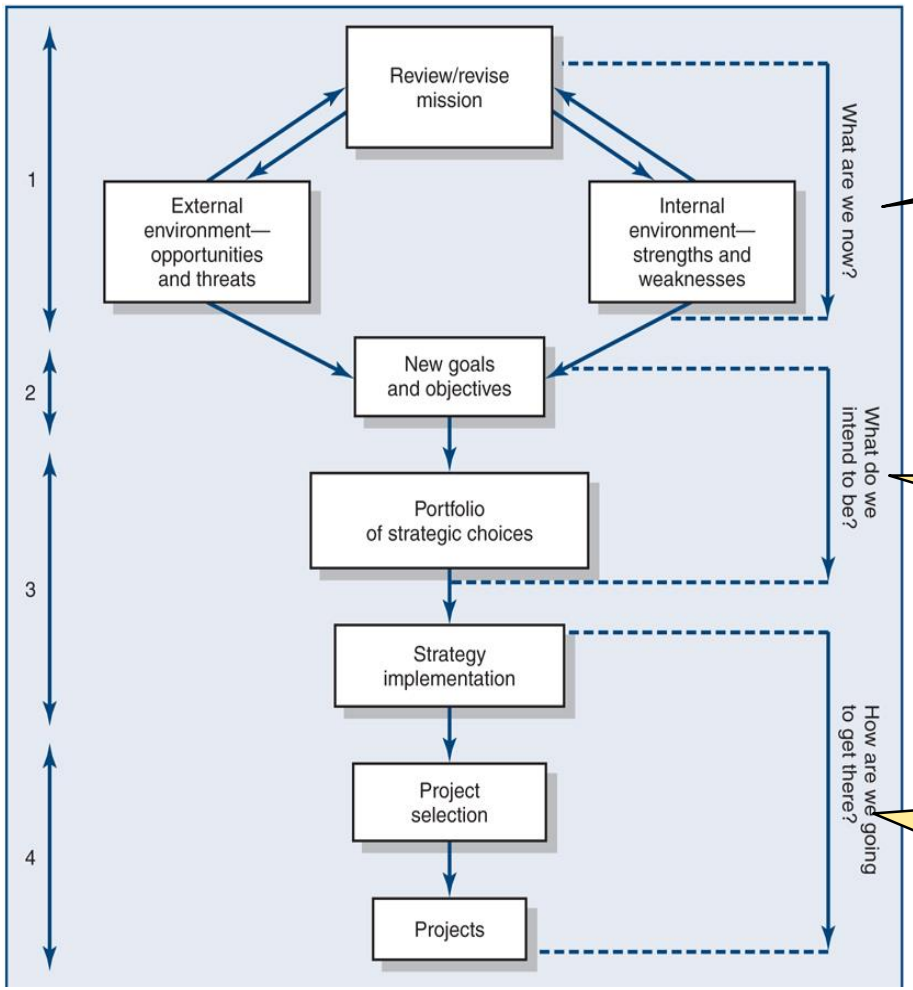
- Mistakes caused by not understanding the role of projects in accomplishing strategy:
  - focusing on problems or solutions with low strategic priority
  - focusing on the immediate customer rather than the whole market place and value chain
  - over-emphasising technology that results in projects that pursue exotic technology that does not fit the strategy or customer need
  - trying to solve customer issues with a product or service rather than focusing on the 20% with 80% of the value (Pareto's Law)
  - engaging in a never-ending search for perfection that only the project team really cares about

The strategic management process: an overview

- Strategic management:
  - requires every project to be clearly linked to strategy
  - provides a theme and focus of organisational future direction. Two major dimensions are:
    - *responding to changes* in the external environment—environmental scanning in dynamic and competitive environments
    - *allocating scarce resources* of the firm to improve its competitive position (internal responses to new programs)
  - requires strong links among mission, goals, objectives, strategy and implementation

The strategic management process

Figure 2.1 THE STRATEGIC MANAGEMENT PROCESS



What/Where are we NOW

What/Where do we WANT to Be

HOW do we get there

The strategic management process: Four Activities

1. Review and define the organisational mission.
2. Set long-range goals and objectives.
3. Analyse and formulate strategies to reach objectives.
   - Objectives should be Measurable => **SMART**
4. *Implement* strategies through projects

Mission statement

- The **Mission Statement** sets the parameters for developing objectives and must be clear and concise

  e.g. http://retailindustry.about.com/od/retailbestpractices/ig/Company-Mission-Statements/Microsoft-Mission-Statement.htm

- Identifies and communicates the purpose of the organisation to all stakeholders
- Identifies the scope of the organisation in terms of its product or service
- Provides a focus for decision making
- Used for evaluating organisational performance

Set long-range goals and objectives

- Translates the mission into specific, concrete and measurable terms (operational if possible)
- Sets targets for all levels of the organisation in a cascaded manner
- *Where* is an organisation headed and *when* it is going to get there
- Focus managers on where the organisation should move to

Characteristics of objectives

S	**Specific**	Be specific in targeting an objective
M	**Measurable**	Establish a measurable indicator(s) of progress
A	**Assignable**	Make the objective assignable to one person for completion
R	**Realistic**	State what can realistically be done with available resources
T	**Time related**	State when the objective can be achieved, that is, duration

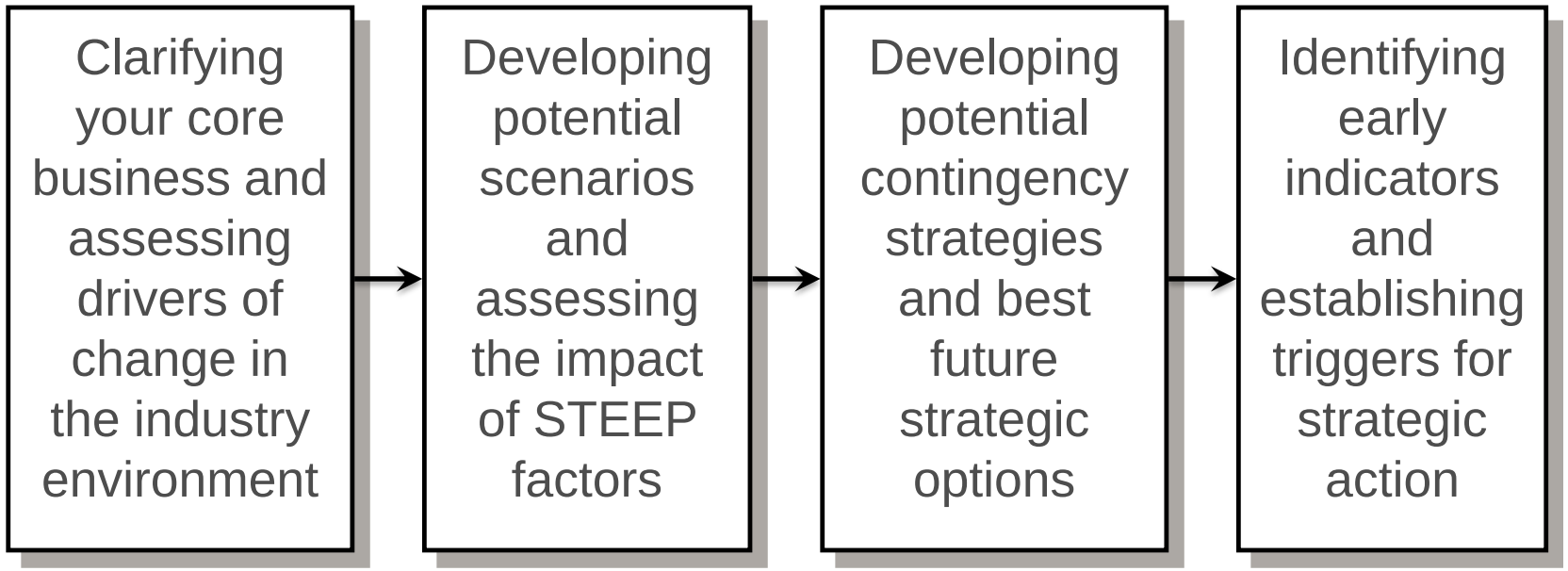
Analyse and formulate strategies to meet objectives

- Focuses on ***what*** needs to be done to reach objectives
- Realistic view of the past and current position
- Assessment of the internal and external environments (**SWOT** analysis)
- Alternatives generated and assessed
- Strategy formulation and assignation

Implementation of strategy through projects

- Focuses on ***how*** the strategies will be realised with resources
- Maintain the link between strategy (the *'what')* and implementation (the *'how')*
- Requires resource allocation
- Requires action and completion of tasks
- Requires prioritisation
  - can require ranking projects

Scenario planning



We will look at RISK in more detail later in the course

Benefits of project portfolio management

- Builds discipline into the project selection process
- Links project selection to strategic metrics
- Prioritises project proposals across a common set of criteria, rather than on politics or emotion
- Allocates resources to projects that align with strategic direction
- Balances risk across all projects
- Justifies stopping projects that do not support strategy
- Improves communication and supports agreement on project goals

Problems with project portfolio management

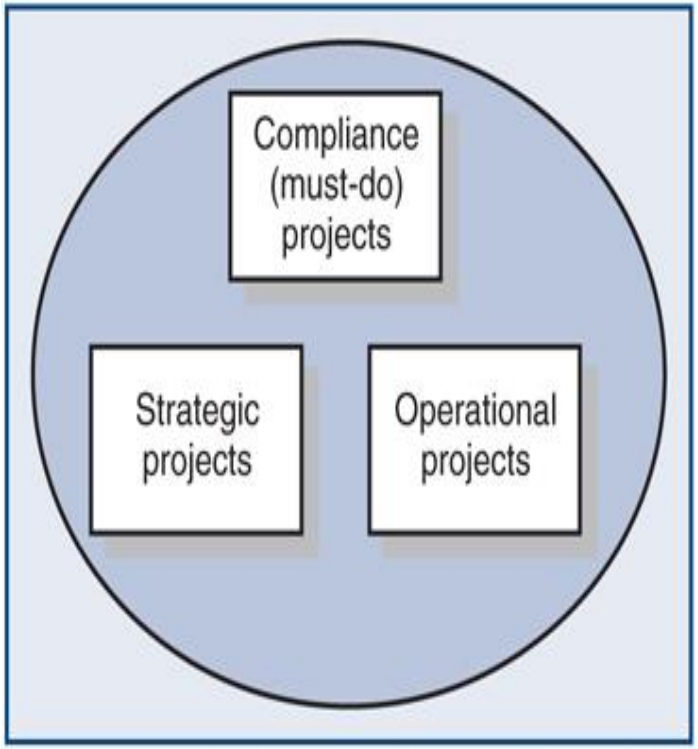
- The **implementation gap**
  - The lack of understanding and consensus on strategy among top management and middle-level (functional) managers who independently implement the strategy
- Organisational politics
  - Project selection is based on the persuasiveness and power of people advocating the projects
- Resource conflicts and **multitasking**
  - Multiproject environment creates interdependency relationships of shared resources which results in the starting, stopping and restarting of projects

A portfolio management system

- Design of a project portfolio system
  - Classification of a project
  - Selection criteria depending upon classification
  - Sources of proposals
  - Evaluating proposals
  - Ranking proposals
  - Managing the portfolio of projects

Portfolio of projects by type

Figure 2.2 PORTFOLIO OF PROJECTS BY TYPE



Project Selection

Which One??

Limitations of Resources:

Time, Money, Personnel, Skills, Equipment,….

A portfolio management system
continued

- Selection criteria
  - Financial: payback, net present value (NPV), internal rate of return (IRR)
  - Non-financial: projects of strategic importance to the firm

- Multi-weighted scoring models
  - use several weighted selection criteria to evaluate project proposals

Financial Analysis of Projects

- Financial considerations are often an important aspect of the project selection process.
- Three primary methods for determining the projected or estimated financial value of projects:
  - **Payback** analysis
  - **Net present value** (NPV) analysis
  - **Return on investment** (ROI)

Payback Analysis

A simple financial consideration is ***payback analysis*.**

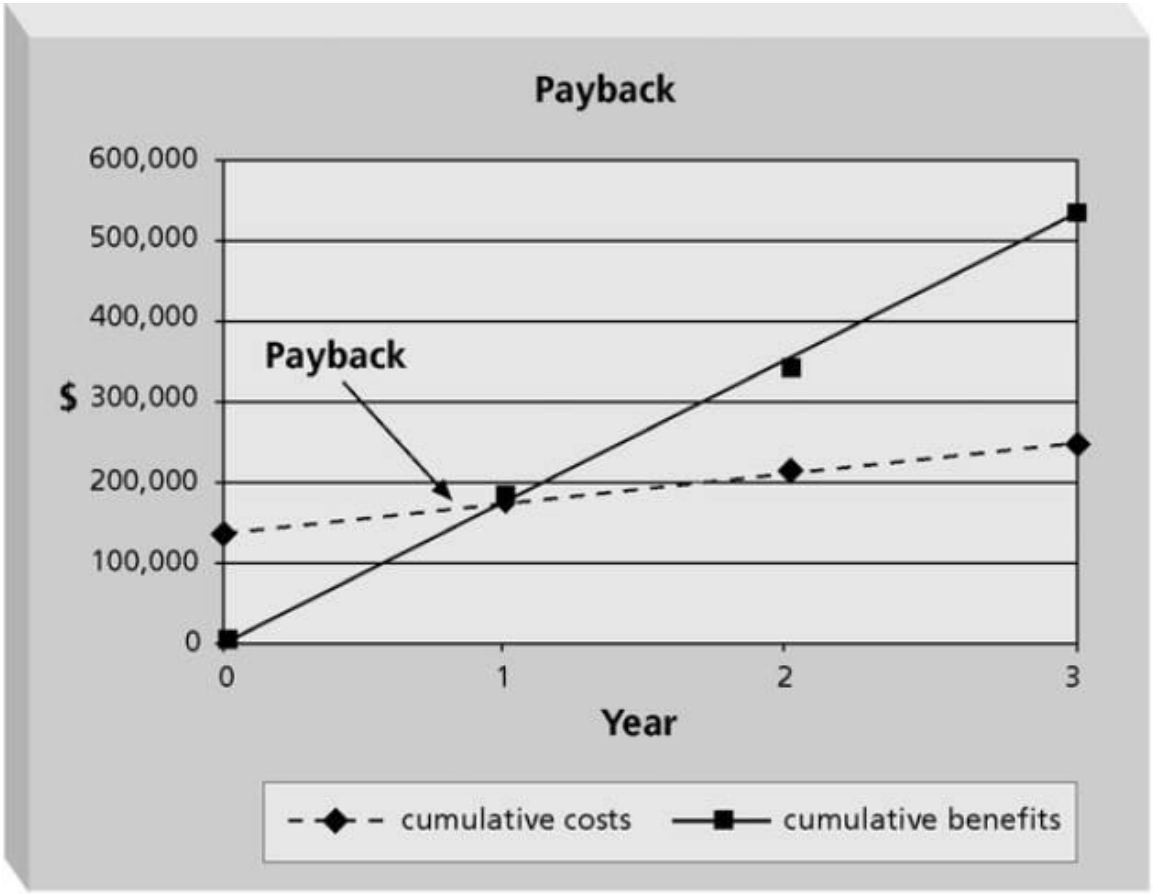
- The **payback period** is the amount of time it will take to recoup, in the form of net cash inflows, the total dollars invested in a project.
- Payback occurs when the ***cumulative discounted benefits*** and ***costs*** reach zero.
- Many organisations want projects to have a fairly short payback period – Why?

Financial models

The payback model:

- measures the time the project will take to recover the project investment
- uses more desirable, shorter paybacks
- emphasises cash flows, a key factor in business

Charting the Payback Period



Financial models

Limitations of the payback model - It:

- ignores the **time value** of money
- assumes cash inflows for the investment period only (and not beyond)
- does not consider profitability

Exhibit 2.3A: Comparing two projects using the payback method

(example uses a minimum acceptable rate of return of 15%)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1					Exhibit 2.3 A								
2													
3				Example Comparing Two Projects Using the Payback Method									
4													
5				Project A		Project B							
6													
7													
8		Investment		$700,000		$400,000				Project A: Payback = (D8/D9)			
9		Annual savings		$225,000		$110,000				Project B: Payback = (F8/F 9)			
10													
11		Payback period*		3.1 years		3.6 years							
12													
13		Rate of return **		32.1%		27.5				Project A: Rate of return = D9/D8)			
14										Project B: Rate of return = (F9/F8)			
15	Project A: Accept. Less than 5 years and exceeds 15% desired rate												
16													
17	Project B: Accept. Less than 5 years.												
18													
19	* Note: Payback does not use the time value of money												
20	** Note: Rate of return is reciprocal of Payback												
21													
22													

Net Present Value Analysis

Net present value (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time.

- Projects with a **positive** NPV should be considered (if *financial value* is a key criterion)
- The **higher** the NPV, the better.

$NPV = \sum_{t=1...n} A/(1+r)^t$

NPV Calculations

1. Determine the ***estimated*** costs and benefits for the life of the project and the products it produces.
2. Determine the ***discount rate*** – the rate used in discounting future cash flow (check with your organisation on what to use).
3. ***Calculate*** the **NPV**

Financial models *continued*

- The net present value (NPV) model:
  - uses management's minimum desired rate-of-return (the discount rate) to compute the present value of all net cash inflows
    - Positive NPV: project meets minimum desired rate of return and is eligible for further consideration
    - Negative NPV: project is rejected

$$\text{Project NPV} = I_0 + \sum_{t=1}^{n} \frac{F_t}{(1+k)^t} \quad \text{where}$$

I_0 = Initial investment (since it is an outflow, the number will be negative)

F_t = net cash inflow for period t

k = required rate of return

Exhibit 2.3B: Comparing two projects using net present value method and the Excel NPV formula

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2						Exhibit 2.3B							
3													
4						Example Comparing Two Projects Using NPV							
5	Project A		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total		Formulas		
6	Required	15%											
7	Outflows		-$700,000						-$700,000				
8	Inflows			$225,000	$225,000	$225,000	$225,000	$225,000	$1,125,000				
9	Net inflows			$225,000	$225,000	$225,000	$225,000	$225,000	$425,000	Project A:	=C7+NPV(B6,D9:H9)		
10	NPV	$54,235											
11													
12													
13	Project B												
14	Required	15%											
15	Outflows		-$400,000						-$400,000				
16	Inflows			$110,000	$110,000	$110,000	$110,000	$110,000	$550,000				
17	Net inflows			$110,000	$110,000	$110,000	$110,000	$110,000	$150,000	Project B:	=C15+NPV(B14,D17:H17)		
18	NPV	-$31,263											
19													
20													
21													
22	NPV comparison: Accept Project A---NPV is positive												
23	Reject Project B---NPV is negative												

We will demonstrate how these are calculated later. For now, just appreciate that the more positive or larger the NPV is the better the project is.

NPV Example
(calculating NPV from discounted inflows and outflows, ie not using Excel NPV formula)

Multiply by the discount factor each year to get discounted costs and benefits,

then ***subtract*** discounted costs from discounted benefits to get the NPV

Discount rate	**8%**					
Assume the project is completed in Year 0			Year			
	0	**1**	**2**	**3**	**Total**	
Costs	140,000	40,000	40,000	40,000		
Discount factor	1	0.93	0.86	0.79		
Discounted costs	**140,000**	**37,200**	**34,400**	**31,600**	**243,200**	
Benefits	0	200,000	200,000	200,000		
Discount factor	1	0.93	0.86	0.79		
Discounted benefits	**0**	**186,000**	**172,000**	**158,000**	**516,000**	
Discounted benefits - costs	(140,000)	148,800	137,600	126,400	**272,800**	←**NPV**
Cumulative benefits - costs	(140,000)	8,800	146,400	272,800		
ROI	**112%**					
	Payback In Year 1					

$$\frac{(516000 - 243200)}{243200}$$

Discount Factor = $1/(1+r)^{\wedge t}$ eg, Year 1 = $1/(1+0.08)^{\wedge 1} = 0.93$
Year 2 = $1/(1+0.08)^{\wedge 2} = 0.86$

Net Present Value Example

	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	PROJECT 1	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
4	Benefits	$0	$2,000	$3,000	$4,000	$5,000	$14,000
5	Costs	$5,000	$1,000	$1,000	$1,000	$1,000	$9,000
6	Cash flow	($5,000)	$1,000	$2,000	$3,000	$4,000	$5,000
7	NPV →	$2,316					
8		Formula =npv(b1,b6:f6)					
9							
10	PROJECT 2	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
11	Benefits	$1,000	$2,000	$4,000	$4,000	$4,000	$15,000
12	Costs	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000
13	Cash flow	($1,000)	$0	$2,000	$2,000	$2,000	$5,000
14	NPV →	$3,201					
15		Formula =npv(b1,b13:f13)					
16							

Note that totals are equal, but NPVs are not because of the ***time value*** of money.

Return on Investment

- **Return on investment** (ROI) is calculated by *subtracting* the discounted project costs from the benefits and then *dividing* by the costs.

$$\text{ROI} = \frac{\text{(total discounted benefits - total discounted costs)}}{\text{total discounted costs}}$$

  - The ***higher*** the ROI, the better.
  - Many organisations have a ***required rate of return*** or minimum acceptable rate of return on investment for projects.
    - This differentiates it from NPV as a financial feasibility factor

ROI Example

Discount rate	**8%**					
Assume the project is completed in Year 0			**Year**			
	0	**1**	**2**	**3**	**Total**	
Costs	140,000	40,000	40,000	40,000		
Discount factor	1	0.93	0.86	0.79		
Discounted costs	**140,000**	**37,200**	**34,400**	**31,600**	**243,200**	
Benefits	0	200,000	200,000	200,000		
Discount factor	1	0.93	0.86	0.79		
Discounted benefits	**0**	**186,000**	**172,000**	**158,000**	**516,000**	
Discounted benefits - costs	(140,000)	148,800	137,600	126,400	**272,800**	← **NPV**
Cumulative benefits - costs	(140,000)	8,800	146,400	272,800		
ROI →	**112%**					
	Payback In Year 1					

ROI = (516000 – 243200) / 243200 = 112.171053%

Non-financial strategic criteria

- To capture larger market share
- To make it difficult for competitors to enter the market
- To develop an enabler product, which by its introduction will increase sales in more profitable products
- To develop core technology that will be used in next-generation products
- To reduce dependency on unreliable suppliers
- To prevent government intervention and regulation

Multicriteria selection models

- Checklist model:
  - uses a list of questions to review potential projects and to determine their acceptance or rejection

- Multiweighted scoring model:
  - uses several weighted qualitative and/or quantitative selection criteria to evaluate project proposals

Sample selection questions

Topic	Question
Strategy/alignment	What specific strategy does this project align with?
Driver	What business problem does the project solve?
Success metrics	How will we measure success?
Sponsorship	Who is the project sponsor?
Risk	What is the impact of not doing this project?
Risk	What is the project risk to our organisation?
Risk	Where does the proposed project fit in our risk profile?
Benefits, value, ROI	What is the value of the project to this organisation?
Benefits, value, ROI	When will the project show results?
Objectives	What are the project objectives?

Sample selection questions *continued*

Topic	Question
Organisation culture	Is our organisation culture right for this type of project?
Resources	Will internal resources be available for this project?
Approach	Will we build or buy?
Schedule	How long will this project take?
Schedule	Is the time line realistic?
Training/resources	Will staff training be required?
Finance/portfolio	What is the estimated cost of the project?
Portfolio	Is this a new initiative or part of an existing initiative?
Portfolio	How does this project interact with current projects?
Technology	Is the technology available or new?

Project screening matrix

Figure 2.3 PROJECT SCREENING MATRIX

Criteria / Weight	Stay within core competencies	Strategic fit	Urgency	25% of sales from new products	Reduce defects to less than 1%	Improve customer loyalty	ROI of 18% plus	Weighted total
	2.0	3.0	2.0	2.5	1.0	1.0	3.0	
Project 1	1	8	2	6	0	6	5	66
Project 2	3	3	2	0	0	5	1	27
Project 3	9	5	2	0	2	2	5	56
Project 4	3	0	10	0	0	6	0	32
Project 5	1	10	5	10	0	8	9	102
Project 6	6	5	0	2	0	2	7	55
⋮								
Project *n*	5	5	7	0	10	10	8	83

Multicriteria selection models

- Checklist model:
  - uses a list of questions to review potential projects and to determine their acceptance or rejection
  - fails to answer the relative importance or value of a potential project and doesn't to allow for comparison with other potential projects

- Multiweighted scoring model:
  - uses several weighted qualitative and/or quantitative selection criteria to evaluate project proposals
  - allows for comparison of projects with other potential projects

Applying a selection model

- Project classification
  - Deciding how well a strategic or operations project fits the organisation's strategy
- Selecting a model
  - Applying a weighted scoring model to bring projects to closer alignment with the organisation's strategic goals:
    - reduces the number of wasteful projects
    - helps identify proper goals for projects
    - helps everyone involved understand how and why a project is selected

		Project number			
Must objectives	**Must meet if impacts**	**...26**	**27**	**28**	**29**
All activities meet current legal, safety, and environmental standards	Yes-Meets objective No-Does not meet obj N/A-No impact	**n/a**			
All new products will have a complete market analysis	Yes-Meets objective No-Does not meet obj N/A-No impact	**yes**			
Want objectives	**Relative Importance 1-100**	**Single project impact definitions**	**Weighted score**	**Weighted score**	**Weighted score**	**Weighted score**
Provides immediate response to field problems	**99**	0 ≤ Does not address ① = Opportunity to fix 2 ≥ Urgent problem	**99**			
Create $5 million in new sales by 20xx	**88**	⓪ < $100,000 1 = $100,000–500,000 2 > $500,000	**0**			
Improve external customer service	**83**	0 ≤ Minor impact 1 = Significant impact ②≥ Major impact	**166**			
Total weighted score						
Priority						

Directly related to objectives identified in the strategic plan

Priority Analysis

FIGURE 2.6

Project proposals

- Sources and solicitation of project proposals
  - Within the organisation
  - Request for proposal (RFP) from external sources (contractors and vendors)

- Ranking proposals and selection of projects
  - Prioritising requires discipline, accountability, responsibility, constraints, reduced flexibility, and loss of power

- Managing the portfolio
  - Senior management input
  - The priority team (project office) responsibilities

Managing the portfolio

- Senior management:
  - provide guidance in selecting criteria that are aligned with the organisation's goals
  - decide how to balance available resources among current projects

- The priority team:
  - publishes the priority of every project
  - ensures that the project selection process is open and free of power politics
  - reassesses the organisation's goals and priorities
  - evaluates the progress of current projects

Project teams

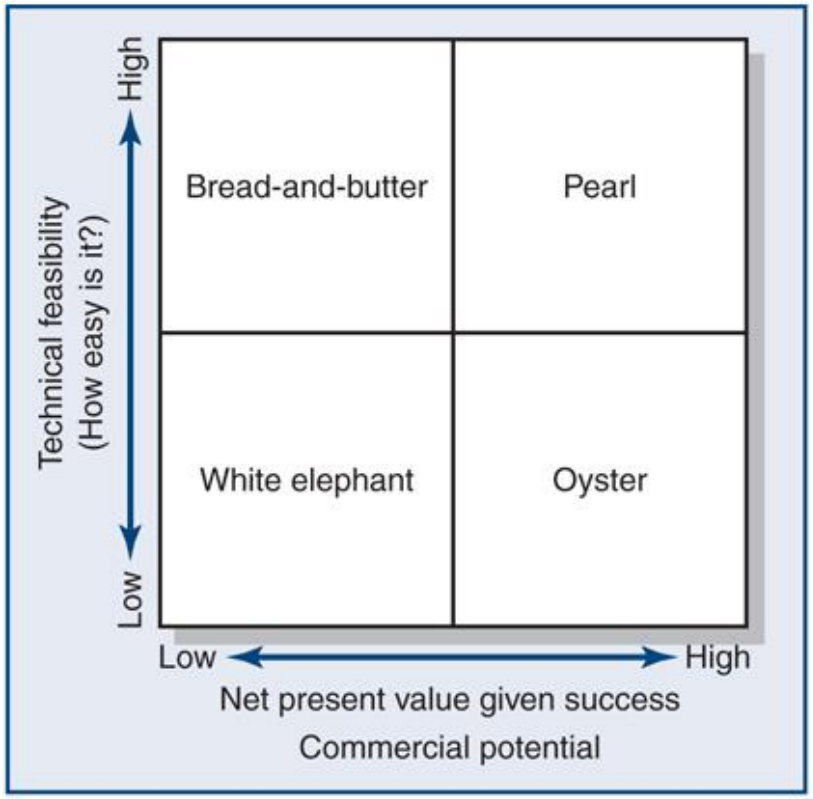
Open and regular communication on project selection criteria, process and transparency helps project teams with priorities.

Project relativity matrix dimensions

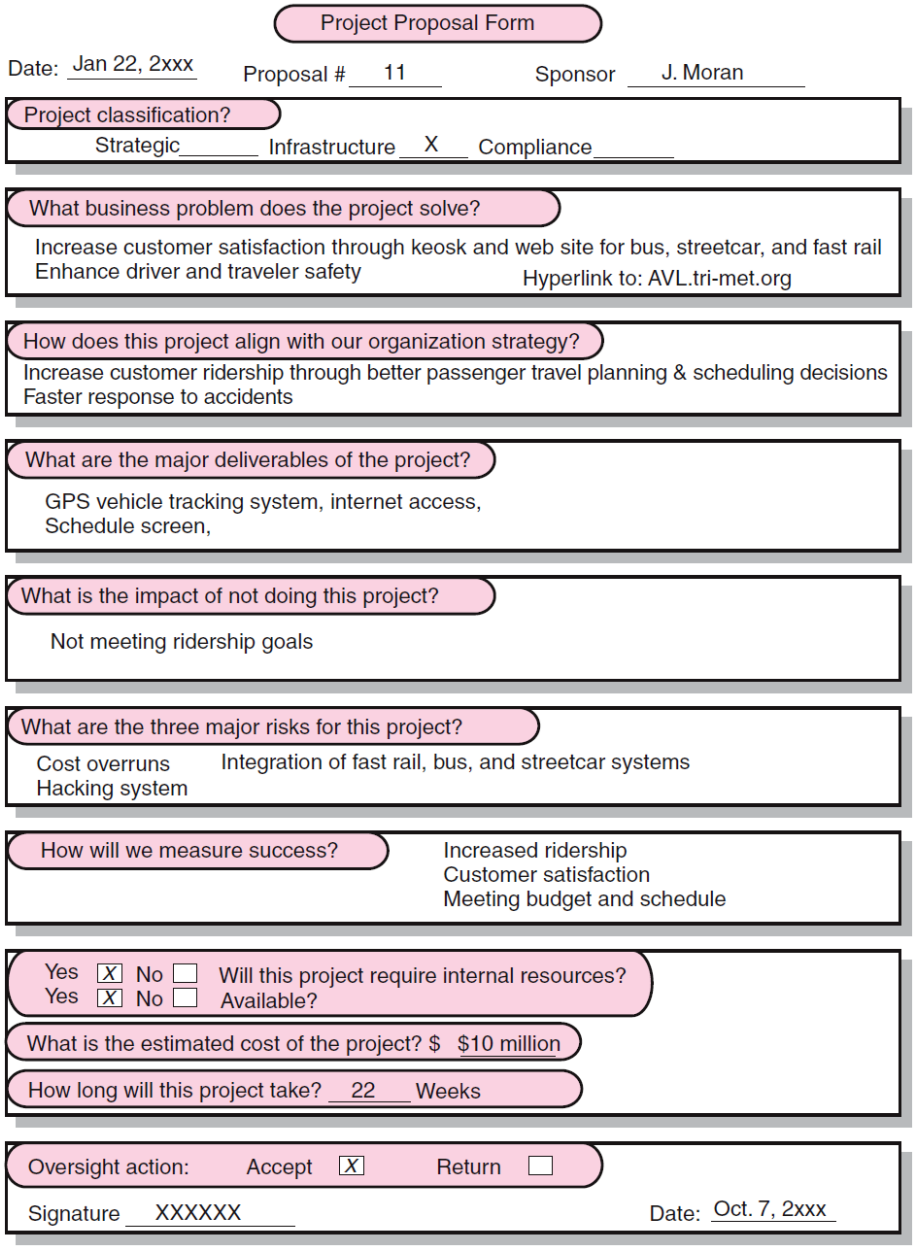
- Bread-and-butter projects:
  - involve evolutionary improvements to current products and services
- Pearls:
  - represent revolutionary commercial opportunities using proven technical advances
- Oysters:
  - involve technological breakthroughs with high commercial payoffs
- White elephants:
  - showed promise at one time but are no longer viable

Project relativity matrix

Figure 2.8 PROJECT RELATIVITY MATRIX



- Bread-and-butter projects:
  - involve evolutionary improvements to current products and services
- Pearls:
  - represent revolutionary commercial opportunities using proven technical advances
- Oysters:
  - involve technological breakthroughs with high commercial payoffs
- White elephants:
  - showed promise at one time but are no longer viable



Project Proposal Form

Date: Jan 22, 2xxx Proposal # 11 Sponsor J. Moran

Project classification?

Strategic_____ Infrastructure X Compliance_____

What business problem does the project solve?

Increase customer satisfaction through keosk and web site for bus, streetcar, and fast rail
Enhance driver and traveler safety
Hyperlink to: AVL.tri-met.org

How does this project align with our organization strategy?

Increase customer ridership through better passenger travel planning & scheduling decisions
Faster response to accidents

What are the major deliverables of the project?

GPS vehicle tracking system, internet access,
Schedule screen,

What is the impact of not doing this project?

Not meeting ridership goals

What are the three major risks for this project?

Cost overruns
Hacking system
Integration of fast rail, bus, and streetcar systems

How will we measure success?

Increased ridership
Customer satisfaction
Meeting budget and schedule

Yes [X] No [ ] Will this project require internal resources?
Yes [X] No [ ] Available?

What is the estimated cost of the project? $ $10 million

How long will this project take? 22 Weeks

Oversight action: Accept [X] Return [ ]

Signature XXXXXX Date: Oct. 7, 2xxx

A Proposal Form for an Automatic vehicular tracking (AVL) Public Transportation Project

FIGURE 2.4A

What are the three major risks for this project?

1. *Federal incentives curtailed*
2. *Land use injunction*
3. *Energy price decrease*

What is the probability of the above risks occuring?	0 to 1.0 none high	Risk 1 above	*.30*
		Risk 2 above	*.20*
		Risk 3 above	*.10*
What is the impact on project success if these risks do occur?	0 to 10 none high	Risk 1 above	*1.0*
		Risk 2 above	*.30*
		Risk 3 above	*.10*

RESOURCES AVAILABLE? *X* Yes _____ No

CURRENT PROJECT STATUS

Start date *2/22/xx* **Estimated finish date** *9/25/xx*

STATUS: ☐ **Active** ☐ **On-hold**

UPDATE:

Start in 3 weeks

PRIORITY TEAM ACTION: ☒ **ACCEPTED** ☐ **RETURNED**

☐ DISCOVERY—project not defined ☒ Duplicate to: *Dat Nguyen*

☐ OPERATIONAL—proposal not a project Project # *676*

☐ NEED MORE INFORMATION—to prioritize project ☐ COMPLETED project

Risk Analysis for 500-Acre Wind Farm

FIGURE 2.4B

Key Terms

Implementation gap

Net present value

Organizational politics

Payback

Priority system

Priority team

Project portfolio

Project screening matrix

Project sponsor

Sacred cow

Strategic management process