Project selection and portfolio management

Chapter 3

Project Selection

Screening models help managers pick winners from a pool of projects. Screening models are *numeric* or *nonnumeric* and should have:

Realism

Capability

Flexibility

Ease of use

Cost effectiveness

Screening & Selection Issues

1. *Risk* – unpredictability to the firm
   a. Technical
   b. Financial
   c. Safety
   d. Quality
   e. Legal exposure
2. *Commercial* – market potential
   a. Expected return on investment
   b. Payback period
   c. Potential market share
   d. Long-term market dominance
   e. Initial cash outlay
   f. Ability to generate future business/new markets

Screening & Selection Issues

3. *Internal operating* – changes in firm operations
   a. Need to develop/train employees
   b. Change in workforce size or composition
   c. Change in physical environment
   d. Change in manufacturing or service operations
4. *Additional*
   a. Patent protection
   b. Impact on company's image
   c. Strategic fit

All models only *partially reflect reality* and have *both objective and subjective* factors imbedded.

Approaches to Project Screening

- Checklist model
- Simplified scoring models
- Analytic hierarchy process
- Profile models

Checklist Model

A checklist is a list of criteria applied to possible projects.

- ✓ Requires agreement on *criteria*
- ✓ Assumes all criteria are *equally important*

Checklists are valuable for recording opinions and stimulating discussion.

Simplified Scoring Models

Each project receives a score that is the weighted sum of its grade on a list of criteria. Scoring models require:

- agreement on *criteria*
- agreement on *weights* for criteria
- a *score* assigned for each criteria

$$Score = \sum (Weight \times Score)$$

Relative scores can be misleading!

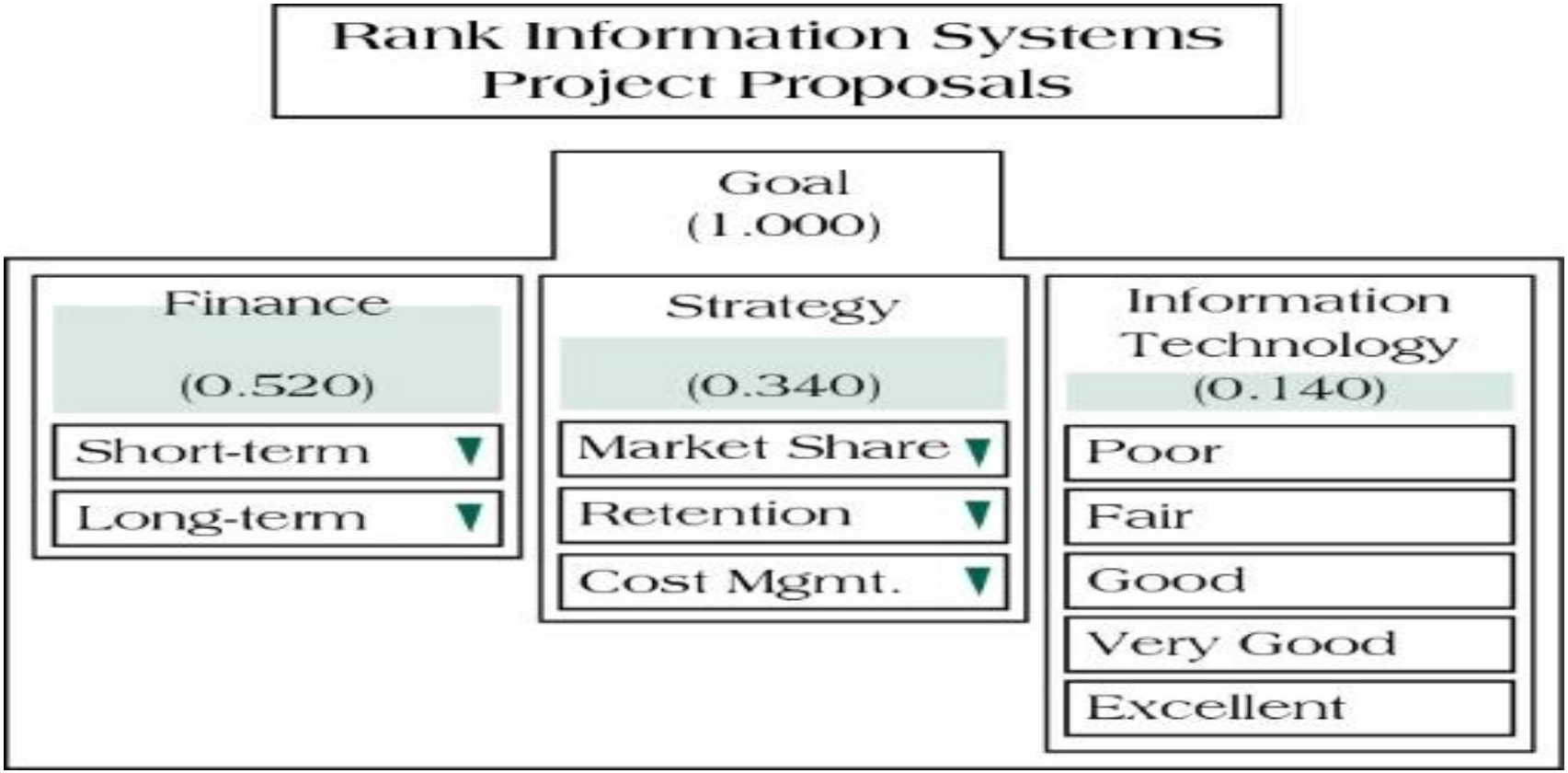
Analytic Hierarchy Process

The AHP is a four step process:

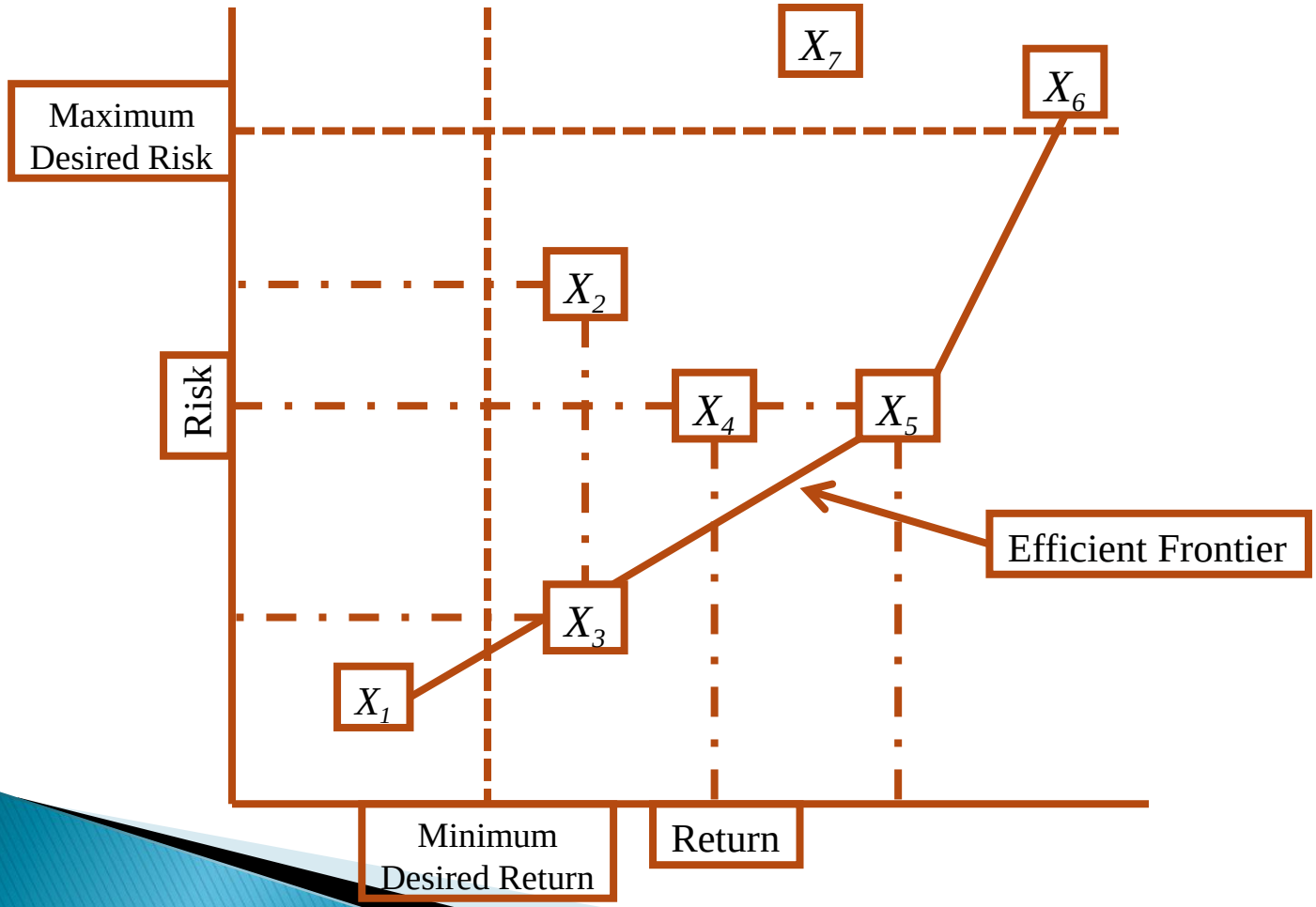
1. Construct a hierarchy of *criteria and subcriteria*.
2. *Allocate weights* to criteria.
3. Assign *numerical values* to evaluation dimensions.
4. *Determine scores* by summing the products of numeric evaluations and weights.

Unlike the simple scoring model, these scores can be compared!

Sample AHP with Rankings for Salient Selection Criteria



Profile Models



Criteria selection as axes

Rating each project on criteria

Financial Models

- Payback period
- Net present value
- Discounted payback period
- Internal rate of return
- Options models

Payback Period

Determines ***how long*** it takes for a project to reach a breakeven point

$$Payback\ Period = \frac{Investment}{Annual\ Cash\ Savings}$$

Cash flows should be discounted.
Lower numbers are better *(faster payback)*.

Payback period example

	Project A		Project B	
	Revenues	Outlays	Revenues	Outlays
Year 0		$500,000		$500,000
Year 1	$ 50,000		$ 75,000	
Year 2	150,000		100,000	
Year 3	350,000		150,000	
Year 4	600,000		150,000	
Year 5	500,000		900,000	

Payback Period Example

Project A	Year	Cash Flow	Cum. Cash Flow
	0	($500,000)	($ 500,000)
	1	50,000	(450,000)
	2	150,000	(300,000)
	3	350,000	50,000
	4	600,000	650,000
	5	500,000	1,150,000

Payback = 2.857 years

3 - $\frac{50,000}{350,000}$ = 2.857

Divide the cumulative amount by the cash flow amount in the third year and subtract from 3 to find out the moment the project breaks even.

Payback Period Example

Project B	Year	Cash Flow	Cum. Cash Flow
	0	($500,000)	($ 500,000)
	1	75,000	(425,000)
	2	100,000	(325,000)
	3	150,000	(175,000)
	4	150,000	(25,000)
	5	900,000	875,000

Payback = 4.028 years

$$5 - \frac{875{,}000}{900{,}000} = 4.028$$

Divide the cumulative amount by the cash flow amount in the third year and subtract from 3 to find out the moment the project breaks even.

Net Present Value

Projects the change in the firm's stock value if a project is undertaken.

$$NPV = I_o + \sum \frac{F_t}{(1 + r + p_t)^t}$$

where

F_t = *net cash flow for period* t

R = *required rate of return*

I = *initial cash investment*

P_t = *inflation rate during period* t

Higher NPV values are better!

Net Present Value Example

Year	Inflows	Outflows	Net Flow	Discount Factor	NPV
0		$100,000	$(100,000)	1.0000	$(100,000)
1	$20,000		20,000	0.8772	17,544
2	50,000		50,000	0.7695	38,475
3	50,000		50,000	0.6749	33,745
4	25,000		25,000	0.5921	14,803
Total					$ 4,567

(table 3.6)

The NPV column total is positive, so invest!

Discounted payback period

	Project Cash Flow*	
Year	Discounted	Undiscounted
1	$8,900	$10,000
2	7,900	10,000
3	7,000	10,000
4	6,200	10,000
5	5,500	10,000
Payback Period	4 Years	3 Years

*Cash flows rounded to the nearest $100.

Internal Rate of Return

A project must meet a *minimum rate of return* before it is worthy of consideration.

$$IO = \sum_{n=1}^{t} \frac{ACF_t}{(1+IRR)t}$$

where

ACF_t = *annual after tax cash flow for time period t*

IO = *initial cash outlay*

n = *project's expected life*

IRR = *the project's internal rate of return*

Higher IRR values are better!

Internal Rate of Return Example

Year	Inflows	Discount Factor at 15%	NPV
1	$2,500	.870	$2,175
2	2,000	.756	1,512
3	2,000	.658	1,316
Present value of inflows			5,003
Cash investment			5,000
Difference			$ 3

This table has been calculated using a discount rate of 15%.

The project does meet our 15% requirement and *should be considered further*.

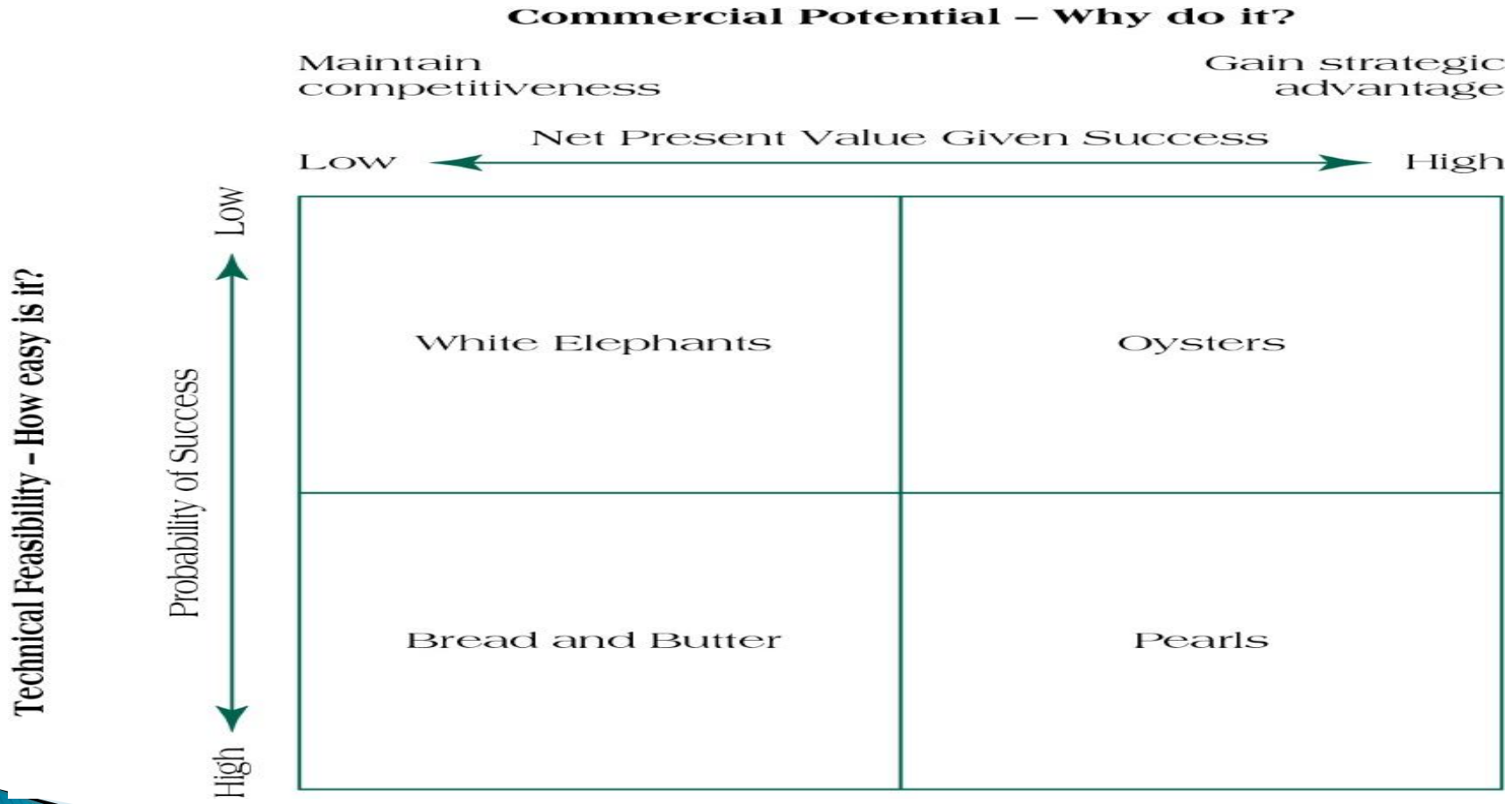
Project Portfolio Management

The systematic process of selecting, supporting, and managing the firm's collection of projects.

Portfolio management objectives and initiatives require:

- decision making
- prioritization
- review
- realignment
- reprioritization of a firm's projects

Proactive portfolio matrix



Keys to Successful Project Portfolio Management

- *Flexible structure* and freedom of communication
- *Low-cost* environmental scanning
- *Time-paced* transition

Problems in Implementing Portfolio Management

- Conservative technical communities
- Out-of-sync projects and portfolios
- Unpromising projects
- Scarce resources