

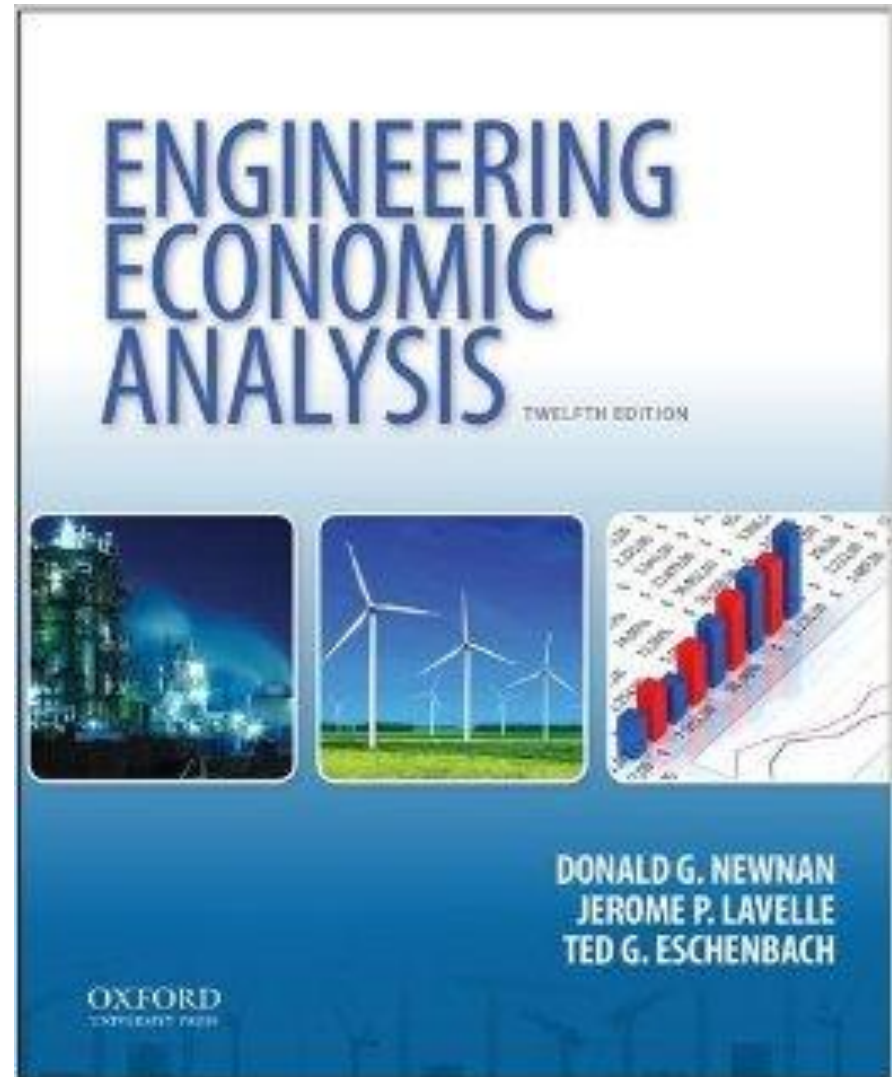
EKONOMI TEKNIK

INTRODUCTION



REFERENCE

Donald G. Newnan,
Jerome P. Lavelle Ted G.
Eschenbach, “Engineering
Economic Analysis”, Oxford
University Press; 12 edition
(November 29, 2013)



Who are you in 4 years later?

1.

2.

3.

If you are an engineer what you bring to your boss?

1.

2.

3.

10 ten skill as engineer

1. **Strong analytical attitude**
2. Attention to detail
3. Excellent communication skill
4. Takes a part of continuing education
5. Creative
6. Able to think logically
7. **Excellent math skill**
8. Team player
9. **Good problem solving skill**
10. **Excellent technical skill**



“Do not pray for an easy life, pray for the strength to endure a difficult one.”

Bruce Lee

Why we study economic engineering?

- As a tool of decision making
- It can predict the future condition
- Basic knowledge as engineer

Why we study economic engineering?

- It deals with the concept and techniques of evaluating and selecting the rational decision of products or services to their cost



Engineering Economic

- Is a knowlegde which explains the methods of assessing investments that should be meet in economical term (feasible and profitable)
- Focuses on costs, revenues and benefits that occur at different times

Engineering Economic

It can answer....

Simple, intermediate or complex problem

Simple problem such as:

- Should I pay cash or use credit car?
- Shall we replace a burn-out laptop?

Engineering Economic

Intermediate problem such as:

- Should I pay my car cash or loan?
- Which equipment should be selected in new assembly line?
- What size of car is the most economical?

Engineering Economic

complex problem such as:

- Should I raise tax this semester or later?
- Which country the next plant should be built?
- How to choose the boyfriend or girlfriend?

Engineering Economic

It can answer...

- Which engineering project worthwhile?
- Which engineering project should have priority?
- How should the engineering project be designed?

Engineering Economic

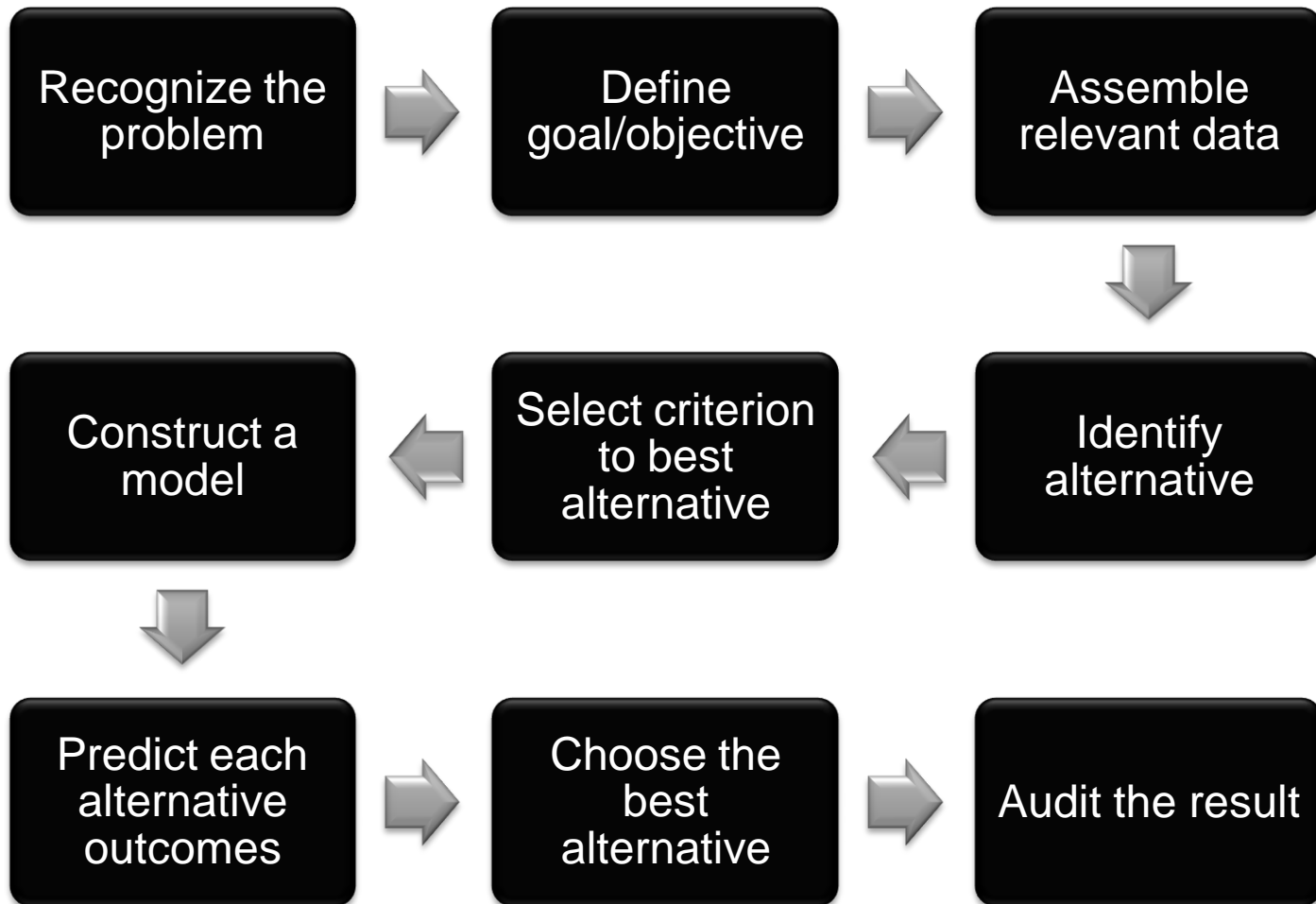
It can answer...

- How to achieve long term financial goals?
- How to compare different ways to finance purchase?
- How to make a short and long term investment decision?

Engineering Economic

- Those typical questions must be answered in technical indicator and evaluation--
convert to economical criterion

9 steps decision process



(Newnan et al, 2013)

1. Recognize the Problem

- Identify the problem exist

2. Define goal/objective

- Goal or objective can be overall or individual
- Firm's goal usually to operate profitably

3. Assemble relevant data

- Assemble good information
- Deciding which data is more important
- The availability of the data may be concern

4. Identify alternatives

- 2 or more alternatives may be good but do-nothing alternatives is also feasible
- People use brainstorming

5. Select criterion to best alternative

- Avoid subjective judgement
 - Translate to numeric criterion is best
- example



(Kegiatan Ekonomi dari Pandangan Sistem Produksi)

Example of criterion:

-fixed input-→ maximize the benefit or other output

-fixed output → maximize the costs or other inputs

-Input, output not fixed→ maximize (benefit-cost) or maximize profit.



(Kegiatan Ekonomi dari Pandangan Sistem Produksi)

6. Construct a model

- Constructing relationship between decision making elements
- Such as:

Purpose: Selling table or chair

criterion: maximise profit

Math model:

$$\text{benefit} - \text{cost} > 1$$

7. Predict each alternative outcomes

- Predict each alternative consequences or outcome not only monetary terms but also non monetary terms

8. Choose the best alternative

- Which alternative best meets the selection criterion

9. Audit the result

- Is the prediction overlook?
- Is it accurate? Realistic?
- Audit means comparison of what happened against the prediction

Examples of relational decision making Manufacturing Sector

- Service Improvement
 - Equipment and Process Selection
 - Equipment Replacement
 - New Product and Product Expansion
-
- Cost reduction or profit maximization can be seen as generic (common, eventual) objectives
 - In the most general sense, we have to make decisions under resource constraints, and in presence of uncertainty – not only in the EEA context

The influence factor of decision making

- The factors of **time, resource limitations** and **uncertainty** are key defining aspects of any investment project

Example:

Getting car in Indonesia

- Avanza > Rp 180 jt



Getting car in Indonesia

- HRV > Rp 200 jt



Getting car in Indonesia

- Agya > Rp 100 jt



Getting car in Indonesia

- Brio > Rp 100 jt



A Simple Illustrative Example: Car to Finance – Toyota or Honda?

- Recognize the decision problem → • Need to lease a car
- Collect all needed (relevant) information → • Gather technical and financial data
- Identify the set of feasible decision alternatives → • Select cars to consider
- Define the key objectives and constraints → • Wanted: small cash outlay, safety, good performance, aesthetics,...
- Select the best possible and implementable decision alternative → • Choice between Toyota and Honda
- • Select a car (i.e., Honda, Saturn or another brand)