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UoG / UESTC Joint School of Engineering

Engineering Project Management & Finance

Engineering Economics: Make or Buy decisions

Dr Imran Shafique Ansari

Definitions

- “Make-or-Buy decisions compare the cost of producing a component (or service) internally against the cost of purchasing the component (or service) from an external supplier”

Tactical Make-Buy Decisions

Some common reasons for make-buy decisions at this level follow:-

- Delivery failure or poor service by existing source
- To allow the organisation to focus on its core business
- To access skills and technologies
- To provide [demand] flexibility
- Market or internal pressure to reduce costs

Simple Lease-or-Buy Example

- You can lease a piece of equipment you need for a project for $150/day. To purchase the item, the investment cost is $1,000, and the daily cost would be another $50/day.
- How long will it take for the lease cost to be the same as the purchase cost?
- If you need the item for 12 days, should you lease it or purchase it?

Simple Lease-or-Buy Solution

- Set up an equation so the “make” is equal to the “buy”
- In this example, use the following equation. Let **d** be the number of days to use the item.

$$\$150d = \$1{,}000 + \$50d$$

- Solve for **d** as follows:
  - Subtract $50d from the right side of the equation to get
    $$\$100d = \$1{,}000$$
  - Divide both sides of the equation by $100
    $$d = 10 \text{ days}$$

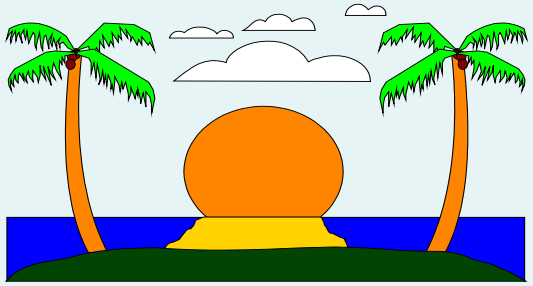
Lease-or-Buy Solution… or is it?

- The lease cost is the same as the purchase cost at 10 days
- If you need the item for 12 days, it would be more economical to purchase it
- But… does this analysis tell the whole story?
  - When might it not be applicable?

The Concept of Relevant Cost Information

- Will you drive or fly to Florida for spring break?

- You have gathered the following information to help you with the decision.
  - Motel cost is $80 per night.
  - Meal cost is $20 per day.
  - Your car insurance is $100 per month.
  - Kennel cost for your dog is $5 per day.
  - Round-trip cost of gasoline for your car is $200.
  - Round-trip airfare and rental car for a week is $500.



- Driving requires two days, with an overnight stay, cutting your time in Florida by two days.

The Concept of Relevant Cost Information

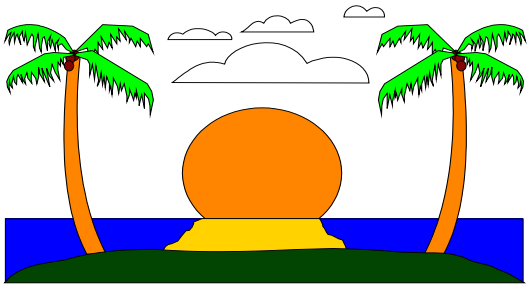
Florida Spring Break Drive/Fly Analysis

Cost	Drive	Fly
Motel	$640	$640
Eating out costs	160	160
Kennel cost	40	40
Car insurance	100	100
Gasoline	200	-
Airfare/rental car	-	500

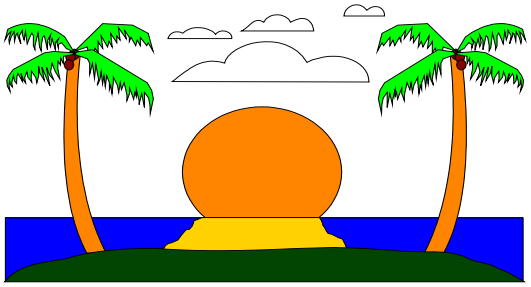
8 days @ $80

8 days @ $20

8 days @ $5



The Concept of Relevant Cost Information



Florida Spring Break
Drive/Fly Analysis

Cost	Drive	Fly
Motel	$640	$640
Eating out costs	160	160
Kennel cost	40	40
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Gasoline	200	-
Airfare/rental car	-	500

Costs do not differ, so they are not relevant to decision.

Also, car insurance is not relevant to the decision as it is a past cost.

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The Concept of Relevant Cost Information

Florida Spring Break
Drive/Fly Analysis

Cost	Drive	Fly
Motel	$640	$640
Eating out costs	160	160
Kennel cost	40	40
Car insurance	100	100
Gasoline	200	-
Airfare/rental car	-	500

Are the extra two days in Florida worth the $300 extra cost to fly?

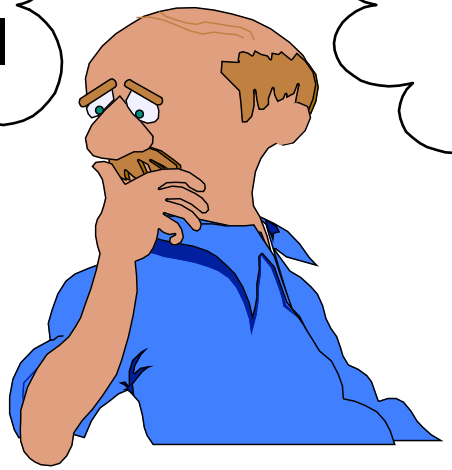
Transportation costs differ between the two alternatives, so they are relevant to your decision

Make or Buy Decisions

Should I continue to make the part, or should I buy it?

I suppose I should compare the outside purchase price with the additional costs to manufacture the part.

What will I do with my idle facilities if I buy the part?



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Make or Buy Decisions

- Incremental costs also are important in the decision to make a product or buy it from a supplier.
- The cost to produce an item must include:-
  (1) direct materials
  (2) direct labor
  (3) incremental overhead
- We should not use the allocated overhead rate to determine product cost.

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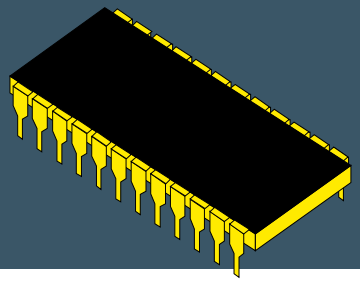

Make or Buy Decisions

Exitel makes computer chips used in one of its products. Unit costs, based on production of 20,000 chips per year, are:

		Annual Cost($)	Per Unit Cost($)
Direct Material		180,000	9.00
Direct Labour		100,000	5.00
Variable Overhead		20,000	1.00
Fixed Overhead		260,000	13.00
	Total	**$ 560,000**	**$ 28.00**

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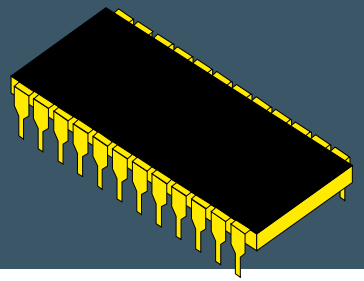

Make or Buy Decisions

An outside supplier has offered to provide the 20,000 chips at a cost of $25 per chip. Fixed overhead costs **will not** be avoided if the chips are purchased. Exitel has **no** alternative use for the facilities.

Should Exitel accept the offer of $25?

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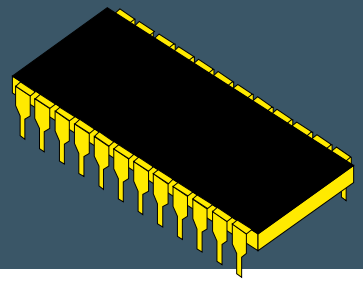

Make or Buy Decisions

Let's look at the per unit **relevant costs** of not making (i.e. costs **avoided** if bought from outside supplier)

	Unit Cost
Direct Material	$ 9.00
Direct Labor	5.00
Variable Overhead	1.00
Total Variable Costs saved	$ 15.00
Remaining fixed Overhead(not saved)	**$13.00**

No, Exitel should **not** pay $25 per unit to an outside supplier. This would save $15 variable costs but would not reduce the Fixed Overhead cost ($13).

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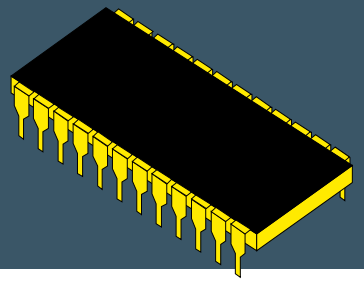

New Information

If Exitel buys the chips from the outside supplier, the idle facilities **could be leased** to another company for $250,000 per year.

Should Exitel buy the chips and lease the facilities?

Cost Analysis (annual)

Figures based on 20,000 chips per year		Make	Buy	Buy & Lease
Direct Material		180,000	0	0
Direct Labour		100,000	0	0
Variable Overhead		20,000	0	0
Fixed Overhead		260,000	260,000	260,000
External Price		0	500,000	500,000
Costs sub-total		**$ 560,000**	**$760,000**	**$760,000**
Lease of Premises **(Income)**		**0**	**0**	**($250,000)**
Total		**$560,000**	**$760,000**	**$510,000**

The opportunity cost of facilities changes the decision.

The real question to answer is,
"What is the best use of Exitel's facilities?"

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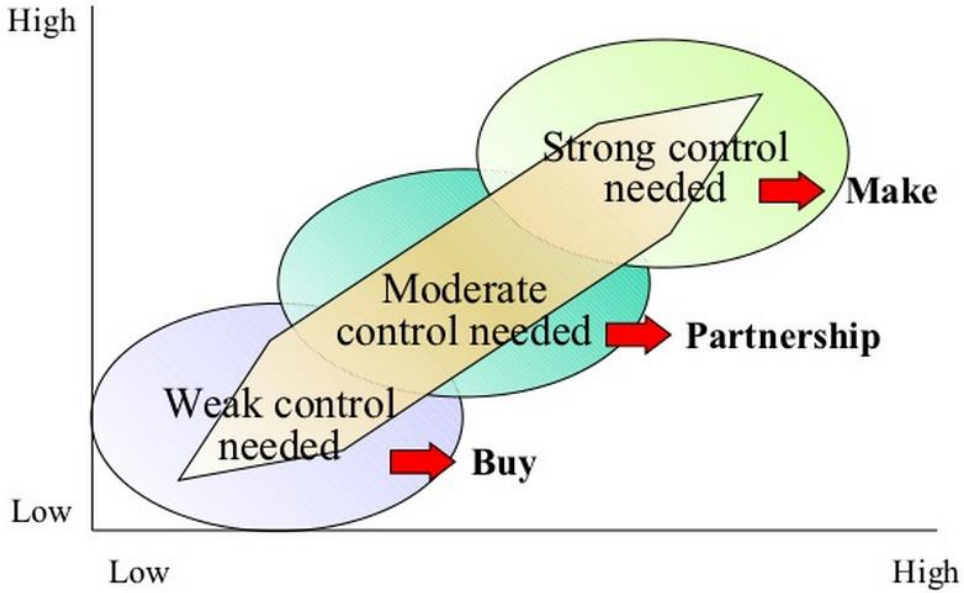
Some other things to consider…

Make or Buy

Advantages of Making

- Low costs
- Better quality
- Unique characteristics
- Better time management
- Control of proprietary information
- Etc…



Risks tied to Outsourcing

- Size, power of producer
- Technical capacity of buyer
- Number of transactions involved

Summary

- We have looked at a simple lease versus buy
  - Are financial considerations always the best for decisions?
  - How do you access ‘hidden’ costs /benefits of ownership?
- We have looked at relevant costs
  - Those costs which are pertinent to a decision
  - Considered ‘intangible costs (benefit of staying 2 more days)
- We have looked at Make versus Buy analysis
  - A lower price offer is not always a good deal
  - Understanding Fixed and Variable costs are important
  - There may be short term financial benefit by leasing

As engineers, you will be required to consider these options on projects and /or facilities

Post Lecture 8 Reading Material

- Read the following:
  - Make versus buy-A Decision Framework: Booz & Co (PWc)
  - Make Versus Buy: Dan Oliver

- Give special consideration to cases when Make versus Buy gives a financial benefit but not a business benefit

Skim | Read | Understand | Critique