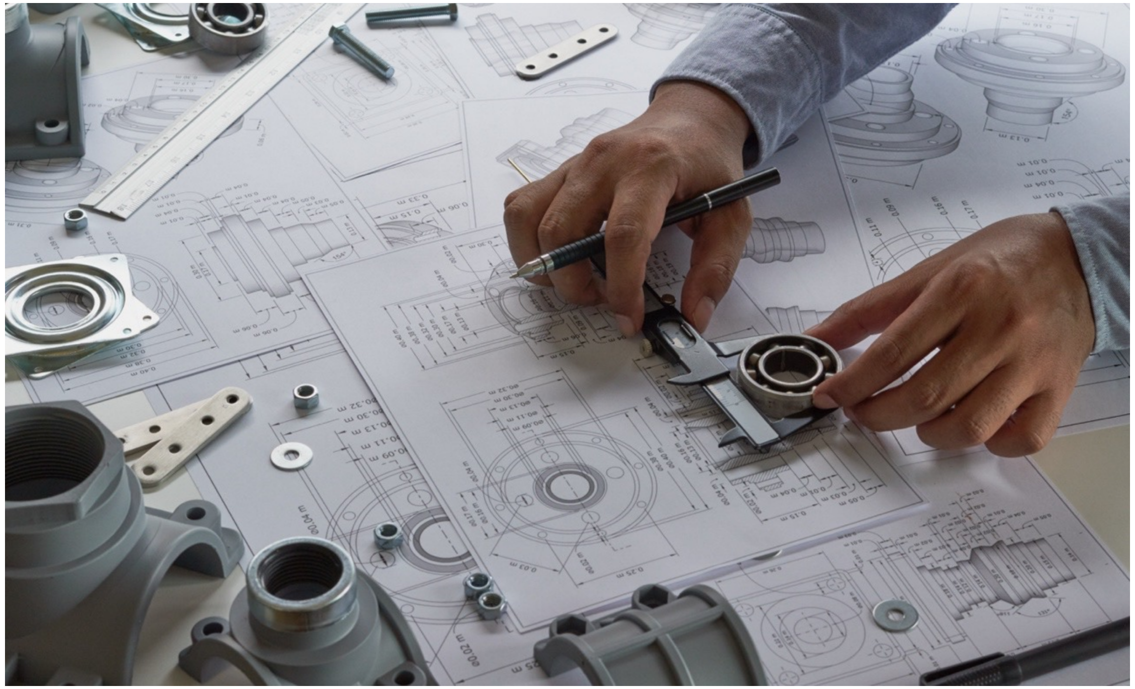
Types of Business Costs

Cost Concepts & Terminology

Our role as engineers is to design a product (or service) that performs according to set of functional criteria, and can be produced at the lowest possible cost.

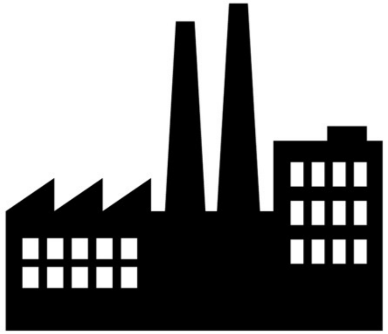
Therefore, understanding different types of costs is a vital skill for today's engineers and product developers.



Concept of Cash Flows

Cash Inflows

“Revenues”



Cash Outflows

“Costs”

Revenues:

- Sale of a Product
- Leasing a Product
- Subscription Fees
- Rents
- Services Provided
- …

Cost of the Product:

- Raw Materials
- Purchased Parts
- Labor
- Consumables
- …

”Direct Costs”

Costs of the Business:

- Marketing
- Engineering
- Finance & Accounting
- IT / Legal / HR
- Upper Management
- …

”Indirect Costs”

Cost Terminology

See Cost Terminology Handout in Course Resources

Direct Costs: those costs connected to manufacturing and distribution of a product (materials, labor)

Indirect Costs: those costs connected with everything else (equipment, management salaries, support functions such as HR, IT, Legal, etc.).

Overhead (O/H): similar to indirect costs

Standard Cost: the estimate for what a product "should" cost, based on a detailed analysis of materials, production labor, and allocation of O/H.

Cost Terminology

Sunk Cost: money spent in the past. These costs can be ignored in any decision process since you can't change what's in the past.

Ex. Over the past 2 years your team spent $2M to develop the technology for more efficient thin-film solar photovoltaic technology.

Now the team wants another $10M to take it into production.

Should the project's financial analysis include the $2M R&D cost?

No – it is was already spent, and therefore it's a Sunk Cost and doesn't have any bearing on the future financial state of the project.

Cost Terminology

Opportunity Cost: the amount of the benefit that is *foregone* by selecting one alternative over another.

Opportunity Cost = (Benefit of the Best Option Not Chosen) - (Benefit of the Option Chosen)

Ex. You are Manager of R&D and have two technology dvelopment projects you're considering. They both cost $200,000 to conduct. Which do you select?

- Project A has an estimated financial return of 25% but has high risk.
- Project B has an estimated financial return of 20% but has a very low risk.

You decide to go with Project B because of its near certainty. What is the Opportunity Cost?

The potential 5% you gave up by foregoing Project A.

Cost Terminology

- *Marginal Costs*

The cost of the next unit produced (or purchased)…

Class Credit Hour Pricing – Traditional

- Part-time (< 9 credit hours): $1,000/cr
- Full-time (≥ 9 credit hours): $9,000

Cost of 9 credit hours: $9,000

Cost of 10 credit hours: $9,000

Marginal cost of the 10^{th} credit hour: $0

Class Credit Hour Pricing – Linear Model

- Cost per credit hour: $1,000/cr

Cost of 9 credit hours: $9,000

Cost of 10 credit hours: $10,000

Marginal cost of the 10^{th} credit hour: $1,000

Cost Terminology

- *Average Costs*

The average cost per unit for all the units produced (or purchased)…

Class Credit Hour Pricing – Traditional

- Part-time (< 9 credit hours): $1,000/cr
- Full-time ($\geq$ 9 credit hours): $9,000

Cost of 9 credit hours: $9,000

Cost of 10 credit hours: $9,000

9 Credit Hours: Avg. cost / credit hour = $1,000

10 Credit Hours: Avg. cost / credit hour = $900

Class Credit Hour Pricing – Linear Model

- Cost per credit hour: $1,000/cr

Cost of 9 credit hours: $9,000

Cost of 10 credit hours: $10,000

9 Credit Hours: Avg. cost / credit hour = $1,000

10 Credit Hours: Avg. cost / credit hour = $1,000

Cost Terminology

- *Recurring vs. Non-Recurring Costs*

Recurring: those costs that occurs in regular intervals (e.g., rent), and are easy to plan for.

Non-Recurring: those costs that occurs in only once in a while (e.g., unexpected service or warranty), and are hard to anticipate.

You'll sometimes hear a company say they are taking a "1-time charge" for something, such as costs of shutting down a plant. This is a non-recurring, 'one-time-only' ("OTO") cost.

More Cost Terminology

Fixed Costs: those costs unaffected by production volumes, such as advertising, R&D, management salaries

Variable Costs: those costs that vary with production volumes, such as raw materials, production labor.

Fixed vs. Variable Cost: Which is it?

Raw Materials?

Rent?

Insurance?

Engineering Salaries?

Sales Commissions?

Shipping Costs?

Machining Fluid?

Utilities (Gas & Electric)?

Generally, if a cost varies with production volume,
it is a variable cost.

Main Takeaways…

- Cash flow represents money flowing into the organization (cash inflow) and money flowing out of the organization (cash outflow).

- Cash inflows represent revenues, what the product receives when it sells its products or services.

- Cash outflows represent costs.

- There are many types of costs:
  - Fixed vs. Variable
  - Average vs. Marginal
  - Sunk Costs & Opportunity Costs
  - Recurring vs. Non-Recurring (”OTO”)

Understanding where the money comes from (Revenues) and where it goes (Costs) are central to financial management!

Next Time…

Conducting a Break-Even Analysis

Credits & References

Slide 1: Business woman holding a pen pointing the graph and partnership to analyze the marketing plan with calculater and laptop computer on wood desk in office by Jirapong, Adobe Stock (182784616.jpeg).

Slide 2: Engineer technician designing drawings mechanical parts, by Chaosamran_Studio, Adobe Stock (321031954.jpeg).

Slide 3: Black factory icons on white background by Anthonycz, Adobe Stock (93389062.jpeg).

Slide 10: Group Of Medical Staff Meeting Around Table by Monkey Business, Adobe Stock (148429335.jpeg). Stacked steels in metal warehouse by sezer66, Adobe Stock (198385645.jpeg).

Slide 14: Break-even analysis by Anton, Adobe Stock (137866355.jpeg).