Product Costing

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Product Cost Accounting

- A two stage process:
  - Standard costs
  - Actual costs
- Standard cost:
  - A company's forecast of its cost of every product it sells
    - All of a company's costs must be allocated to its product lines
      - Direct costs
      - Overhead or indirect costs
        - Gets harder the farther away from a specific product
    - Generally done annually in advance
      - Used for:
        - Profit forecasting
        - Pricing

Product Cost Accounting

- Actual costs:
  - The reconciliation between forecast standard costs and actual operating experience
    - May be positive or negative variance
      - Higher/lower raw material prices
      - Better/lower yield
      - Greater/lower throughput
      - Higher/lower overtime costs
      - etc.
    - Experience gets fed back into the generation of next year's standard costs

Product Cost Accounting

- What are the components of product cost?
  - Raw materials /components
    - Number * Unit cost
  - Direct manufacturing labor
    - Tends to get lower with automation
      - Replaced by depreciation
  - Indirect manufacturing costs, inc.
    - Depreciation
    - Royalties

Indirect Manufacturing Costs

- Indirect material
- Indirect labor
- Maintenance & Repair
- Supplies
- Utilities
- Other Variable Expenses
- Manufacturing managerial salaries
- Occupancy (Rent)
- Depreciation
- Other Fixed Expenses

Chemical Transformation Costing

- Put in all components to generate unit amount of finished product, allowing for yield:
  - 0.57 * Compound A
  - 0.43 * Compound B
  - 0.21 * Compound C
- Do reaction by-products have value?
  - If so, credit against production cost
  - - 0.11* By-product X

Semiconductor Costing

- Calculate cost to process one wafer
- Divide by number of finished devices
- Divide by yield of usable devices
  - Yield is critical
    - 80% ➔ 90% equates to a 12% drop in unit cost

How to Calculate COGS

- "Bottom Up" COGS model is commonly used

Material + Manufacturing + Delivery + Administration

* While in clinical trials, you're not generating revenue on your product. It's considered to be a R&D expense.

Direct Material Beginning Balance	$	5,000
+ Direct Material Purchase	$	65,000
- Direct Material Ending Balance	$	3,000
Direct Material Used in Prod	**$**	**67,000**
Direct Material Used in Prod	$	67,000
+ Direct Labor	$	25,000
+ Manufacturing Overhead	$	17,000
Total Production Cost	**$**	**109,000**
Total Production Cost	$	109,000
+ WIP Beginning Balance	$	1,000
- WIP Ending Balance	$	1,500
Cost of Goods Manufactured	**$**	**108,500**
Cost of Goods Manufactured	$	108,500
+ Finished Goods Beginning Balance	$	4,500
Goods Available for Sale	$	113,000
- Finished Goods Ending Balance	$	3,000
Cost of Goods Sold	**$**	**110,000**

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As Volume Grows

- Many things change
  - Your fixed costs are spread over a greater volume, so unit costs ↓
  - Costs of your components ↓, as suppliers spread their fixed costs over greater volume
  - You replace high variable/low fixed cost components for low variable/high fixed cost components, so unit costs ↓

As Volume Grows

- Example: Product Shell
  - Early stage: Fabricate from metal
    - High material cost (variable)
    - High labor cost (variable)
    - Low or no tooling cost (Fixed)
  - As volume grows: Change to injection molded
    - Low material cost (variable)
    - Low labor cost (variable)
    - High tool cost (Fixed)

As Complexity Grows

- As companies grow, their product lines become more complex
  - 10-20% of their product line generates 80% of sales
    - 200% of profits
  - Many low volume products lose money
- Traditional cost accounting systems don't account for complexity well
  - High per unit sales and support costs
  - Inventory costs
- Activity-Based Costing attempts to account for these factors
- P&G currently selling 100 product lines that have low total sales

Lifesciences Product Costing

- Average margins
  - Pharmaceutical : 80% - 95%
  - Biologics : 60% - 90%
  - Device : 15% – 40%
  - Diagnostic : < 10%
  - Theranostic: 40% - 60% (Tysabri JCV assay)

Manufacturing Costs -- Pharmaceuticals

- Raw Materials (10-15% of Cost Of Production)
  - Materials group negotiates raw material costs with vendors for the coming year.
  - Raw material costs are included in product's Bill of Material
- Overhead – (about 85-90% of Cost Of Production)
  - All costs other than direct materials that are associated with production
    - Direct overhead are costs associated with production in mfg, i.e. labor, utilities, building costs.
    - Indirect overhead are costs associated with ongoing business activity, i.e. support functions
- Royalties payable on licenses
  - Included in COGS