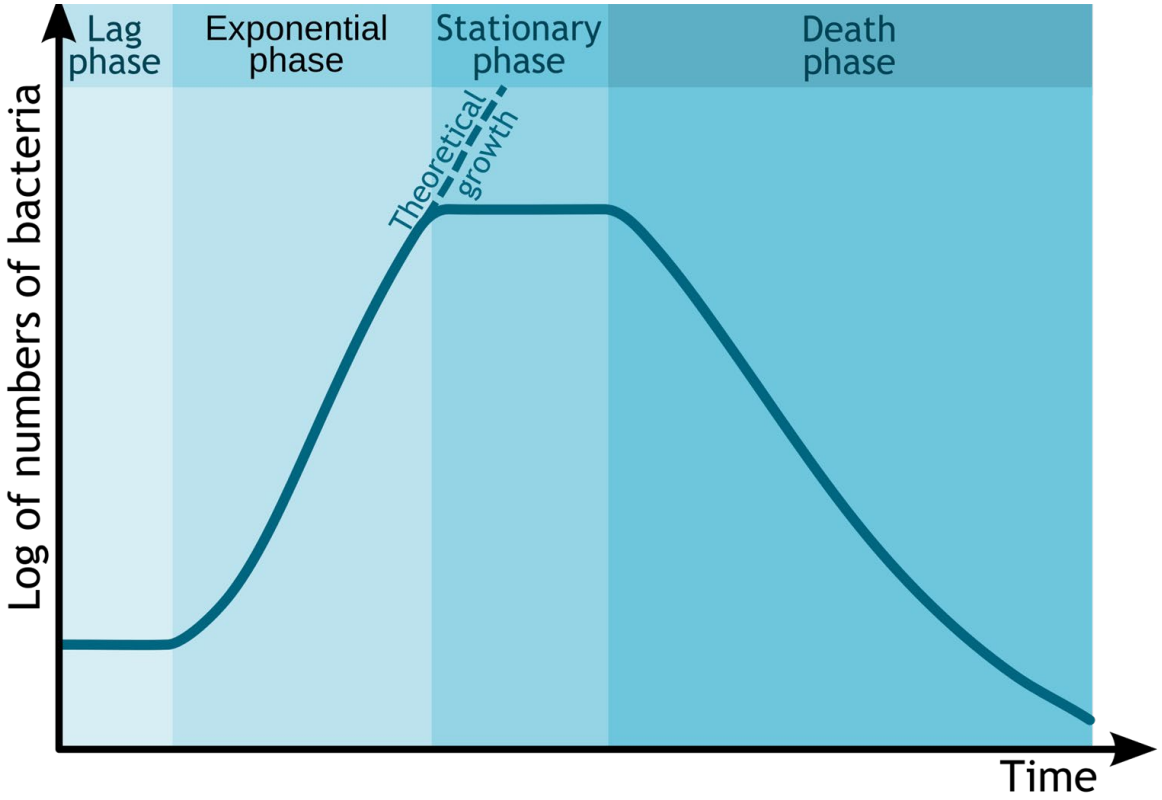
Econs For Biologists

Module 2: “Shareholder What Now?”

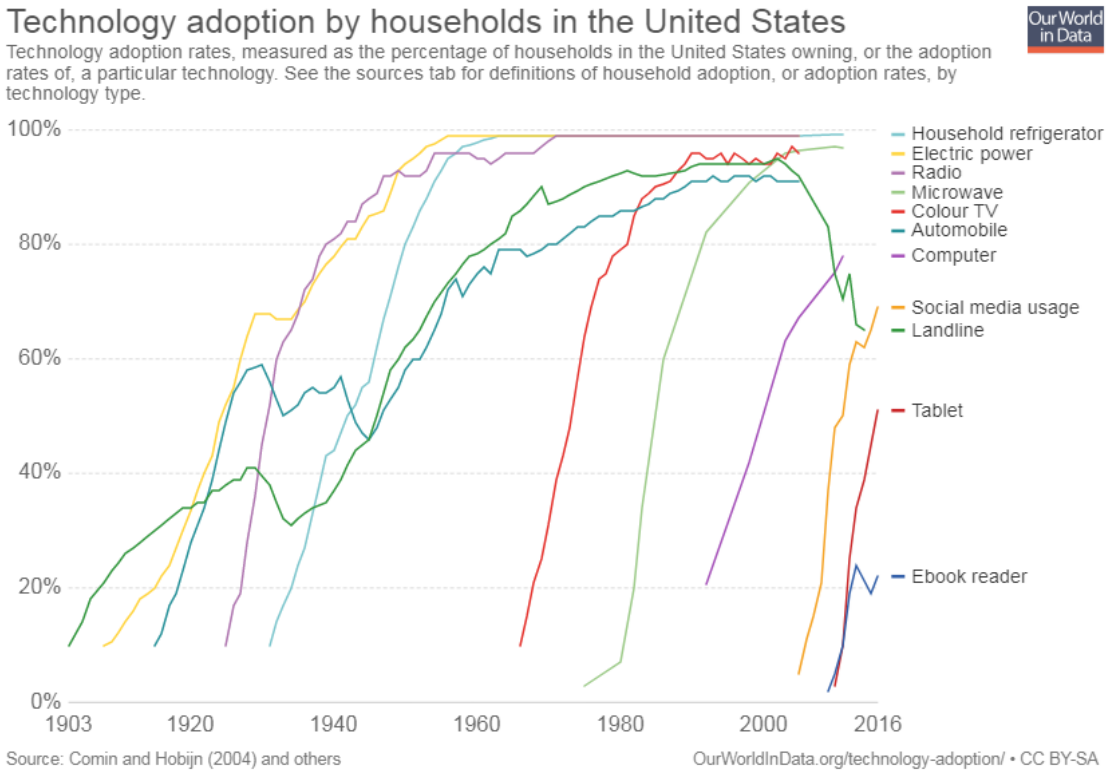
What will we cover?

- Fighting for resources
- Market dynamics case study
  - Industry growth in a competitive market
- Competition
  - Porter’s five forces
  - SWOT
- Basic accounting
  - The three financial statements
  - Basic Ratios
  - Case Study: APPL
  - Dupont Model
- Shareholder Value Creation
  - The Value Chain
  - Deloitte Shareholder Value Map
- Cases
  - M&A

1.1 Fighting for Resources



1.2 The S-Curve in Markets: Technology Adoption



1.3 Introducing Adaptation / Innovation

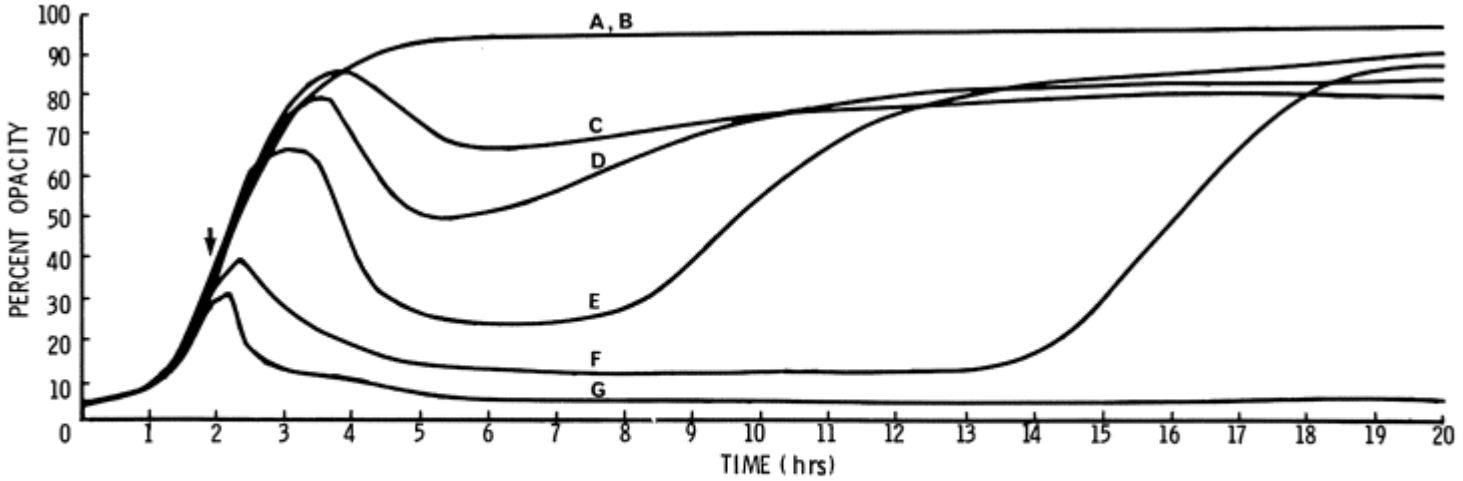
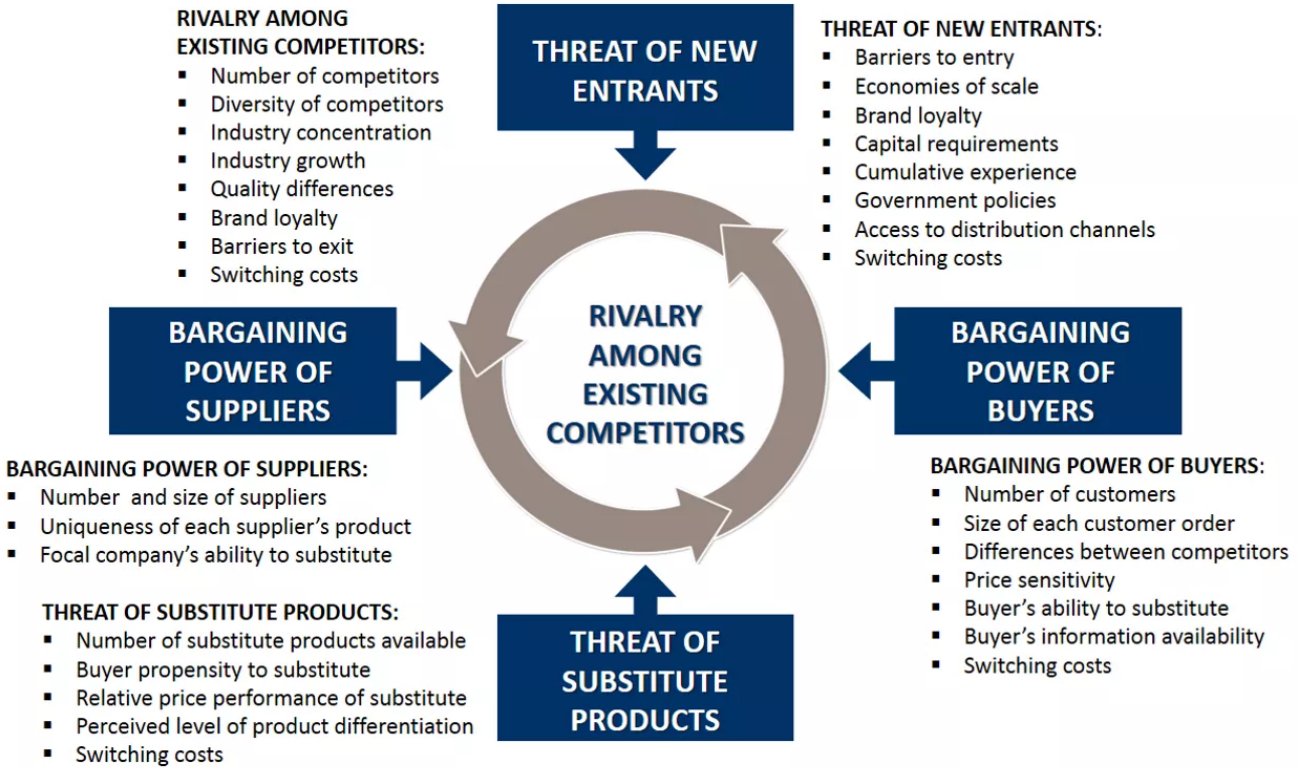


Fig. 1. Continuous turbidity records of *Escherichia coli*. Benzylpenicillin added at *arrow* to achieve the following concentrations (mg/l): *A*, 0; *B*, 4; *C*, 8; *D*, 16; *E*, 32; *F*, 64; *G*, 128. (Greenwood and O'Grady 1973 a)

1.4 Innovation in a competitive market: Case Study

Music Industry Through the Decades

2.1 The Competitive Forces that shape a market



2.2 When to use the Porter's Five Forces

- BEFORE you make a decision and CONTINUOUSLY in a competitive market
- Do I enter a market?
- Do I commit resources to a new project?
- Do I commit to ...X… lab project?

- Basically, all the time (either consciously or not)

Michael Porter Himself

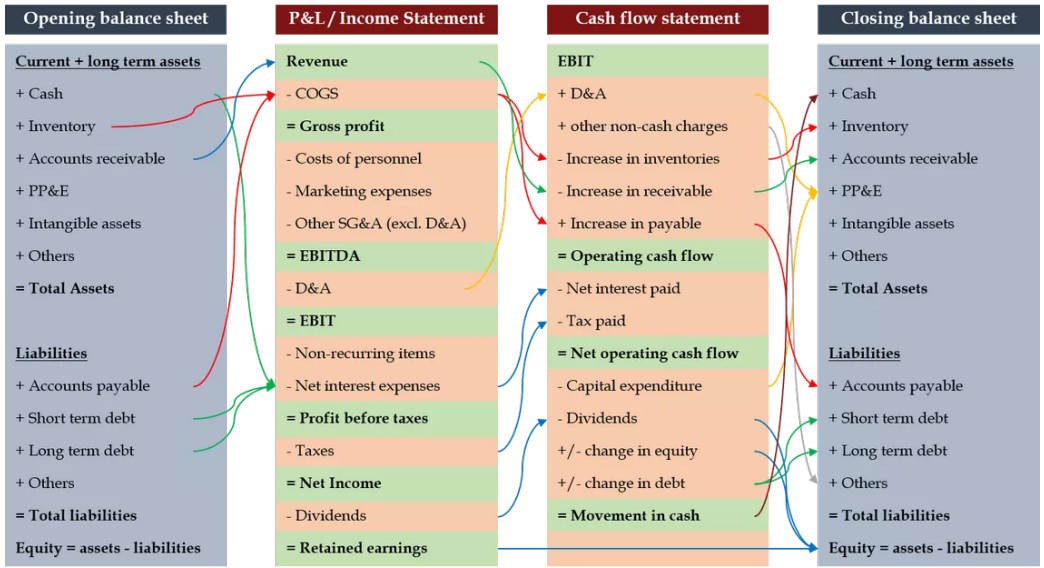
2.3 SWOT Analysis

3.1.1 Basic Accounting: Why are we doing this?

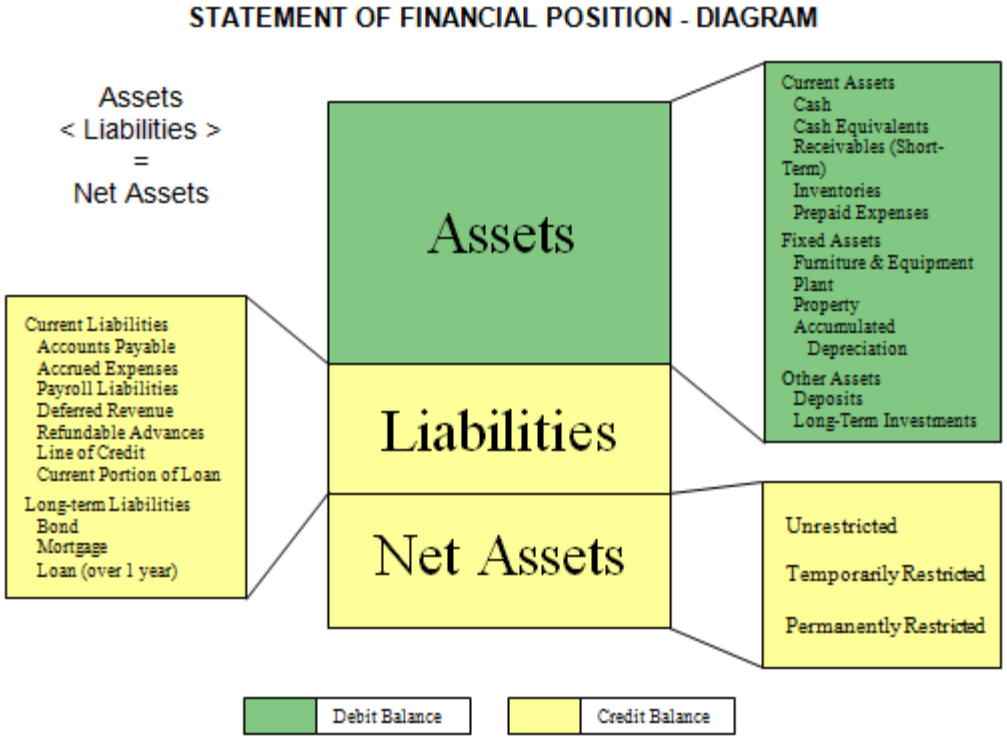
INCOME STATEMENT	20X1	20X2	20X3	20X4
Revenue	**1,331**	**1,464**	**1,611**	**1,772**
Cost of Goods Sold	799	878	966	1,063
Gross Profit	**532**	**586**	**644**	**709**
Operating Expenses (SG&A)	200	220	242	266
Operating Income (EBIT)	**333**	**366**	**403**	**443**
Interest Expense	43	38	33	28
Pretax Income	**290**	**329**	**370**	**415**
Income Tax Expense	102	115	130	145
Net Income	**189**	**214**	**241**	**270**

BALANCE SHEET	20X1	20X2	20X3	20X4
Cash	478	627	809	1,026
Accounts Receivable	109	120	132	146
Inventory	131	144	159	175
Total Current Assets	**718**	**892**	**1,100**	**1,346**
Property Plant & Equipment (PP&E)	840	837	827	808
TOTAL ASSETS	**1,559**	**1,729**	**1,927**	**2,155**
Accounts Payable	66	72	79	87
Current Portion on Long Term Debt	50	50	50	50
Total Current Liabilities	**116**	**122**	**129**	**137**
Long Term Debt	400	350	300	250
TOTAL LIABILITIES	**516**	**472**	**429**	**387**
Common Stock	100	100	100	100
Retained Earnings	943	1,157	1,397	1,667
TOTAL EQUITY	**1,043**	**1,257**	**1,497**	**1,767**
TOTAL LIABILITIES & EQUITY	**1,559**	**1,729**	**1,927**	**2,155**
Check	*0.0*	*0.0*	*0.0*	*0.0*

CASH FLOW STATEMENT	20X1	20X2	20X3	20X4
CASH FLOW FROM OPERATING ACTIVITIES				
Net Income		**214**	**241**	**270**
Add Back Non-Cash Items				
Depreciation		73	81	89
Amortization		0	0	0
Changes in Working Capital				
Accounts Receivable		(11)	(12)	(13)
Inventory		(13)	(14)	(16)
Accounts Payable		7	7	8
Net Cash Provided by Operating Activities		**269**	**302**	**337**
CASH FLOW FROM INVESTING ACTIVITIES				
Capital Expenditures - Purchase of PP&E		(70)	(70)	(70)
Net Cash Used in Investing Activities		**(70)**	**(70)**	**(70)**
CASH FLOW FROM FINANCING ACTIVITIES				
Revolving Credit Facility		0	0	0
Long Term Debt (Current Portion)		(50)	(50)	(50)
Net Cash Provided by (Used in) Fnce Activities		**(50)**	**(50)**	**(50)**
Net Cash Flow		**149**	**182**	**217**



3.1.2 Assets and Liabilities



3.1.3 The Free Cash Flow (FCF)

Free Cash Flow

Free Cash Flow (FCF) refers to a firm's cash resources available for distribution to the owners of the company.

Free Cash Formula

FCF = Operating Cash Flow – All Capital Expenditure

OR

FCF = EBIT x (1-Tax Rate) + Depreciation + Amortization – Change in Net Working Capital – Capital Expenditure

Free cash flow is an important measurement since it shows how efficient a company is at generating cash. Investors use free cash flow to measure whether a company might have enough cash, after funding operations and capital expenditures, to pay investors through dividends and share buybacks.

3.2.1 What information can I get from the statements?

Exhibit 1: Common-Size Financial Statement Data for Firms in 6 Industries

	(A)	(B)	(C)	(D)	(E)	(F)
Balance Sheet at End of Year						
Cash and Marketable Securities	96.3%	14.9%	10.9%	14.8%	31.8%	252.9%
Inventories	0.5%	2.1%	9.9%	7.8%	12.2%	0.7%
Receivables (Current + Noncurrent)	17.2%	13.3%	15.7%	65.6%	23.6%	827.9%
Other Current Assets	6.6%	4.1%	1.8%	5.8%	1.4%	6.2%
Long Term Investments	2.9%	3.0%	16.1%	33.0%	0.7%	10.7%
Property, Plant, and Equipment, at cost	35.4%	128.9%	57.6%	82.6%	68.5%	22.8%
Accumulated Depreciation	(11.7%)	(35.0%)	(28.5%)	(51.6%)	(34.6%)	(11.5%)
Net PP&E	23.7%	93.9%	29.1%	31.0%	33.9%	11.3%
Goodwill and Intangible Assets	36.0%	0.4%	50.2%	-	25.7%	1.7%
Other Noncurrent Assets	5.0%	7.1%	3.2%	2.8%	13.2%	18.1%
Total Assets	187.8%	138.8%	136.9%	160.8%	142.4%	1,129.5%
Current Liabilities	28.7%	33.4%	42.0%	58.5%	44.4%	456.6%
Long-Term Debt	6.0%	60.4%	9.8%	33.3%	39.3%	554.4%
Other Noncurrent Liabilities	9.5%	6.9%	17.2%	11.1%	22.0%	28.5%
Shareholders' Equity (incl. Minority Interest)	143.6%	38.1%	67.9%	57.9%	36.8%	90.0%
Total Liabilities and Equity	187.8%	138.8%	136.9%	160.8%	142.4%	1,129.5%
Income Statement for Year						
Total Revenue	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cost of Goods Sold or Cost of Revenue	(41.1%)	(82.8%)	(52.5%)	(84.5%)	(26.2%)	(52.8%)
Gross Profit	58.9%	17.2%	47.5%	15.5%	73.8%	47.2%
Selling, General and Administrative	(19.5%)	(14.3%)	(30.2%)	(5.8%)	(21.6%)	(31.7%)
Research and Development	(13.2%)	-	(1.7%)	(3.7%)	(18.4%)	-
Income Taxes	(5.2%)	(1.1%)	(3.7%)	(2.5%)	(5.6%)	(4.7%)
All Other Items, net	0.5%	(1.6%)	(0.4%)	0.8%	(7.2%)	0.4%
Net Income	21.6%	0.2%	11.5%	4.4%	21.0%	11.2%

http://web.stanford.edu/group/mba/pdf/classimmersion/identify-industries.pdf

3.2.2 What information can I get from the statements?

Exhibit 13-5 Key Financial Ratios

Ratio	Definition	Explanation
Analyzing Firm Profitability		
• Gross profit percentage	$\frac{\text{Gross profit on sales}}{\text{Net sales}}$	Percentage of income generated from sales after deducting the cost of goods sold.
• Return on sales	$\frac{\text{Net income}}{\text{Net sales}}$	Percentage of net income remaining from a dollar of sales after subtracting all expenses.
• Asset turnover	$\frac{\text{Net sales}}{\text{Average total assets}}$	Amount of sales generated from each dollar invested in assets.
• Return on assets	$\frac{\text{Net income}}{\text{Average total assets}}$	Rate of return generated on a company's investment in assets from all sources.
• Return on common stockholders' equity	$\frac{(\text{Net income} - \text{Preferred stock dividends})}{\text{Average common stockholders' equity}}$	Rate of return generated by a business for its common shareholders.
Analyzing Short-Term Firm Liquidity		
• Working capital	Current assets − Current liabilities	The difference between a firm's current assets and its current liabilities.
• Current ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$	Amount of current assets available to service current liabilities
• Quick ratio	$\frac{(\text{Cash and cash equivalents} + \text{Short-term investments} + \text{Accounts receivable})}{\text{Current liabilities}}$	Amount of liquid assets available to service current liabilities
• Operating-cash-flow-to-current-liabilities ratio	$\frac{\text{Cash flow from operating activities}}{\text{Average current liabilities}}$	Amount of cash flow from operating activities available to service current liabilities.
• Accounts receivable turnover	$\frac{\text{Net sales}}{\text{Average accounts receivable (net)}}$	Number of sales/collection cycles experienced by a firm.
• Average collection period	$\frac{365}{\text{Accounts receivable turnover (net)}}$	Number of days required, on average, to collect an outstanding accounts receivable.
• Inventory turnover	$\frac{\text{Cost of goods sold}}{\text{Average inventory}}$	Number of production/sales cycles experienced by a firm.
• Days' sales in inventory	$\frac{365}{\text{Inventory turnover}}$	Number of days, on average, required to sell the inventory currently on hand.
Analyzing Long-Term Firm Solvency		
• Debt-to-equity ratio	$\frac{\text{Total liabilities}}{\text{Total stockholders' equity}}$	Percentage of total assets provided by creditors.
• Times-interest-earned ratio	$\frac{\text{Income before interest expense and income taxes}}{\text{Interest expense}}$	Extent to which current operating income covers current debt service charges.
• Operating-cash-flow-to-capital-expenditures ratio	$\frac{\text{Cash flow from operating activities}}{\text{Annual net capital expenditures}}$	The ability of a firm's operations to provide sufficient cash to replace and expand its property, plant, and equipment.
Financial Ratios for Common Stockholders		
• Earnings per share	$\frac{(\text{Net income} - \text{Preferred stock dividends})}{\text{Weighted-average number of common shares outstanding}}$	The net income available to common shareholders calculated on a per share basis.
• Price-earnings ratio	$\frac{\text{Market price per share}}{\text{Earnings per share}}$	A measure of the price of a share of common stock relative to the share's annual earnings.
• Dividend yield	$\frac{\text{Annual dividend per share}}{\text{Market price per share}}$	The earnings on an investment in stock coming from dividends.
• Dividend payout ratio	$\frac{\text{Annual dividend per share}}{\text{Earnings per share}}$	The percentage of net income paid out to shareholders as dividends.

14.3 (B) Industry ratios:

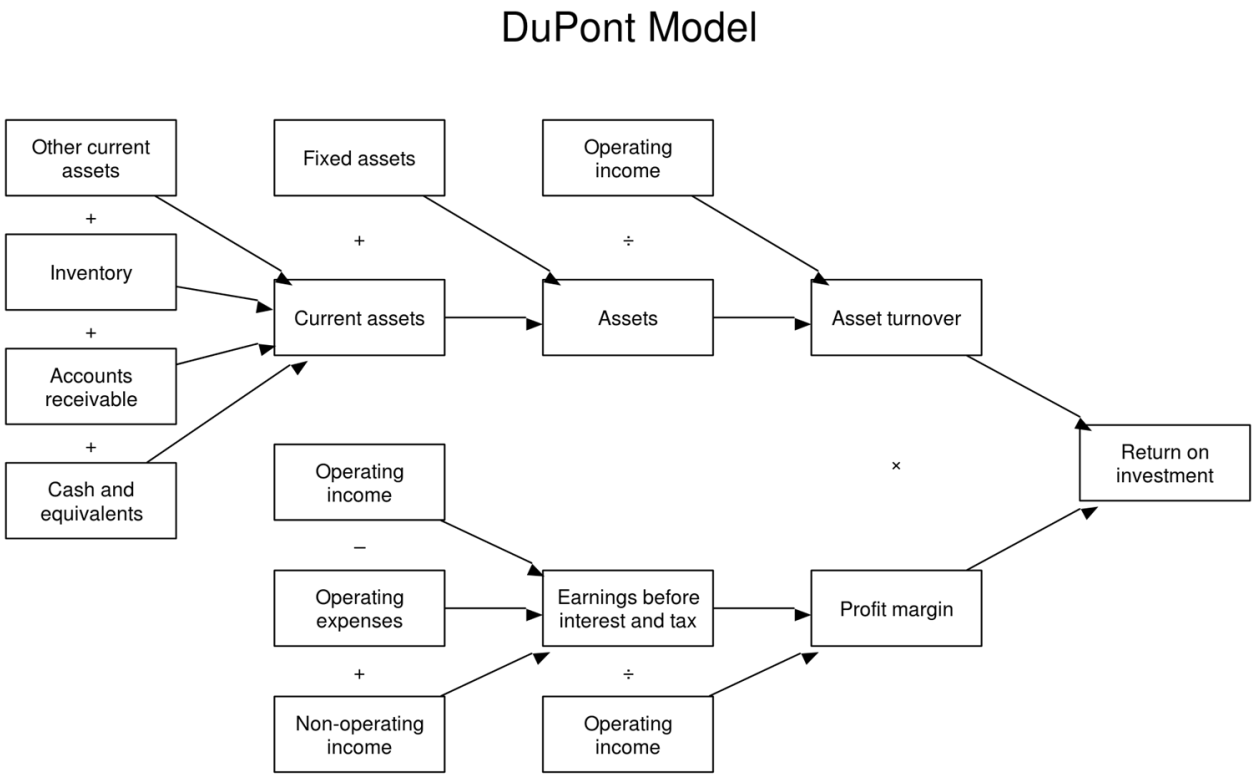
Table 14.8 Financial Ratios: Industry Averages

Ratio or Account	Airlines	Auto	Pharmaceuticals	Oil and Gas	Retail	Computer Hardware
P/E	22.44	7.38	87.80	5.39	34.29	20.97
Gross margin	19.28%	21.77%	59.54%	47.47%	24.51%	43.54%
Profit margin	0.75%	3.79%	14.85%	12.14%	2.94%	17.08%
Current ratio	0.92	0.32	2.77	1.11	1.23	2.86
Debt-to-equity ratio	1.69	0.34	0.11	0.19	0.81	0.19
Return on assets	0.70%	3.57%	9.40%	12.11%	6.31%	18.22%
Return on equity	0.77%	10.17%	14.71%	20.10%	16.82%	26.24%

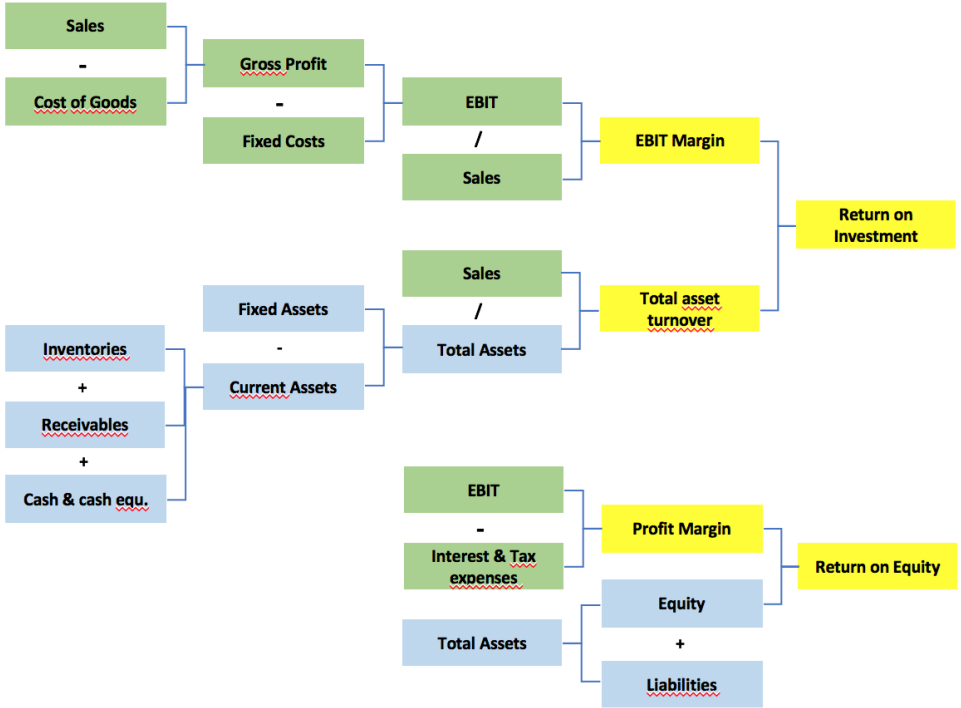
Source: Data from Reuters (www.investors.reuters.com).

- Industry ratios are often used as benchmarks for financial ratio analysis of individual firms.
- There can be significant differences in various key areas across industries, which is why comparing company ratios with industry averages can be very useful and more informative.

3.3.1 The DuPont Model - ROI



3.3.2 The DuPont Model



3.3.3 ROI is Everywhere - Team Exercise

Q: What should I have for Dinner?

Tip: You assign **Utility Functions** to all alternative choices

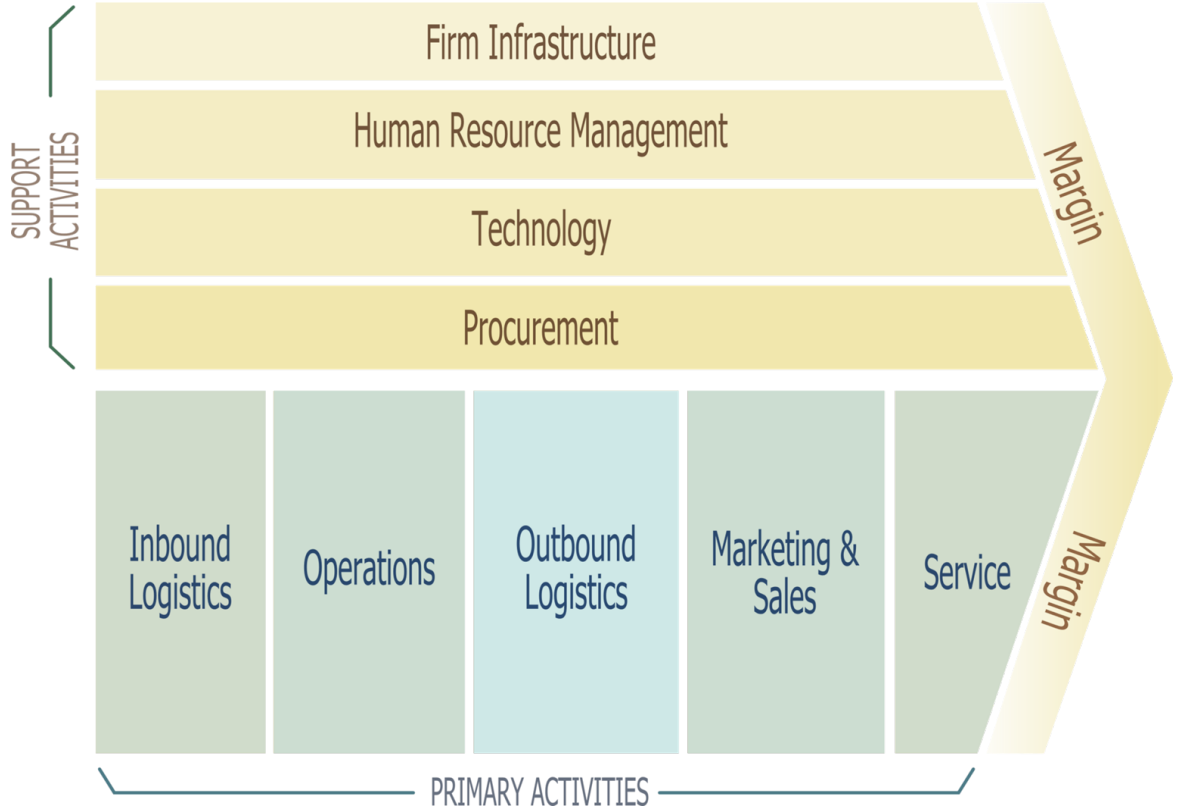
Going Technical 1

Going Technical 2

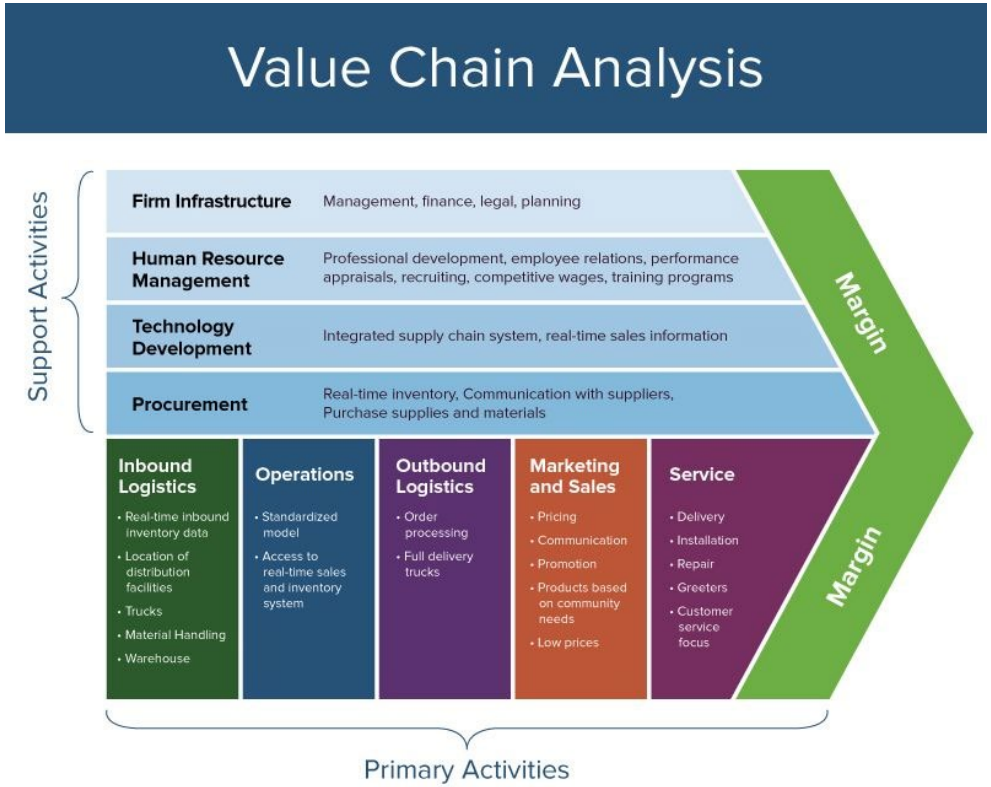
3.4 Case study: APPL 10K

Apple Inc. November 2018 10K

4.1.1 The Value Chain (again from Porter)

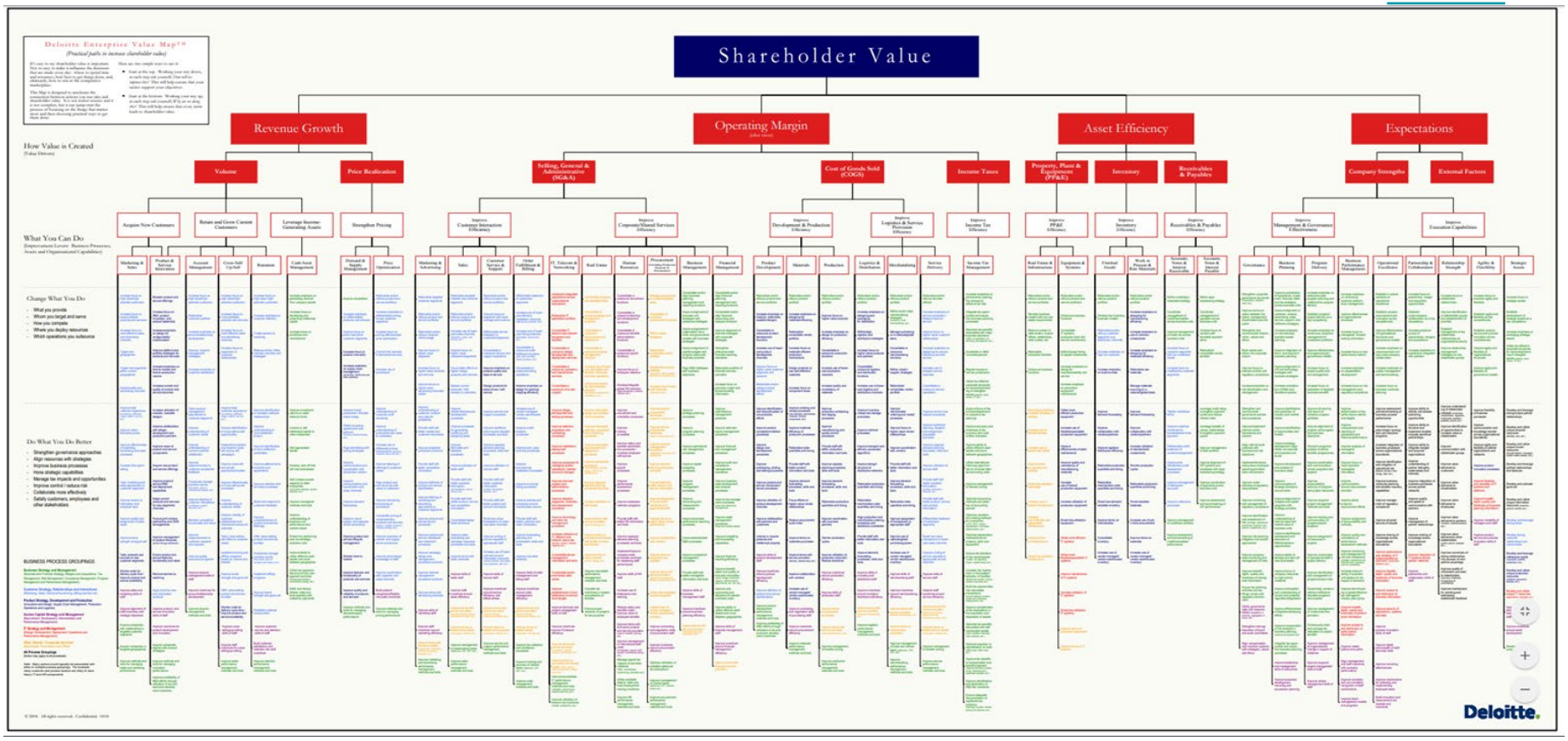


4.1.2 The Value Chain (again from Porter)



4.2 The Deloitte Enterprise Value Map

Link Out



5.1 Case Study: M&A

Our client is an electronics holding called Chip'n'Chip.

They want to **invest** in a Printed Circuit Board (PCB) manufacturer called **OnBoard**, and asked you whether it's going to be a good investment.

How would you help them?

5.1.2 How to solve: Common Frameworks

BUSINESS SITUATION FRAMEWORK

New Market Entry, New Product, New Business, How to Grow, Strategy, Turnaround, Company Position Assessment

Customer

Who is the customer?
- identify segments (segment size, growth rate, % of total market)
- compare current year metrics to historical metrics (look for trends)

What does each customer segment want? - identify keys needs
What price is each segment willing to pay? - determine price points and price elasticity/sensitivity
Distribution channel preference for each segment
Customer concentration and power* (does one customer control all the demand, the " Wal-Mart" effect)

Product

- **Nature of product** (think out loud about the product, it's benefits, why someone would buy it)
- **Commodity good or easily differentiable goods** (could company increase differentiation)
- Identify **complimentary goods** (can we piggy back off growth in compliments or near compliments?)
- Identify **substitutes*** (are we vulnerable to indirect competitors namely substitutes?)
- Determine **product's lifecycle** (new vs. almost obsolete)
- Packaging (optional) - what's bundled, included (ex. Razor vs. razor blades, with w/o service contract... can change in packaging make product more likely to meet needs of specific customer segments.)

Company

- **Capabilities and expertise**
- **Distribution channels** used
- **Cost structure** (mainly fixed vs. variable - is it better to have higher fixed cost with lower variable, or vice versa. High fixed cost = barrier to entry.... compare to industry, often insightful)
- Investment cost (optional: only if case involves an investment decision)
- **Intangibles** (e.g., brands, brand loyalty)
- **Financial situation**
- Organizational structure (optional: e.g., is team organization in conflict with how customers want to do business. Ex: We're organized by product line, but customers want one point of contact across all product lines)

Competition

- **Competitor Concentration* & Structure** (monopoly, oligopoly, competitive, market share concetration)
- Competitor behaviors (Target customer segments, products, pricing strategy, distribution strategy, brand loyalty)
- Best practices (are they doing things we're not?)
- **Barriers to entry*** (do we need to worry any new entrants to market)?
- **Supplier concentration*** (optional: ex: Microsoft or Intel in PC Market... use full 5 forces if this is a likely issue)
- Industry regulatory environment
- Life-cycle of industry

* From Porter's Five Forces: An excellent framework that I've incorporated into this one. I don't use five forces separately for no other reason than habit/preference (though I do use the concepts). If you're not familiar with five forces, it's worth reading up on it.

5.1.3 How to Solve: One M&A Framework

MERGERS & ACQUISITIONS "FIT" FRAMEWORK

Use this framework when Company A is looking to acquire or merge with Company B, AND the two companies are different.
This framework determines if there's a good fit. If Company A & B are nearly identical, use a capacity expansion framework instead.

"Fit Framework" - General Idea: Use "Core Business Situation Framework" and run it for Company A, Company B, and Company A+B

This framework does not answer the question IF it's a good idea to merge/acquire. It assumes you already know that it IS a good idea and the question is whether or not this particular target company is good fit. To determine IF merging/acquiring is a good idea, use Capacity Expansion Framework instead

	Customers	Products	Company	Competition
Company A				
Company B				
Company A+B				

- Identify synergy in new company
- Identify opportunities for one-way or mutual exploitation (Classic good "fit" = Company A has huge sales force buy lousy products,
- Company B has minimal salesforce but killer products. Potential sources of synergy: customers, products, distribution, resources, expertise, access to markets, physical assets, unique capabilities, overlapping cost structures)
- Hint: Every time there's a synergy, that's one vote in the "good fit" column

5.1.4 How to Solve: Extra Questions

- **Why** do we want to buy/invest/merge with this company?
  - Access to it's resources / expertise
  - Growth by acquisition / diversification
  - Deny them access to our market
  - Synergies
  - Undervalued
  - …
- **Can** we invest in this company?
  - How will the deal be financed?
  - Do we have the $$?
  - What will regulators think?
  - ...
- What is the **ROI**?
  - Cost/Benefit Analysis
  - Risk tolerance
- If all the answers above are positive, **should** we still invest in that company?
  - Opportunity costs
  - Maybe there is another asset (e.g. another company) that is more attractive
  - Risks
    - M&A are notorious for failing in the Post-Merger phase (synergies not realized, culture conflicts etc)

6. Selected Resources

1. Courses
    a. Accounting
    b. Ratios and Analytics
    c. Mergers and Acquisitions
2. Understand the Lingo:
    a. Listen to Earnings Calls
        i. Apple Q4 2018
        ii. Read Analyst reports
            1. Argus on Apple (free)
    b. Read SEC Filings:
        i. Alphabet Inc. Investor Relations
3. Books:
    a. Michael Porter Collection
    b. Competition Demystified
    c. The Portable MBA in Finance and Accounting (Free through Levy Library)