1. Platform Business Models

- **Connecting problem to solution for faster & higher efficiency**
- **Linear Value Chain (traditional):** Design → Manufacture → Sell → Deliver
- **Platform Structure:** Producers → Platform ← Consumers

Advantages of platforms

- **No gatekeepers to manage flow (open market):** anyone can publish on kindle, gatekeepers replaced by market signals, consumers have freedom
- **New sources of value & supply (sharing economy):** Airbnb expands faster than Marriot → doesn't own assets, thus less risky expansions
- **Community feedback loops:** Wikipedia vs Encyclopedia Britannica → self-correcting loops utilizing user feedback

Network effects

- Impact that number of users of a platform has on value created for users
  - Positive: well-managed platform → more value/user
  - Negative: poorly-managed platform → less value/user
- **Economy of Scale:**
  - Industrial revolution - more units produced → lower unit cost
  - Internet era - more ppl use → more valuable
  - E.g. 1 phone - no value, 2 phones - 1 conn, 4 phones - 6 conn
- **Two-Sided Market:**
  - Firms spend money to attract customers, can stop once enough ppl
  - Virality attracts people, but network effect keeps them there (stickier)
  - More important for firms to be able to *scale seamlessly*
- **Not Network Effects!!:**
  - Price effect (temporary) - attractive due to low price
  - Brand effect (sticky) - attractive due to trust/well-known

Network Effect Types

- **Positive Same-Side:** benefits received ↑ when same type of users ↑
- **Negative Same-Side:** effects of competition (e.g. guys in OKCupid)
- **Positive Cross-Side Effects:** Users benefit from ↑ no. of participants on other side of market (e.g. Visa/Mastercard)
- **Negative Cross-Side Effects:** Matching problems and clutter (e.g. dating apps, men > women, but due to matching problems, can't find right match)

Monetizing Network Efforts - Difficulties

- Charging may discourage participation, lower usage
- Charging for consumption may ↓ consumption → affect producers
- Charging for production may ↓ value creation → affect consumer

Sources of value

- **for consumers:** access to value created on platform
- **for producers:** access to community or market
- **for both:** access to tools to facilitate interaction & access to curation mechanisms that ↑ quality of interactions

How to charge

- **Transaction fee:** not discouraged from joining, only on txn (requires exp.)
- **Access:** producers charged access to community, doesn't discourage users
- **Enhanced access:** producers charged for enhanced access to consumers, impt: distinguishable paid content and limited sponsored post so platform still relevant, not cluttered
- **Enhanced Curation:** ↑ quality of interactions for premium (vet providers)
- **Who to charge:** All users / one side while subsidizing other / charge most full price (except stars) / price discrimination based on price sensitivity

Principles of Monetization

1. Avoid charging for value that users previously got for free
2. Avoid reducing access to value that users are accustomed to receiving
3. Strive to create additional value that justifies charges imposed
4. Consider monetization strategies when making the initial platform choices

Metrics - should be actionable, accessible, audit-able

Pipeline Model (alphabet) vs Platform (numbered)

a. **Operations:** produce goods/services efficiently in sufficient numbers
b. **Marketing:** reach customers through proper channels at appropriate prices
c. **Finance:** Ensure adequate revenues generated to produce profits/value

1. Generate value through network effects
2. Metrics should measure rate of interaction success & factors that contribute
3. Focus on metrics that quantify success in generating desirable interactions

Metrics in Startup phase

- **Liquidity:** min. number of producers/consumers, % of active usage is high
- **Matching Quality:** accuracy of search algorithms and curation (e.g. % of search leading to interactions / sales conversion rate) [sales conversion rate]
- **Trust:** how comfortable users are with the level of risk associated with engaging in interactions on platform (requires good curation)
- **Platform specific:**
  - Range of metrics measuring commitment to ecosystem
  - Outcome based metrics
  - Content creation metrics
  - Market access regardless of complete interaction

Metrics in Growth phase - maintain bal. on both sides, side-switching rate

- **Producers:** frequency of producer participation success
- **Consumers:** frequency of consumption

Metrics in Maturity Phase

- **Driving Innovation:** adapt to user needs, changes in regulations/competitors
- **Care for existing ecosystem:** incorporate applications into existing env.

2. Time Value of Money

Future Values and Compound Interest

- **Future Value:** investment + interest earned (FV = initial amt $\times(1+r)^t$)
  - calculate interest based on t, if t = monthly, r = monthly interest
- **Compound Interest:** interest earned on interest
- **Simple Interest:** interest earned only on the original investment

Present Value

- **Present Value:** today's value of future money ($PV = \frac{\text{Future value after } t \text{ periods}}{(1+r)^t}$)
- **Discount Factor:** present value of a $ 1 future payment ($DF = \frac{1}{(1+r)^t}$)
- **Discount Rate:** interest rate used to compute PVs of future cashflows
- **Discounted Cash Flow (DCF):** Method of calculating PV by discounting future cashflows
- Free Credit: Interest = 0 / Cost of money: another term for interest

Perpetuities and Annuitities

- **Perpetuity:** stream of money that never ends
  - PV of perpetuity - $PV = \frac{C}{r}$, C = cash payment, r = interest rate
- **Annuity:** stream of money at regular intervals with finite maturity
  - Made at end of payment interval
  - PV of annuity - $PV = C[\frac{1}{r} - \frac{1}{r(1+r)^t}] = \frac{C}{r}[1 - \frac{1}{(1+r)^t}]$
  - FV of annuity - $FV = [C \times PVAF] \times (1+r)^t = C[\frac{(1+r)^t - 1}{r}]$
- **PV Annuity Factor (PVAF):** present value of $1 a year for each of t years when $C = 1$ (same formula as PV for Annuity)
- **Annuity Due:** payment made at start of payment interval
  - Annuity due vs ordinary annuity: $PV_{\text{annuity due}} = PV_{\text{annuity}} \times (1+r)$
  - Future value vs ordinary annuity: $FV_{\text{annuity due}} = FV_{\text{annuity}} \times (1+r)$
- Amortization: amt that actually goes into reducing (loan) principle

Effective Interest Rates (i/r - interest rate)

- **Effective Annual Interest Rate:** i/r annualized with compound interest: $EAR = (1+MR)^{12} - 1$, MR is monthly interest rate
- **Annual Percentage Rate:** i/r annualized using simple interest: $APR = MR \times 12$

Inflation

- **Inflation:** rate at which prices as a whole are increasing
- **Nominal Interest Rates (current i/r):** rate at which money invested grows
- **Real Interest Rate (constant i/r):** rate at which purchasing power of investment increases
- $1 + \text{real interest rate} = \frac{1+\text{nominal interest rate}}{1+\text{inflation rate}}$
- **Approx.**: Real i/r ≈ nominal i/r − inflation rate (*nom/inflation rate small*)
- Current dollar cashflows discounted by nominal interest rate, real cashflows discounted by real interest rate

3. Marketing 101

Marketing refers to activities of a company associated with buying, advertising, distributing, or selling a product or service

To focus on **needs, wants, demands, marketing** (delivering and capturing value to & from customers), **marketing myopia** (tunnel-visioned into current wants instead of underlying needs)

Production Concept: Focus on production & distribution efficiency, assumes consumers prefer products that are affordable & available, appropriate when: demand >> supply, improved productivity reduces cost

Product Concept: Focus on making continued product innovations, assumes consumers prefer products with best quality/features/performance, could lead to marketing myopia (overly-narrow definition of business)

Selling Concept: Focus on selling & promotion, normally used for unsought goods

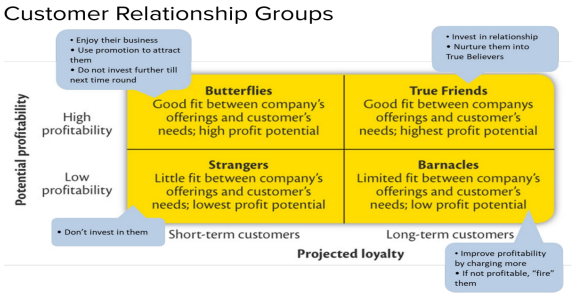
Marketing Concept: Determining needs & wants of target markets more efficiently and effectively than competitors. Focus on buyer's needs, adaptable

Customer Driven vs Customer Driving

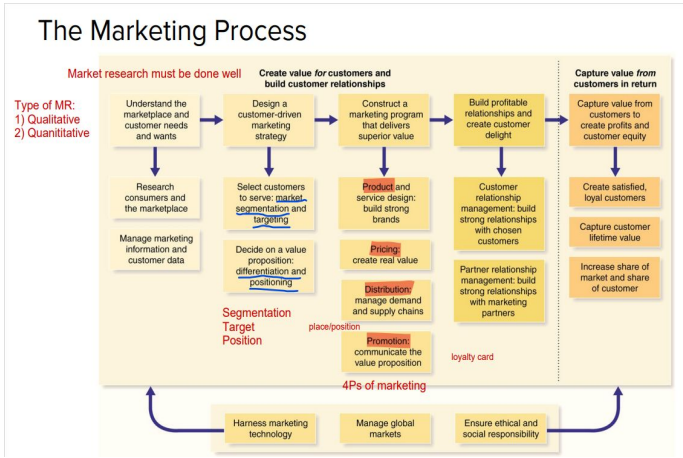
- **Customer Driven:** know what customer wants → create product that meet current needs
- **Customer Driving:** knows better than customers → create products that meet current and future needs

Customer Relationship Management (CRM)

Building and maintaining profitable customer relationships by delivering customer value & satisfaction



Marketing Management Process



- **Segmentation:** Group ppl who respond similarly given a set of marketing efforts together
- **Targeting:** Choose one or more segments to enter based on attractiveness
- **Positioning:** [perception-based] Arranging product to occupy distinct space in customers' minds relative to other products [e.g. $$$ = good quality]
- **Long Tail:**
  - Selling low volumes of niche products to many customers
  - Issue: problems finding local audience + physical limitations
  - Solution: selling online → no more physical limits
- **Bottom of Pyramid** - people at base of pyramid
  - Huge growth potential, resilient → encourage creative ways to promote their products due to challenges in region, innovation
- **Managing Marketing Effort:** SWOT analysis, planning strategies, implementing marketing strategies, evaluating results and taking corrective actions

4. Customer Lifetime Value

Delivering Customer Value

Aim to be best at one, while maintaining industry standards in the other two

- **Operational Excellence:** sell reliable, affordable goods with minimal difficulty
- **Customer intimacy:** tailored offerings for customers
- **Product Leadership:** sell the "best" products/services so ppl buy from you

Product Centric Business Models

- **Growth engines:** new products (Dyson creating headphones) and new markets (Dyson selling to different places)
- **However:** shorter product life cycles, ↑ competition due to digitization and globalization, focus shift from selling products to solutions

Customer Centric Business Models

- Identify valuable customers, maximize their long-term value rather than get more money out of current purchases
- **Customer Acquisition:** Identify ideal customers and decide $$ to get them
- **Customer Retention:** Do we retain every customer?
- **Customer Development:** Identify segment of customers to develop further

Customer Lifetime Value (CLV)

- $$ this customer can provide (net PV of all future cash flows from him)
- **How is it computed:** Use past data about a customer to predict the future
- **Why**: Determine amt to spend on Customer Acquisition and Retention

CLV Model $CLV = (M - R)\left(\frac{1+d}{1+d-r}\right)$

- $M: margin/customer (revenue - variable costs)
- $R: retention spending
- r: retention rate
- d: discount rate
- Survival Rate: probability that customer has a relation in a given period $t = r^{t-1}$
- $CLV = (M - R)(1 + (\frac{r}{1+d}) + (\frac{r}{1+d})^2 + (\frac{r}{1+d})^3 + \cdots)$
- For businesses where revenue is obtained after service is delivered $CLV = (M - R)\left(\frac{r}{1+d-r}\right)$
- $CLV_{segment} = CLV_{avg\_customer} \times$ no. of customers in segment

5. Pricing

Price is the only P (Product, Price, Promotion, Place) that directly affects revenue, all other Ps incur cost

Pricing Approaches

- **Economic approach:** finding balance between supply and demand curve
- **Accounting approach:** variable / fixed costs
- **Marketing approach:** segmentation, targeting and positioning, PPP strategies

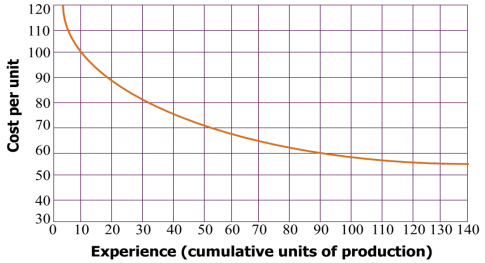
Factors Affecting Pricing - Internal and External

Internal Factors - marketing objectives / costs

- **Marketing objectives**
  - Survival, current profit maximization
  - Market share leadership *(early Grab with big discounts)* VS product quality leadership
  - Competitive entry barriers *(Grab competitors now)* and Reseller support
  - Cost recovery (public/non-public firms)
- **Marketing-Mix Strategy**
  - Product design, distribution, promotion
  - Price vs Non-price competition *(truck vs supply chain provider)*
  - Parallel importers *(buy in SG > buy in TW + travel tix → buy in TW)*
- **Organization**
  - Top management decides pricing of products
- **Costs**
  - Floor price determined by production cost, ceiling price determined by demand
  - Types of costs
    - Fixed - rent, employee salaries
    - Variable - raw materials, direct labor costs, sales commissions
    - Total cost = fixed + variable
    - Average = total cost / total quantity
    - Marginal - Add. cost for adding/producing one additional customer/product

Experience Curve Pricing

Experience Curve drives down the prices
(produce more stock → lower price/item)



External Factors

- **Market & Demand** - form of competition & price elasticity of demand
- **Consumer perceptions** - price-quality relationships & price used in absence of other cues
- **Competitors**
  - Reference point: Pepsi & Cola prices are same
  - Responsiveness: actions taken affect competitors *(price war)*
  - Product homogeneity: more price sensitive
- **Others** - economy, distributor reactions, government

Form of competition

- **Pure** - many sellers offering identical products, no control on price
- **Monopolistic** - many sellers offering differentiated products, low on control price
- **Oligopolistic** - a small number of sellers dominate the market, determine price by considering the action and reactions of competitors
- **Monopoly** - only one seller, complete control on price

Price elasticity of demand

- **Elastic** - demand changes when price changes
- **Inelastic** - demand remains even when price changes
- **Cross-elasticity** - substitute & complementary products *(Apple ecosystem)*

New-Product Pricing

- **Price Skimming:** charge a high price with intention to reduce it in future
  - Company makes fewer, but more profitable sales
  - When to use: Segmentation on price elasticity, Image supportive, Safety/Hedge, No immediate competition, Costs of smaller volume cannot be so high to cancel advantage of charging more
- **Price Penetration:** set low initial price to attract more demand than competitors
  - When to use: Consumers price sensitive, experience curve effects operative, Potential competition

Methods and Strategies: Cost-Oriented Strategies

- **Markup Pricing based on Cost** - $\frac{\text{price-cost}}{\text{cost}} \times 100$
  - Neglects demand
  - Markup based on sales: $\frac{\text{price-cost}}{\text{price}} \times 100$
- **Target Return or Target Profit Pricing**
  - Predetermined return on capital used to produce & market product
  - Target return based on Standard Volume: $P = DVC + \frac{FC}{X} + \frac{rK}{X}$
    - P = price
    - X = Standard Volume
    - DVC = Direct Variable Cost
    - r = Desired Rate of Return
    - FC = Fixed Cost
    - K = Capital used
  - Issue - how to determine X? *(use past year's sales vol. as benchmark)*

Other Strategies:

- **Demand-Oriented Pricing:** Methods based on & used to affect consumer perceptions & behavior
- **Perceived-Value Pricing:** price based on buyer's perception of value, soundest approach → consistent with marketing concept e.g. Diamond Ring
- **Odd/Psychological Pricing:** Set prices below even-dollar amounts ($9.99), used to connote lower price level through rounding down
- **Loss Leader Pricing:** set some prices lower to bait them to buy other things → increase overall profits
- **Optional-Product Pricing:** Sell accessory items with main product *(addons)*
- **Captive-Product Pricing:** Products that must be used with main product, they are expensive while main product is cheap *(printer cartridges)*
- **Bundled Pricing:** Several products combined and sold as bundle to reduce price, promote sales of products not frequently bought
- **Price Discrimination:** Time (Peak vs Off-Peak), Place (ERP: Downtown or outskirts), Customer (Adults vs Child vs Senior Citizens)

Example Questions

1. Mortgages

Sometimes you may need to find the series of cash payments that would provide a given value today. For example, home purchasers typically borrow the bulk of the house price from a lender. The most common loan arrangement is a 30-year loan that is repaid in equal monthly installments. Suppose that a house costs $125,000 and that the buyer puts down 20% of the purchase price, or $25,000, in cash, borrowing the remaining $100,000 from a mortgage lender such as the local savings bank. What is the appropriate monthly mortgage payment? The borrower repays the loan by making monthly payments over the next 30 years (360 months). The savings bank needs to set these monthly payments so that they have a present value of $100,000. Thus

- Present Value = mortgage payment × 360-month annuity factor = $\$100,000$
- Mortgage payment = $\frac{\$100,000}{\text{360-month annuity factor}}$
- Suppose that the interest rate is 1% a month. Then
- Mortgage payment = $\frac{\$100,000}{\frac{1}{0.01} - \frac{1}{0.01(1.01)^{360}}} = \frac{\$100,000}{97.218} = \$1,028.61$

2. Retirement

You plan to retire in 30 years and want to accumulate enough by then to provide yourself with $30,000 a year for 15 years.

(a) If the interest rate is 10%, how much must you accumulate by the time you retire?
- PV = $\$30,000 \times \left(\frac{1}{0.10} - \frac{1}{0.10 \times (1.10)^{15}}\right) = \$228,182.39$
- The PV here refers to PV 30 years from now. This is the amount needed in that year's dollars.

(b) How much must you save each year until retirement in order to finance your retirement consumption?
- $\frac{\$228,182.39}{(1.10)^{30}} = \$13,076.80$
- The present value of your 30-year savings stream must equal this present value. Therefore, we need to find the payment for which:
- $C \times \left(\frac{1}{0.10} - \frac{1}{0.10 \times (1.10)^{30}}\right) = \$13,076.80 \Rightarrow C = \text{PMT} = \$1,387.18$
- You must save $1,387.18 per year.

(c) Now you remember that the annual inflation rate is 4%. If a loaf of bread costs $1 today, what will it cost by the time you retire?
- $1.00 \times (1.04)^{30} = 3.24$

(d) You really want to consume $30,000 a year in real dollars during retirement and wish to save an equal real amount each year until then. What is the real amount of savings that you need to accumulate by the time you retire?
- We repeat part (a) using the real interest rate: $\frac{1.10}{1.04} - 1 = 0.0577$, or 5.77%.
- The retirement goal in real terms is:
- PV = $\$30,000 \times \left(\frac{1}{0.0577} - \frac{1}{0.0577 \times (1.0577)^{15}}\right) = \$295,796.61$

(e) Calculate the required preretirement real annual savings necessary to meet your consumption goals.
- The future value of your 30-year savings stream must equal $295,796.61. Therefore, we solve for payment (PMT) in the following equation:
- $C \times \left(\frac{1.0577^{30} - 1}{0.0577}\right) = 295,796.61 \Rightarrow C = \text{PMT} = \$3,895.66$
- Therefore, we find that you must save $3,895.66 per year in real terms. This value is much higher than the result found in part (b) because the rate at which purchasing power grows is less than the nominal interest rate, 10%.

(f) What is the nominal value of the amount you need to save during the first year? (Assume the savings are put aside at the end of each year.)
- If the *real* amount saved is $3,895.66 and prices rise at 4% per year, then the amount saved at the end of 1 year, in nominal terms, will be:
- $3,895.66 \times 1.04 = 4,051.49$

(g) What is the nominal value of amount you need to save during 30th year?
- The 30th year will require nominal savings of:
- $3,895.66 \times (1.04)^{30} = 12,635.17$