ME Week 12 Notes

L1: Public Goods

Two Characteristics

Rival vs Non-rival — Excludable vs Non-excludable

1. Non-rival
2. Non-Excludable

Public Good

When it is non-rival as well as non-excludable in nature

Clean air ⇒ Non-rival, Non-excludable

Clean water ⇒ Bottle them ⇒ excludable, ↳ Rival ↳ Rival

Defence → Non-excludable, Non-rival

→ but still there are boundaries (very hard to find pure public goods, these days)

Impure Public Goods

Not fully rival

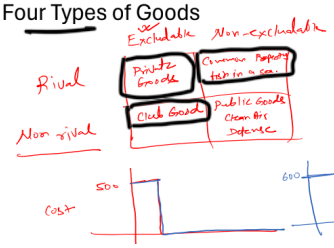
Not fully excludable → Impure public good

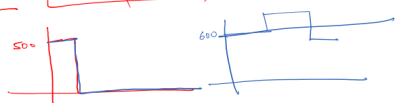
→ Non-rival
→ Non-excludable

500 ✓ 500

Four Types of Goods

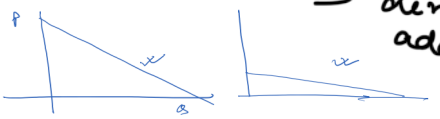
Club → you pay for 1 time, then you can enjoy equally.

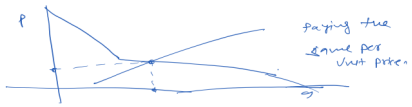




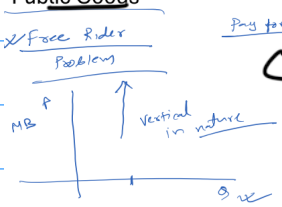
Provision of Private Goods

→ demand curve gets added up horizontally





Free Rider and The Problem of Provision of Public Goods



Pay for it

(everyone is consuming the same quantity, their marginal benefit could be different)

Samuelson Rule

→ it is possible that there will be some guys who won't pay for it but just enjoy it (free rider)

The Role of the Government

Taxation → allows you to enjoy public goods but you need to pay in other form.

L2: Platform Economics 1

Network Effect

- Increasing return to scale in Consumption
- Why Network Eternality (Star, Hub-Spoke)
  - Larger Reach
  - Complementarities
  - Informational
  - Fashion
- Positive vs Negative Network Externality

Demand in Case of Network Effect

- Positive Network Effect → Price Responsiveness of the Demand Curve
- Choke Price/Reservation Price (Chicken and Egg or Start-Up problem)
- Monopoly or Competition?
- The Lock-In Issue

What is a Platform?

- An intermediary that "makes a market" to bring together buyers and sellers
  - BSE/NSE exchanges for public equities
  - Flipkart or Amazon's e-commerce platforms
  - Apple's "app store" for developers and consumers.
  - Google's "ad platform" for websites and advertisers
- (Going beyond buyers and sellers) An intermediary that brings together groups of users to facilitate economic or social exchange
  - Payment networks: Visa, Mastercard, Paypal
  - Social platforms: Facebook, Twitter, Match.com.
  - Media (papers, websites): advertisers, consumers, content.

Platform markets

Different Types of Platforms

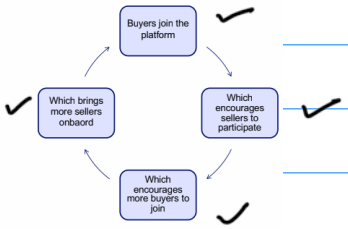
- Software Platforms: Allow applications developers and users to interact
  - Personal Computers, Tablets, Video Games, Apple Music
- Transaction System: A method of payment works only if buyers and sellers are willing to use it
  - Credit cards, UPIs, Currency Notes, Paypal
- Ad Supported Media: News papers, TV, Google Search
- Exchanges: Help 'buyers' and 'sellers' search for feasible contracts and for the best prices
  - Dating Services, Stock Exchange, BSE/NSE

Network Effects

Key idea in the economic analysis of platforms is that they are characterized by network effects

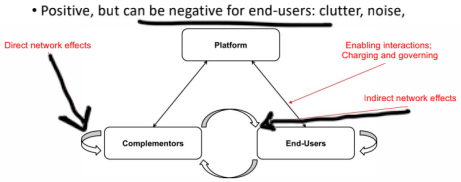
- Examples
  - Developers want to create products for Windows, iPhone, Android because of consumer base. Consumers are attracted in part because of the applications.
  - People want to have Visa cards because they are widely accepted, and merchants want to accept them because most people have them.
  - Traders want to trade in markets where they can easily find counter-parties, and where the market is liquid.

Virtuous Circles



A Platform has more than one side

- Direct or same-side network externalities: Increasing the number of users on one side of the network makes it either more or less valuable for users on the same side
  - Mostly positive for end-users: compatibility, dominance, sharing
  - Mostly negative for complementors: competitive crowding
- Indirect, or cross-side, network externalities: Increasing the number of users on one side of the network makes it either more or less value to users on the other side
  - Mostly positive for complementors: potential consumer base
  - Positive, but can be negative for end-users: clutter, noise,



Platform	Complementor	End-user
Magazine publisher	Advertisers	Consumers
VCR producer	Content producers	Consumers
PDA producer	Application developers	Consumers
Console manufacturer	Game publishers	Consumers

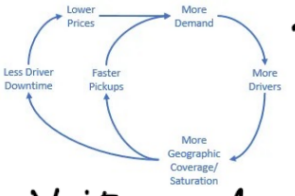
Identifying Externalities

Platform	Sides	Inter Group (Cross/Indirect)	Intra Group (Direct)
Visa cards	A: Consumers B: Sellers	A+ B+	A / B −
Dating Sites/ Night Club	A Men B Women	A + B+	A − B −
X-box	A: Players B: Game Developers	A + B+	A + B −
Newspapers	A: Readers B: Advertisers	A + B -	A / B −

Traditional Business (Just to Contrast)

Buyer ← Conventional business → Sellers

Linear | Pipeline Structure



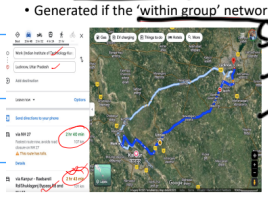
given by david sacks for Uber

Virtuous cycle

L3: Platform Economics 2

Attraction Loop

- Generated if the 'within group' network effect is positive



Direct Network Effects on Google Map

Positive 'within group' network effects
- More users ⟹ More information ⟹ Google Map becomes more useful

Attraction loop
- With more users ⟹ App becomes more useful⟹ attracts more users

- Impact on Platform Choices: "Winner-Take-All"
- A simple Mathematical Model to Illustrate
- Rare to find such situations

→ Google Map
→ Apple Map
→ Waze

A simple Model for "Winner-Take-All"

- Users arrive randomly on the market and must choose between 2 platforms: A & B
- Users value stand-alone utility + network benefits

Cross Group Network Effect

- Positive on both sides [Attraction Spiral]
- Positive on one side and Negative on the other [Attraction-Repulson Pendulum
- Positive on one side and Neutral on the other [Attraction Spill Over]
- Negative on both sides?

A Simple Model for Attraction Spiral

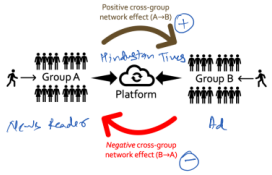
- Two Groups: A & B with n_A and n_B members
- β_A and β_B are cross network effects

$$K_A = \frac{1}{1-\beta_A\beta_B}$$

$$K_B = \frac{\beta_A}{1-\beta_A\beta_B}$$

Attraction-Repulsion Pendulum

- Attraction is not always mutual
  - Ad-financed media
  - Operating System: Users and Malware writers



Mathematical Model Continued

Attraction Spillover

One group is positively attracted by the other, but the other group does not care.

- Example: Amateurs and Professionals

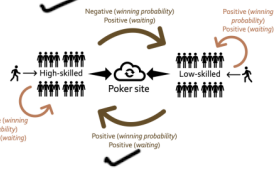
Professionals (\) ⟷ (+) Amateurs

Difficulty: Within or Cross-Group Network Effects

- Tricky to Determine in many situations
- Examples:
  - YouTube
  - Phone Network
  - Online Poker Games
- Does it matter?

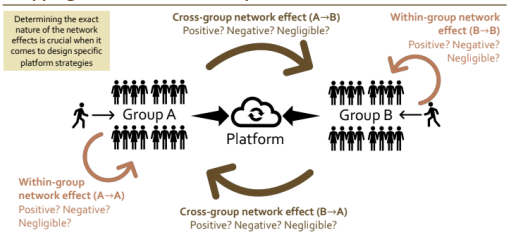
A Case of An Online Poker Platform

- The platform's attractiveness depends on
  - Probability of winning
  - Waiting time for a play
- 2 groups of players: high & low-skilled
  1. Waiting time: Reduced with more players
  2. Winning Probability
- Wimmer et al. (2018) show that
  - **A poker site is more attractive if more low-skilled and/or fewer high-skilled players participate.**



Mapping network effects on a platform

Determining the exact nature of the network effects is crucial when it comes to design specific platform strategies



A definition of platforms

- 2 requirements to be considered a platform
  1. To facilitate the interaction between users who are linked by some form of network effects.
  2. To manage these network effects in an active way.

A platform is an entity that brings together economic agents and actively manages network effects between them.

- Digital platforms
  - Digital technologies make it easier to meet both requirements.
    - Lower transaction costs to interact *(search, matching, trust, reputation, etc.)*
    - New tools to manage network effects more actively *(recommender and rating systems, payment systems, data analytics, transaction monitoring, etc.)*

What is (and what is not) a platform?

	Are network effects present?	Are network effects managed?	Platform?
Original Facebook	Yes (within-group)	Yes	**Yes**
Wikipedia	Yes (within-group)	Yes	**Yes**
Uber	Yes (cross-group)	Yes	**Yes**
Esperanto	Yes (within-group)	No	**No**
JioMart	No	No	**No**
Shopping Malls	Yes (cross-group)?	Yes?	**Yes?**
Individual blog	No	No	**No**
Group or ad-financed blog	Yes (cross-group)	Yes	**Yes**
Petrol stations	No	No	**No**
Notaries	No	No	**No**

Value Creation and Capture

- How does a platform *create* economic value?
  - By leveraging mutual positive cross-group network effects (attraction spiral)
  - By leveraging positive within-group network effects (attraction loop)
  - Through stand-alone products or services
- How does a platform *capture* economic value?
  - By charging, users enjoying positive network effects: Possibly through a 'freemium' strategy
  - By offering a bundle including a 'bad'
    - 'Bad' = advertising and/or transfer of personal (or anonymized) data

Typology based on value creation and capture

		Value creation: Leverage within-group network effects	Value creation: Leverage cross-group network effects	Value creation: Capitalize on stand-alone services
Value capture	Charge users of services	Netflix; LinkedIn 2002; Amazon	LinkedIn 2005; Amazon Marketplace	Tinder; YouTube Premium; Not a platform
Value capture	Monetize via other users	Facebook		YouTube; The New York Times

A Simple Model with a Single Good and Two Users

- Model
  - 2 Users: X and Y
  - Unit demand for good
  - Intrinsic Value: r_X and r_Y
  - Assume $r_X > r_Y$
  - Cost per Unit: A
- Demand Function absent Network effects

Characteristics of the Demand Function

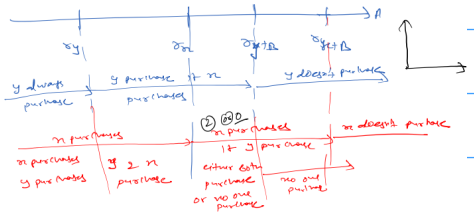
The Same Model with Network effects

- Network Effects
  - Addition Benefit of $\beta > 0$ if the other user also purchases the good
  - Examples:
- Conditionality and Interdependence
- Demand Derivation

		B: Buy	B: Don't Buy
A	Buy	$r_X + \beta - A$, $r_Y + \beta - A$	$r_X - A$, 0
A	Don't Buy	0, $r_Y - A$	0, 0

Weak Network Effect ($\beta < r_X - r_Y$)

Strong Network Effect ($\beta > r_X - r_Y$)



A simple model: Summary

- **'Weak' network effects**
  - Demand function similar to benchmark case
  - Larger set of prices for which both users buy
- **'Strong' network effects**
  - 2 major transformations in the demand function
    - No price such that only one user buys the good.
    - *The same price may give rise to two different quantities.*
  - Consequences
    - **Unpredictability**: For intermediate fees, no way to know a priori whether the good will be adopted or not
    - **Potential inefficiency**:
      - $A \leq r_y + \beta \rightarrow$ Both users are better off if they buy.
      - $A > r_x \rightarrow$ Users may not buy at equilibrium.

Network effects make users' purchasing decisions interdependent. As a result, there can be several levels of demand for the same fee, making it hard to predict a priori what users will decide and giving rise to potential inefficiencies, as users may fail to purchase the product although this would make them all better off.