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37E00100 Information Economy:

Platform Mediated Networks - 1

Topics

Platform-Mediated Networks and Services:

- **Overview, Definitions, and Core Concepts**
- Network Mobilization
- Platform Control
- Platform Envelopment

Based on material provided by Professor **Thomas R. Eisenmann**, Harvard Business School; Professor **Marshall Van Alstyne**, Boston University and MIT Sloan School; and Associate Professor **Geoffrey Parker**, Tulane University

1995

- Netscape IPO
- Rob Glaser launches RealNetworks
- VocalTec introduces VoIP
- First cable modems
- FCC auctions digital mobile spectrum
- Palm launches Pilot

1999

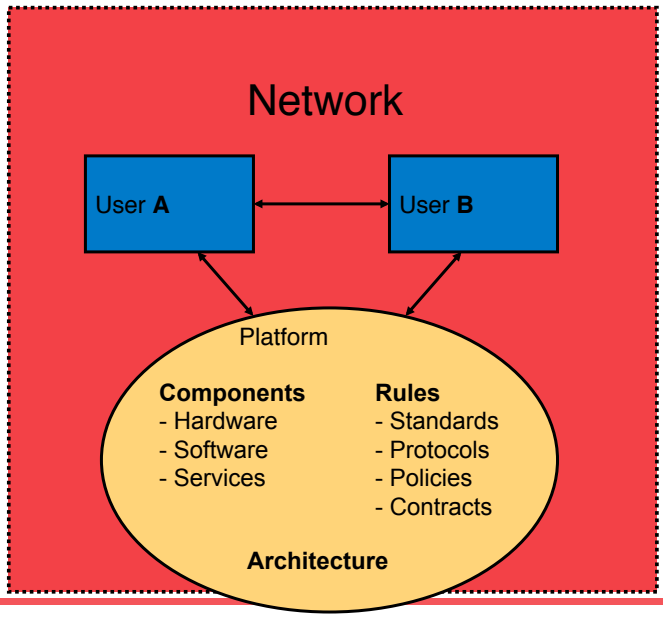
- IBM embraces Linux
- XML is created, paving the way for “web services”
- 802.11b (Wi-Fi) takes off
- Napster launched
- TiVO launched

2004 on: Explosive Growth in…

- Google's valuation
- Skype
- RSS, podcasting
- Blogs
- Open source software
- Wikipedia
- BitTorrent
- ..
- Social Media (MySpace, Facebook, LinkedIn,Twitter,…)
- WikiLeaks
- Smart phone applications
- …

Platform-Mediated Networks

- Network users access a common platform that facilitates their interactions
- Platforms = subset of components and rules employed by users in most of their transactions
  - Components = hardware, software, services
  - Rules = technical standards, protocols for information exchange, policies, and contracts that govern transactions
- Users rely on a platform when doing so is more efficient than unmediated bilateral dealings



eBay's Platform

- Components
  - Browser and Internet access (from 3rd parties)
  - Website design
  - Bid tracking software
  - Shipping services (from 3rd parties)
  - Links to PayPal (an eBay-owned platform)
  - Etc.
- Rules
  - Registration requirements
  - Dispute resolution processes
  - Feedback system
  - Policies for bidding
  - Etc.

Platforms & Applications

- Platform: Components used in common across a product family whose functionality can be extended by 3rd parties (Boudreau 2007) characterized by network effects (Eisenmann, Parker & Van Alstyne 2009).
- Examples:
  1. Desktop OS: *Unix, Mac, Windows*
  2. PDAs: *Palm, Psion, Newton*
  3. Game Consoles: Wii, Xbox, Playstation
  4. Network Switches: Cisco, IBM, HP
  5. Multimedia: Adobe/Flash, MS/Silverlight, Google-Apple/HTML5
  6. Payment Systems: Paypal, Google Checkout, Visa, Apple, Mobile Felica
  7. Mobile Devices: iPhone, Android, Symbian, Blackberry
  8. Enterprise Systems: Salesforce, Oracle, i2, IBM, SAP
  9. Social Networks: Facebook, MySpace, LinkedIn, Monster, Twitter
  10. Batteries: Sony, Panasonic, Sanyo, A123
  11. Web Search: Google, Bing+Yahoo!, Baidu
  12. Ebooks: Amazon, iPad, Nook, Sony

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Network Effects

- Definition: Network's value to a user depends on the number of other network users
  - "Value" = willingness-to-pay for network participation = WTP for platform affiliation = cap on platform fees
- Properties
  - Can be negative, e.g., due to congestion
  - WTP tends to increase as "S"-shaped (logistic) function of network growth
  - Network effects are demand-side economies of scale, i.e., they impact revenues
    - Network effects are not supply-side scale economies, which improve unit margins through fixed-cost leverage
    - However, many networked businesses do enjoy strong supply-side economies

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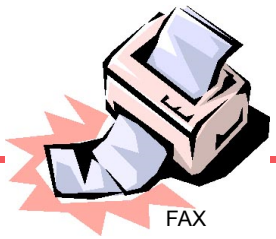
(Re)interpreting Network Externalities

- "Network Externalities" are *demand* economies of scale.
- They imply at least some level of *interaction* as when I email you, or you FAX or IM me.


Phone


E-Mail


FAX

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Why Study Platform-Mediated Networks?

- Large and growing share of global economy
- Distinctive management challenges

Large and Growing Share of Global Economy

- Not just digital industries, also:
  - Financial services, e.g., ATMs, credit cards, stock exchanges
  - Transportation, e.g., package delivery, airlines, travel agents, reservation systems, fuel cell-powered cars
  - Retail, e.g., shopping centers, bar codes/RFID
  - Energy, e.g., grid + appliances, energy trading
  - Real estate, e.g., home buying
  - Health care, e.g., HMOs
  - Enterprise administration, e.g., recruiting, B2B procurement
- 60 of the world's 100 largest companies earn most of their revenue from platform-mediated networks

Distinctive Challenges

- Platform-mediated networks are very complex, but oversimplification is common
  - Over- or underestimate strength of network effects
  - Price to network's sides as if they were separate markets
- Errors can be fatal
  - Yahoo, Amazon failed in U.S. auctions
  - eBay exited Japan and China; failed to dislodge PayPal
  - NASDAQ collusion = $1 billion fine; ECN entry
  - IBM spent $1+ billion on OS/2
  - Apple forfeited Microsoft's position

Distinctive Challenges

- **Business Model Design**
- Winner-Take-All Dynamics

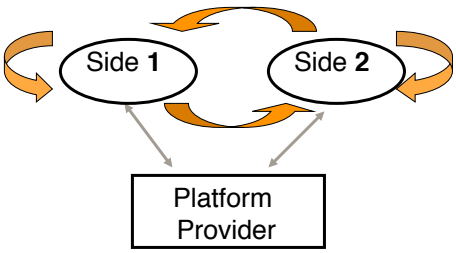
Business Model Design

- "This is like the Cambrian explosion 550 million years ago, when multicelled life first appeared on the scene. It was the greatest speciation ever seen, but it was also — which people forget — the greatest rate of extinction ever seen. We're going to see all kinds of ideas tried, and the majority of them are probably going to fail." (Jeff Bezos, CEO Amazon.com, Business Week, 9/13/99)
- Designing Business Models is Difficult Due To:
  - "Two-sidedness" of most networks
  - Bifurcation of platform roles
  - Rapid growth, precluding trial-and-error

One- and Two-Sided Networks

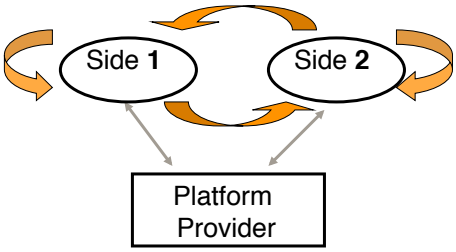
- "One-sided" networks: Transaction partners alternate roles, e.g., e-mailers send & receive, traders buy & sell
- "Two-sided" networks: Users are permanent members of one distinct group — a "side" — which transacts with a second group, e.g.,
  - Job seekers + recruiters
  - Card holders + merchants

A two-sided network has *four* network effects



- A ***same-side*** effect for each side, i.e., preference regarding number of other users on *own* side
- A ***cross-side*** effect in each direction, i.e., preference regarding number of users on *other* side

Each network effect can be positive or negative



+ ***same-side*** : Player-to-player contact in Xbox MMOG, end-user PDF sharing.

- ***same-side*** : competing suppliers in Covisint auction, competing dates on Match.com

+ ***cross-side*** : merchants & consumers for Visa, developers & end-users for Windows

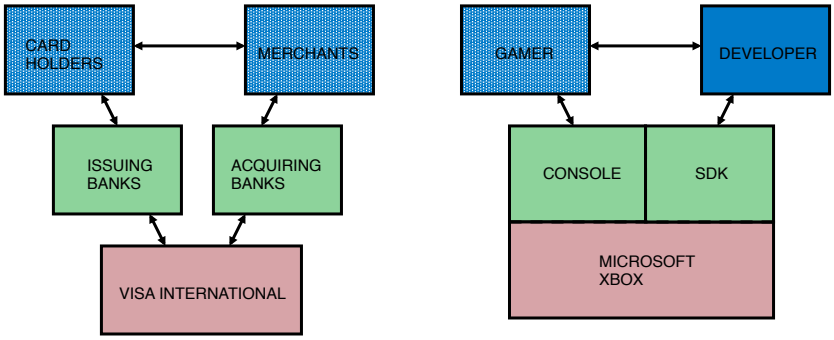
- ***cross-side*** : Digital Rights Management costs to consumers. Advertising clutter to viewers.

Platform Roles: Sponsors and Providers

- Providers are users' primary point of contact with platform
- Sponsors do not deal directly with users; rather, sponsors hold property rights that determine:
  - Who may change platform technology
  - Who may participate in network as a platform provider or network user

VISA =
JOINTLY SPONSORED
SHARED PLATFORM

XBOX =
SOLE SPONSORED
PROPRIETARY PLATFORM



Distinctive Challenges

- Business Model Design
- **Winner-Take-All Dynamics**

Schumpeterian Competition: Serial WTA Battles

- VCR ⇒ DVD + PVR + VOD
- LP ⇒ CD ⇒ download and/or subscription
- Human market makers ⇒ ECNs
- 1G ⇒ 2G ⇒ 3G
- Analog POTS ⇒ VoIP
- Broadcast ⇒ cable ⇒ IP TV
- Atari ⇒ Nintendo ⇒ Playstation ⇒ Xbox?
- Wi-Fi ⇒ WiMax?
- Gasoline-powered cars ⇒ Fuel cell-powered cars?
- Barcodes ⇒ RFID?

Managerial Implications

- ***Winners in a platform market generally have the "best" platform strategy, not necessarily the "best" product***

- **Best platform?**
  1. Open *(but not too open)* interfaces
  2. Modular architectures *(easy to build on/extend)*
  3. Compelling complements *(generally result of vibrant ecosystem)*

- **Best product?** Best standalone value proposition, but while starting here is good, usually not enough to win a platform market

Source: Cusumano 2010

Winner-Take-All Issues

1. Supply & Demand economies of scale **winner-take-all** ⇒ one platform prevails
2. Examples: Windows, eBay, PDF, DVD, fax, real estate MLS
3. Winner-take-all implies *loser takes next to nothing*!

Proprietary vs. Shared Platforms

- Proprietary platforms have usually have a sole sponsor (e.g. Skype, Windows, Monster.com)
- Shared platforms have multiple sponsors (e.g. DVD, Visa, Real Estate Assoc', color TV)
- Sole sponsors may license to create the benefits of shared (e.g. Apple licensing iPod to HP, MBNA / AMEX card)

Proprietary	Shared
• Monopoly profits if win all the market	• Less intense spending rivalry • Faster adoption (Better expectations mgmt)

WTA Implications

- Sharing and racing are “bet-the-company” decisions, so organizational design is crucial
- Growth opportunities ⇒ capital market bubbles
- WTA ⇒ monopoly power ⇒ government intervention

Platform Structure

- Winner-take-all: one platform serves the mature networked market
- Mono-homing: most users on a given side affiliate with a single platform
- Multi-homing: most users on a given side affiliate with multiple platforms

Platform Structure Examples

Network	Side 1 Users	Side 1 Structure	Side 2 Structure	Side 2 Users
Fax	Sender/receivers	WTA		(Homogeneous network)
DVDs	Consumers	WTA		Movie studios
Mobile FeliCa	Cell phone users	WTA		Retail stores, etc.
Real estate MLS	Home buyers	WTA		Home sellers
Windows desktop O/S	PC users	WTA		Application providers
Online auctions	Buyers	WTA		Sellers
PDF	Readers	WTA		Document creators
Instant messaging	Sender/receivers	Mixed-mode		(Homogeneous networks)
Credit cards	Consumers	Mixed-mode	Mixed-mode	Merchants
Yellow Pages	Consumers	Mixed-mode	Mixed-mode	Marketers
Recruitment sites	Job seekers	Mixed-mode	Mixed-mode	Recruiters
Video games	Consumers	Mono-	Mixed-mode	Game developers
Shopping mall	Consumers	Mono-	Multi-	Stores
Subscription music	Consumers	Mono-	Multi-	Artists/labels
Multichannel TV (DBS vs. cable)	Consumers	Mono-	Multi-	Programming networks

Networked Market is More Likely to be Served by a Single Platform When:

- The platform is a natural monopoly

OR…

- Multi-homing costs are high AND
- Network effects are positive and strong AND
- Demand for differentiated features is weak
  - OR dominant platform can offer such features selectively to users willing to pay premium

Natural monopolies are rare, but evident in some networked businesses

- Past: local utilities (phone, power, cable TV), railways, postal delivery
- Present
  - Internet content delivery networks (e.g., Akamai, which has 85% market share based on huge investment in servers)
  - Failed LEO satellite communications (e.g., Iridium, Teledesic)

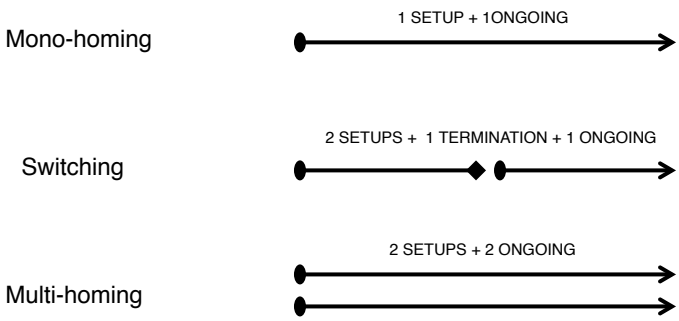
Homing costs: costs/investments incurred by user due to platform affiliation

Upfront	•Search and negotiation •Account setup, e.g., software configuration •Initial hardware & software investment; system integration •Training
Ongoing	•Membership and transaction fees •Maintenance costs; customer service hassles •Tenure- or volume-based benefits
Exit	•Account termination hassles and costs, e.g., changing email address, moving funds between brokerage accounts •Contract severance penalties •Salvage value of hardware, software

Switching Costs

- Out-of-pocket expenses and inconveniences incurred by network users (or by platform providers on their behalf) when users switch from one platform to another
- Network effects may deter or encourage switching, depending on the relative sizes of rival platforms.
- However, network effects and switching costs are conceptually distinct and should not be confused

Homing vs. Switching Costs



Homing vs. Switching Costs

- Usually they move together, e.g., satellite radio (both high), package delivery (both low)
- Sometimes, switching cost is *high* but multi-homing cost is *low*
  - **Email account:** costly to *switch* because you must notify all your contacts, but *not* very costly to *multi-home*
  - **eBook readers:** costly to *switch* because you must replace entire library, but *not* very costly to *multi-home*

Homing vs. Switching Costs

- When predicting whether a new networked market will be served by a single platform, focus on multi-homing costs
- When predicting whether to race to acquire network users, focus on switching costs
- When predicting whether an established platform is vulnerable to displacement by a new platform, focus on both multi-homing costs and switching costs

Users' Preferences for Differentiated Platform Functionality

- User segments have different needs
  - DBS picture is sharper than cable's
    - Appealing for sports and movie lovers?
  - DBS requires a set-top box for every TV
    - A liability for large families?
- Can functionality be offered selectively to users willing to pay a premium?
  - To match DBS picture quality, cable would have to convert to all-digital architecture, so selectivity is not an option

Strength of Network Effects

- Network effects are stronger when:
  - Users demand novelty from repeated transactions (e.g., DVDs)
  - Mobile users require geographic coverage (e.g., ATMs, Wi-Fi, refueling)
  - Participants in a matching network have idiosyncratic needs and offers (e.g., home buying, executive recruiting)
- Access to network users is not valued equally
  - Some are extremely valuable (e.g., friends, family)
  - Others are worth little/nothing (e.g., strangers in another country)
  - Some have negative value (e.g., telemarketers, stalkers)
- Strong preference for variety yields "long tail"

WTA Potential?

	DVD: WTA	*Credit Cards:* Multi-Homing
Strength of Network Effect	***High*** for most users on both sides, i.e., consumers and studios	***High*** for most users on both sides, i.e., card holders and merchants
Multi-Homing Cost	***High*** for both sides	***Low*** for both sides
Demand for Inimitable Features	***Low*** due to technical standardization of TV	***High:*** "revolve" vs. charge (i.e., pay-in-full with no preset limit)

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Mono-Homing + Multi-homing Example: Online Subscription Music

	Side 1 *Mono-Homing*: Consumers	Side 2 *Multi-Homing*: Music Companies
Strength of Network Effect	•***High:*** want access to all music	•***High:*** revenue increases in direct proportion with user base
Multi-Homing Cost	•***High:*** monthly fees, playlist ***management***	•***Low:*** duplicated legal work, but zero inventory and modest incremental production costs due to digital distribution
Demand for Inimitable Features	•***Moderate:*** differences include quality of editorial content, IM integration	•**Low:** music companies have similar needs for DRM, promotional support, etc.

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Summary: Core Concepts

- Platform mediated networks
- Network effects (or externalities)
- One- and Two-sided networks
- WTA dynamics
- Homing costs
- Switching costs
- Preferences for differentiated platform functionality