

Information Rules:

A Strategic Guide to the Network Economy

Networks and Positive Feedback

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Important Ideas

- Positive feedback
- Network effects
- Returns to scale
 - Demand side
 - Supply side

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Positive Feedback

- Strong get stronger, weak get weaker
- Negative feedback: stabilizing
- Makes a market “tippy”
- Examples: VHS v. Beta, Wintel v. Apple
- “Winner take all markets”

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Sources of Positive Feedback

- Supply side economies of scale
 - Declining average cost
 - Marginal cost less than average cost
 - Example: information goods
- Demand side economies of scale
 - Network effects
 - In general: fax, email, Web
 - In particular: Sony v. Beta, Wintel v. Apple

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Network Effects

- Real networks
- Virtual networks
- Number of users
 - Metcalfe’s Law:
Value of network of size n proportional to n^2
- Importance of expectations

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Lock-In and Switching Costs

- Network effects lead to substantial collective switching costs
- Even worse than individual lock-in
- Due to coordination costs
- Example: QWERTY

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Don't Get Carried Away

- Network externalities don't always apply
 - ISPs (but watch out for QoS)
 - PC production
- Likelihood of tipping
 - See next slide

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Likelihood of Tipping

	Low Scale Economies	High Scale Economies
Low Demand For Variety	Unlikely	High
High Demand For Variety	Low	Depends

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Chicken & Eggs

- Fax and fax machines
- VCRs and tapes
- Internet browsers and Java

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Igniting Positive Feedback

- Evolution
 - Give up some performance to ensure compatibility, thus easing consumer adoption
- Revolution
 - Wipe the slate clean and come up with the best product possible

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Evolution

- Offer a migration path
- Examples
 - Microsoft
 - Intel
 - Borland v Lotus
- Build new network by links to old one
- Problems: technical and legal

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Technical Obstacles

- Use Creative design
- Think in terms of system
- Converters and bridge technologies
 - One-way compatibility

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Legal Obstacles

- Need IP licensing
- Example: Sony and Philips CDs

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Revolution

- Groves's law: "10X rule"
- But depends on switching costs
- Example: Nintendo

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Openness v. Control

- Your reward = Total added to industry x your share
- Value added to industry
 - Depends on product *and*
 - Size of network
- Your share
 - Depends on how open

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Openness

- Full openness
 - Anybody can make the product
 - Problem: no champion
- Alliance
 - Only members of alliance can use
 - Problem: holding alliance together

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Control

- Control standard and go it alone
- If several try this strategy, may lead to standards wars

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Generic Strategies

	Control	Open
Compatible	Controlled Migration	Open Migration
Incompatible	Performance Play	Discontinuity

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Performance Play

- Introduce new, incompatible technology
- Examples
 - Palm Pilot
 - Iomega Zip
- Attractive if
 - Great technology
 - Outsider with no installed base

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Controlled Migration

- Compatible, but proprietary
- Examples
 - Windows 98
 - Pentium
 - Upgrades

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Open Migration

- Many vendors, compatible technology
- Examples
 - Fax machines
 - Some modems

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Discontinuity

- Many vendors, new technology
- Examples
 - CD audio
 - 3 1/2" disks

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Historical Examples of Positive Feedback

- RR gauges
- AC v. DC
- Telephone networks
- Color TV
- HD TV

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Lessons

- Positive feedback means strong get stronger and weak get weaker
- Consumers value size of network
- Works for large networks, against small ones
- Consumer expectations are critical
- Fundamental tradeoff: performance and compatibility

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Lessons, continued

- Fundamental tradeoff: openness and control
- Generic strategies
 - Performance play
 - Controlled Migration
 - Open Migration
 - Discontinuity
- Lessons of history