

Innovation, Openness & Platform Control

Geoffrey Parker
Tulane University

Marshall Van Alstyne
Boston University & MIT

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Motivation & Research Questions

- How can IP be used to promote open innovation?
 - Effects of reuse, size of developer pool, technology, uncertainty, time to bundle...
- Does competition help or hurt innovation?
- Do developers prefer sponsored platforms or open standards?
 - Which is better cooperation or coercion?

The Intellectual Property Debate

Long / Closed is Better

- Long but narrow patents
 - Gilbert & Shapiro '90
- Infinitely renewable ©
 - Landes & Posner '03
- Sequential innovation
 - Green & Scotchmer '95
 - Chang '95

Free / Open is Better

- Fundamental right of access
 - Stallman '92
- Collective production / Open science
 - Benkler '02
 - David '04
- Tragedy of the “AntiCommons”
 - Heller & Eisenberg '98

The Innovation Debate

Monopoly is Better

- “To promote progress in science and the useful arts”
 - U.S. Constitution
- Competition guts incentive to enter.
 - Salop '77, Dixit & Stiglitz '77

Competition is Better

- No double marginalization.
 - Spengler '50, Motta '04
- Innovation occurs to “escape” competition
 - Aghion, Bloom, Blundell, Griffith, Howitt '02

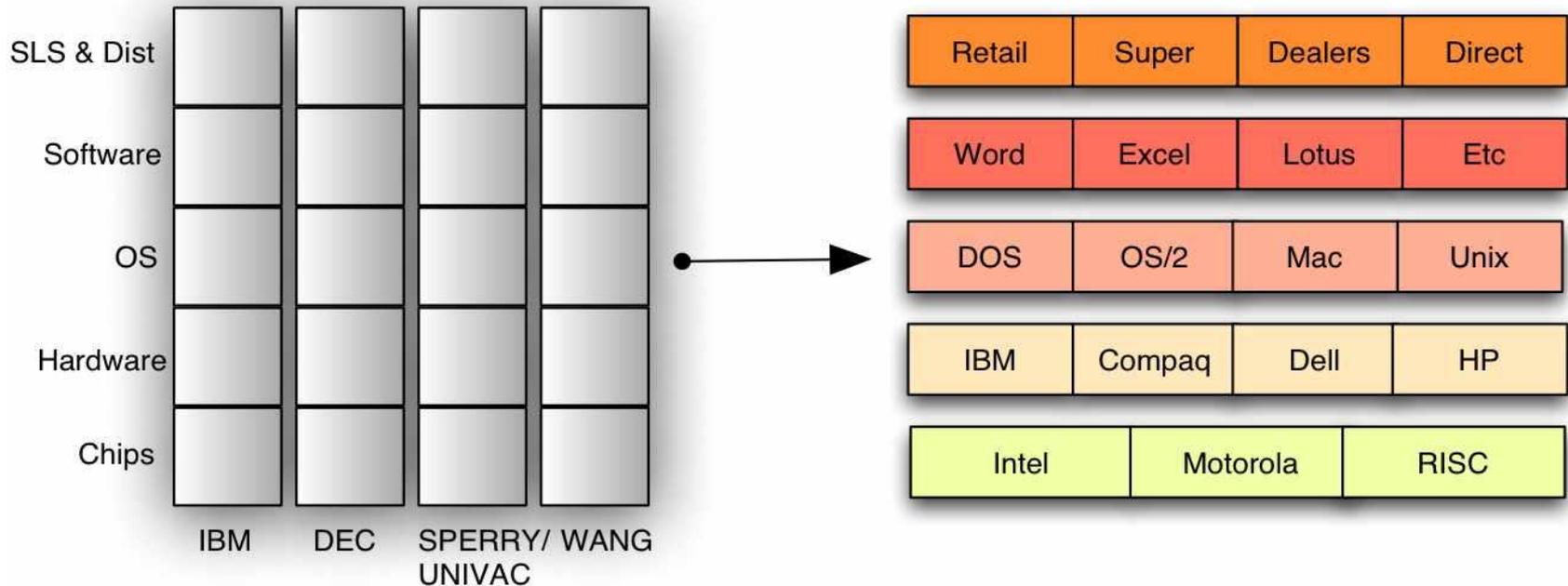
We introduce a downstream production function

Focal Market: Platforms & Applications

- **Platform:** Components used in common across a product family whose functionality can be extended by applications (Boudreau 2007).
- **Examples:** Operating systems, game consoles, multimedia, wi-fi, cellphones, application exchanges, etc...

Natural evolution toward needing to control platform layer above.

Vertical to Horizontal Transition in Computer Industry



Source: Adapted from Andy Grove (Only the Paranoid Survive), Carliss Y. Baldwin & Kim Clark (Designs and Design Architecture)

Illustrations

Downstream enhancements
add value

Google Mash-ups

Paul Rademacher combines maps with Craigs List.

Lawyers say Sue! Engineers say Hire!

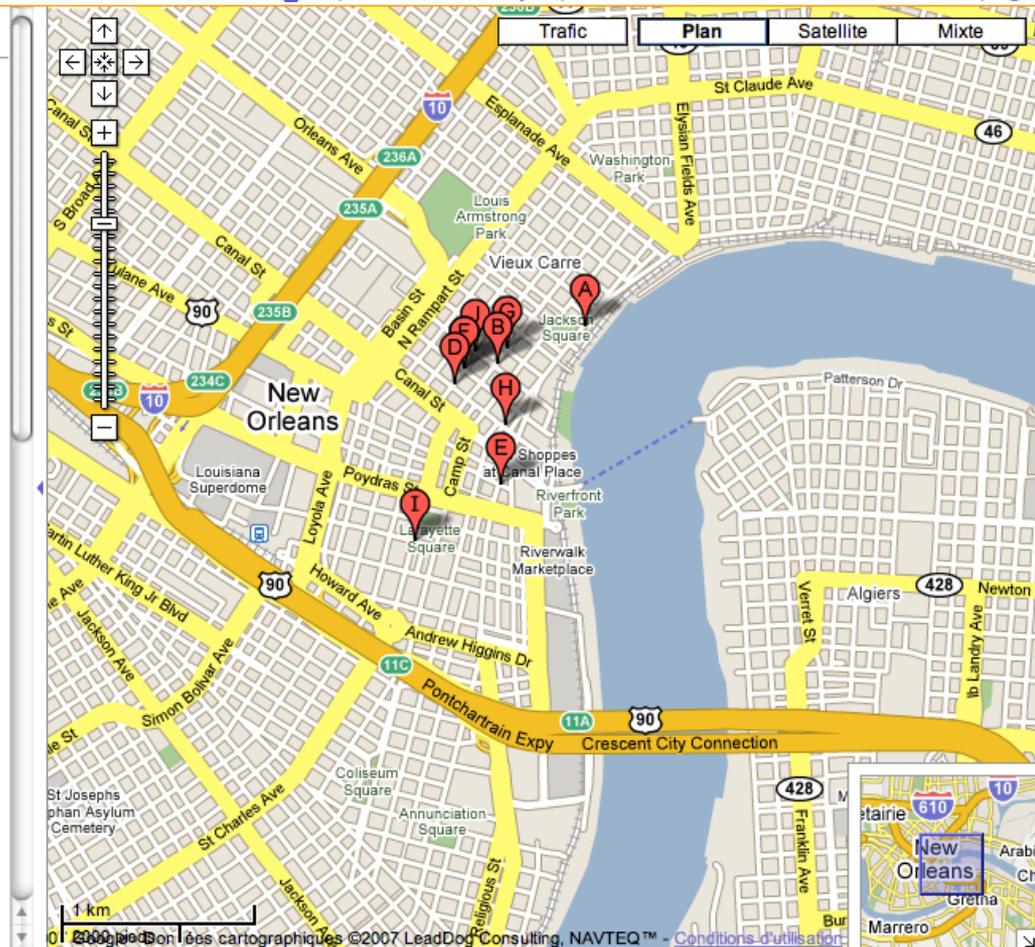
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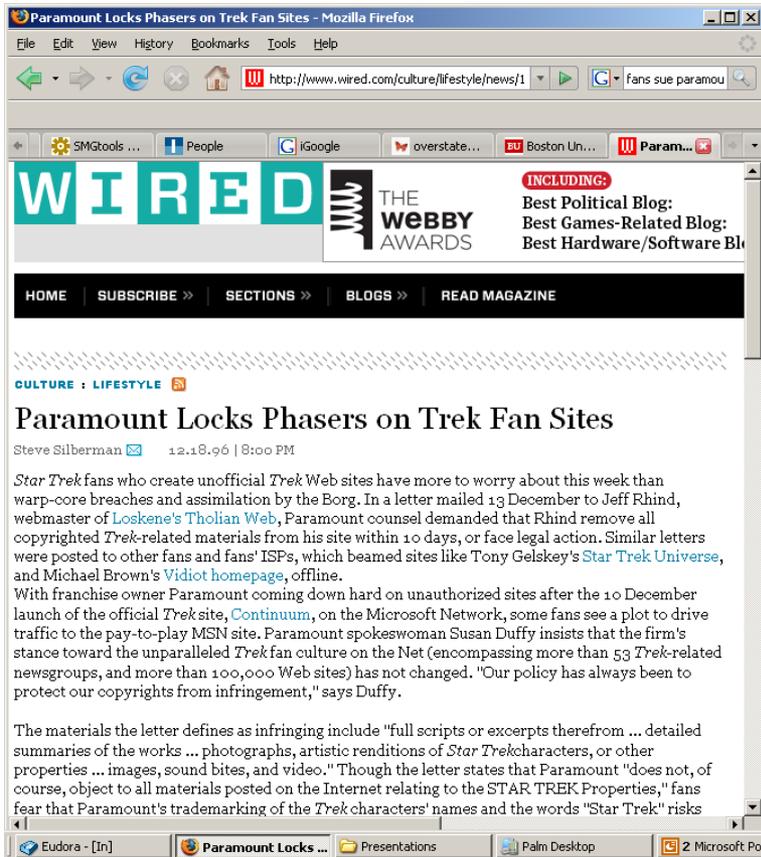
Vue Texte Vue Plan

Résultats 1-10 sur environ 30932 pour french restaurants à proximité de Nouvelle Orléans, LA, Etats-Unis d'Amerique - [Modifier la recherche](#)

- A** [Cafe Du Monde Coffee Stand: French Market](#) - plus d'infos »
800 Decatur St, New Orleans, LA, USA
(504) 525-4544 - ★★★★★
- B** [Brennan's Restaurant](#) - plus d'infos »
417 Royal St, New Orleans, LA, USA
(504) 525-9711 - ★★★★★
Catégorie : Restaurants
- C** [Arnaud's Restaurant](#) - plus d'infos »
813 Bienville St, New Orleans, LA, USA
(504) 523-0611 - ★★★★★
Catégorie : Restaurants
- D** [Galatoire's Restaurant Inc](#) - plus d'infos »
209 Bourbon St, New Orleans, LA, USA
(504) 525-2021 - ★★★★★
Catégorie : Restaurants
- E** [Restaurant August](#) - plus d'infos »
301 Tchoupitoulas St, New Orleans, LA, USA
(504) 299-9777 - ★★★★★
Catégorie : Restaurants



Old Model



Webmasters of fan websites received take-down notices
“Our policy has always been to protect our © from infringement.”

New Model

YouTube - forbiddenkingdom's Channel - Mozilla Firefox

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04.18.08

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DIRECTOR

A discovery made by a kung fu obsessed American teen sends him on an adventure to China, where he joins up with a band of martial arts warriors in order to free the imprisoned Monkey King.

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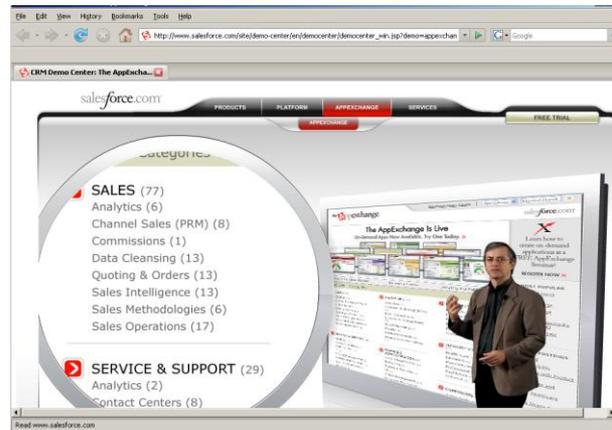
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Ecosystem Led Innovation



Microsoft allows anyone to develop - takes 30%



SalesForce.com promotes sales of applications at AppExchange - takes 30%

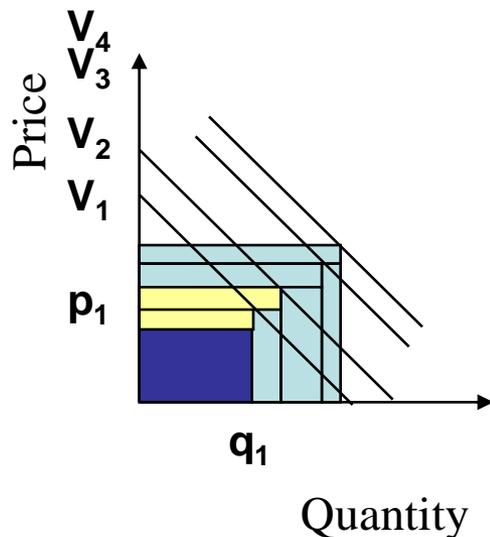


Apple invited developers onto iPhone - takes 30%.

The Model

We need a platform and multiple rounds of innovation.

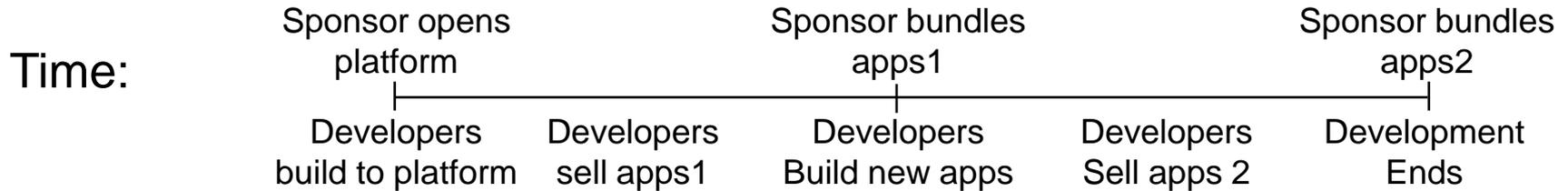
Intuition – Standing on the shoulders of giants



- Sponsor offers platform of value V
 - Then gives some of it away.
- Developers build apps for installed base, adding new layers of value.
- Benefits:
 - Sponsor from increased sales, and downstream royalties.
 - Developer from cost savings and installed base.
- Sponsor bundles new innovation into platform. Makes new value available.
- Repeat

Downstream enhancements add value

The Model



Profits: Platform sponsor can sell V or share fraction σV with developers. Sponsor and developers divide surplus based on Nash bargaining.

$$\pi_p = V(1 - \sigma) + \frac{1}{2}py_1 + \delta \frac{1}{2}py_2$$

$$\pi_d = \frac{1}{2}py_1 + \delta \frac{1}{2}py_2$$

Prices: Developers add unit value v , but the price is limited by the time until the platform sponsor bundles applications into the open resource pool.

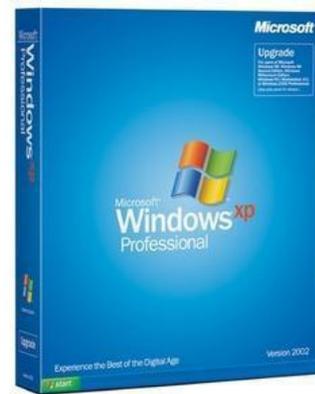
$$p = v(1 - \delta)$$

Production: Output is Cobb-Douglas. the open resource pool is input to production.

$$y_1 = k(\sigma V)^\alpha; \quad y_2 = k^{1+\alpha}(\sigma V)^{\alpha^2}$$

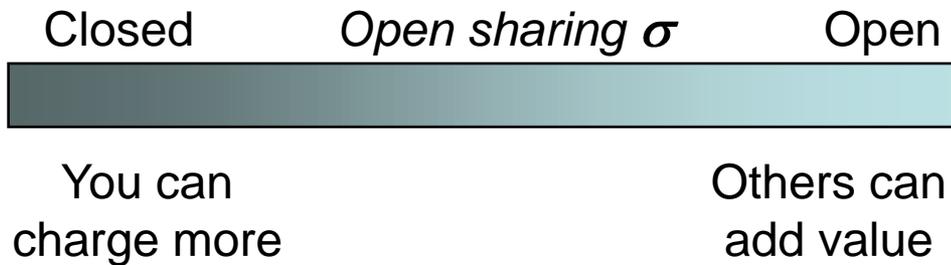
How should a firm manage the platform ecosystem?

Openness & Time: Having opened its platform, does Microsoft (or Cisco or Google or Apple) kill its ecosystem by bundling developer value into Windows?



Consider: Multithreading, Disk Compression, Internet Browsing, Streaming Media, Instant Messaging, ...

Platform Questions



- How open should the platform be?



- When should new features become part of the standard platform?

Platform Answers



$$\frac{(1/2)py_1}{\sigma V} \eta_1 + \frac{(1/2)\delta py_2}{\sigma V} \eta_2 = 1$$

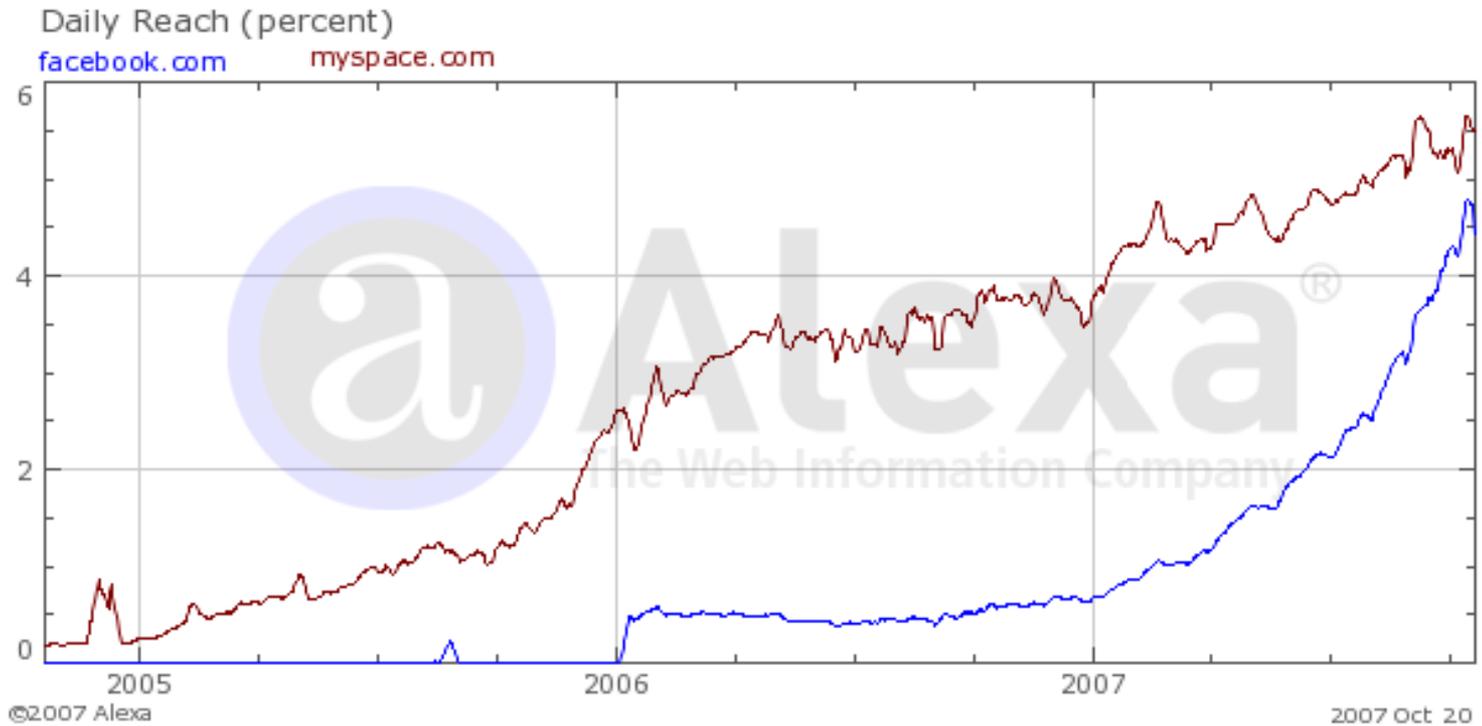
- Open enough so that opportunity cost is proportional to growth in value (times elasticity of output)



$$\delta^* = \frac{1}{2} \left(1 - \frac{y_1}{y_2} \right)$$

- Fold in new features at point in time when the value of 2nd generation output passes 1st generation.

Does Openness Work?



Openness adds value to Facebook – overtaking MySpace!

When does *open* beat *closed*?

Microsoft vs. Apple



Apple vs. Google



When does “open” beat “closed?”

Closed Benefit

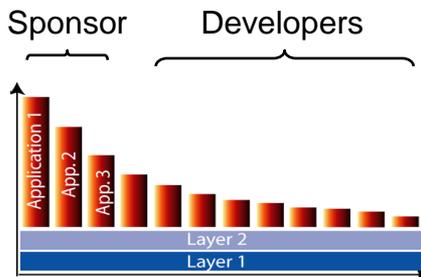
- No sacrifice of $(1-\sigma)$ platform profits.
- Selectively open whole platform, increasing integration and developer added value (systemic innovation)

Open Benefit

- Users can see, modify, or redistribute
- Network effects can arise from low cost experimentation, transparency, lack of hold-up (incremental innovation)

Proposition: Subcontracting is *initially* more profitable when the developer pool is small, but openness increasingly dominates when:

1) Developers add broad value



2) High reuse creates positive feedback

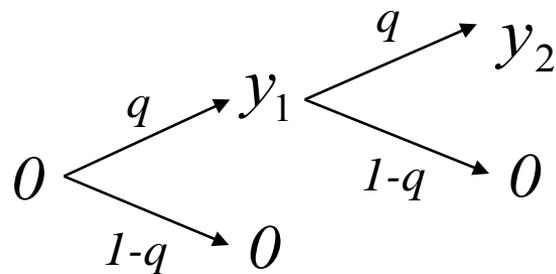


How does technological risk affect openness?

Platform
payoffs
now



Innovation
payoffs
later



Proposition: More risk reduces willingness to open. Firms prefer certain profits now to uncertain profits in the future.

Corollary: **But** if developers will bear risk and their experimentation reduces technology uncertainty, the platform sponsor will *open more and bundle later*.



Both companies encourage broad experimentation on their platforms, then take an interest in those that succeed.

Does competition deter innovation?



Source: Salon 9/10 2002 “Mozilla Rising”
Farhad Manjoo

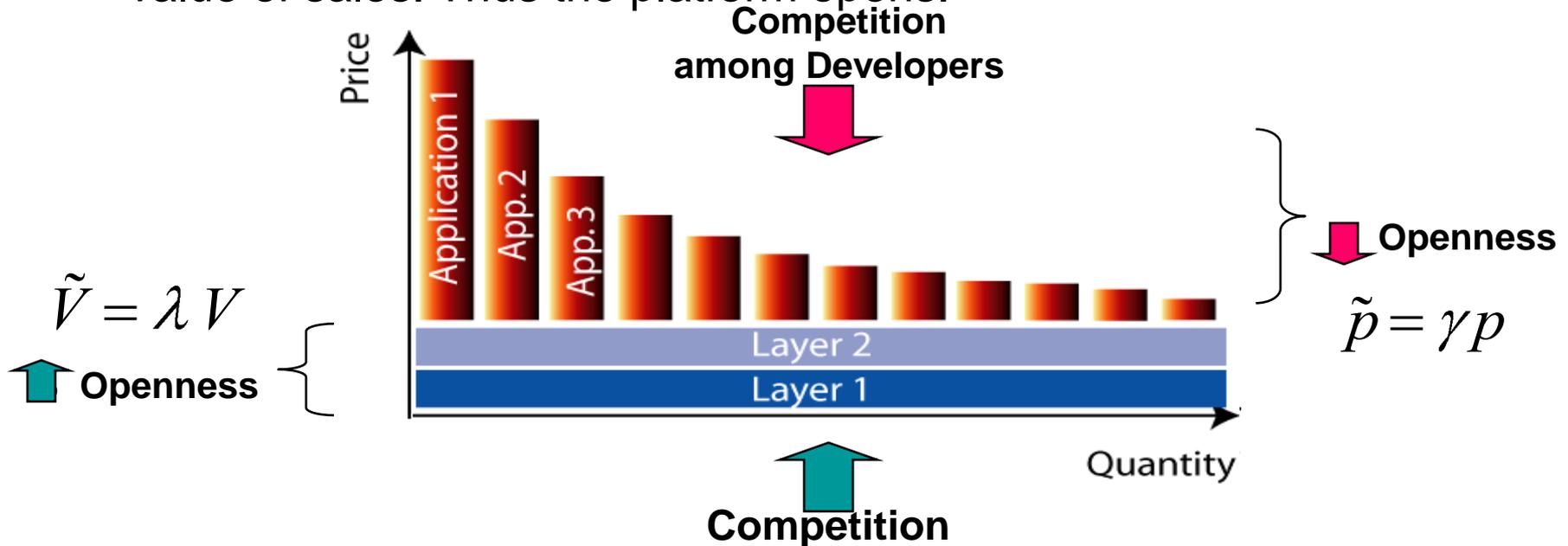
Conventional wisdom: YES!

If people can't profit, they won't invest.

If competition curbs rents, they won't enter.

Does competition deter innovation?

No! Reason: If the platform sponsor faces direct competition, the marginal value of downstream royalties rise relative to marginal value of sales. Thus the platform opens.



Yes! Reason: If downstream competition among platforms is high, the platform sponsor loses interest in subsidizing developers. With a less open platform, developer output also falls.

Would Developers Cooperate Naturally?

The answer is “No” due to a prisoner’s dilemma. ... arising from:

1. More platform resources in the open pool complement development.
2. Private desire to charge lengthens t .

		<i>Developer B</i>		
		Defect	Coop	
<i>Developer A</i>	Defect	(π^{DD}, π^{DD})	(π^{DC}, π^{CD})	$\pi^{DD} > \pi^{CD}$
	Coop	(π^{CD}, π^{DC})	(π^{CC}, π^{CC})	$\pi^{DC} > \pi^{CC}$

This implies

1. Platform sponsors need long protection to impose short periods on developers.
2. Developers are better off with a coordinating sponsor than totally open standards
3. A strong sponsor resolves the “tragedy of the anti-commons”.

Results & Policy Implications

- *Platforms can increase downstream innovation* by optimally controlling openness and bundling.
- *Openness dominates subcontracts* when (i) network effects rise (ii) subsidy or opportunity costs fall (iii) developer output rises (iv) technology improves (v) when there are many developers.
- *Antitrust – the social optimum* is to open sooner and more fully. Rising costs cause social planners to behave more like platform sponsors!
- *Technological Uncertainty* intrinsically reduces openness. A larger developer pool reduces this both by (i) increasing output and (ii) reducing risk.
- Developer competition *reduces* openness & innovation. Platform competition *raises* openness & innovation.
- Developers can prefer sponsored platforms over standards. Property rights need to be *longer for platforms*.

Papers

- “Innovation, Openness & Platform Control”
<http://ssrn.com/abstract=1079712>
- “Strategies for Two Sided Markets” *Harvard Business Review*, Oct 2006. pp 92-101.
- “Two Sided Networks – A Theory of Information Product Design” *Management Science*, 51(10) 2005 pp. 1494-1504.

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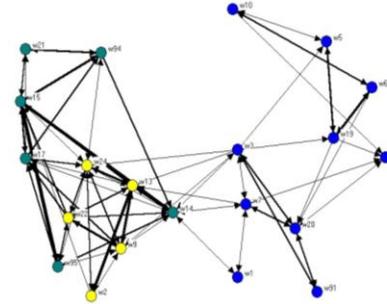
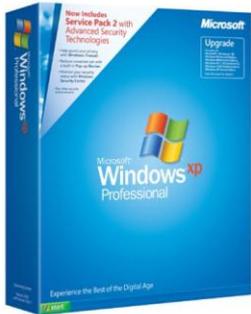
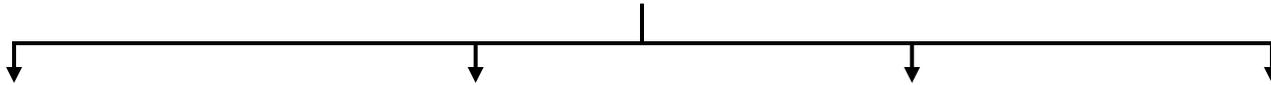
Information Economics Research

Products &
Network Effects

Communications
Markets (Anti-Spam)

Information &
Productivity

IP Law &
Policy



Thank you!