

# Innovation, Openness & Platform Control

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Sponsored by NSF IIS-0338662, and grants from CISCO & Microsoft Corporations

# 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

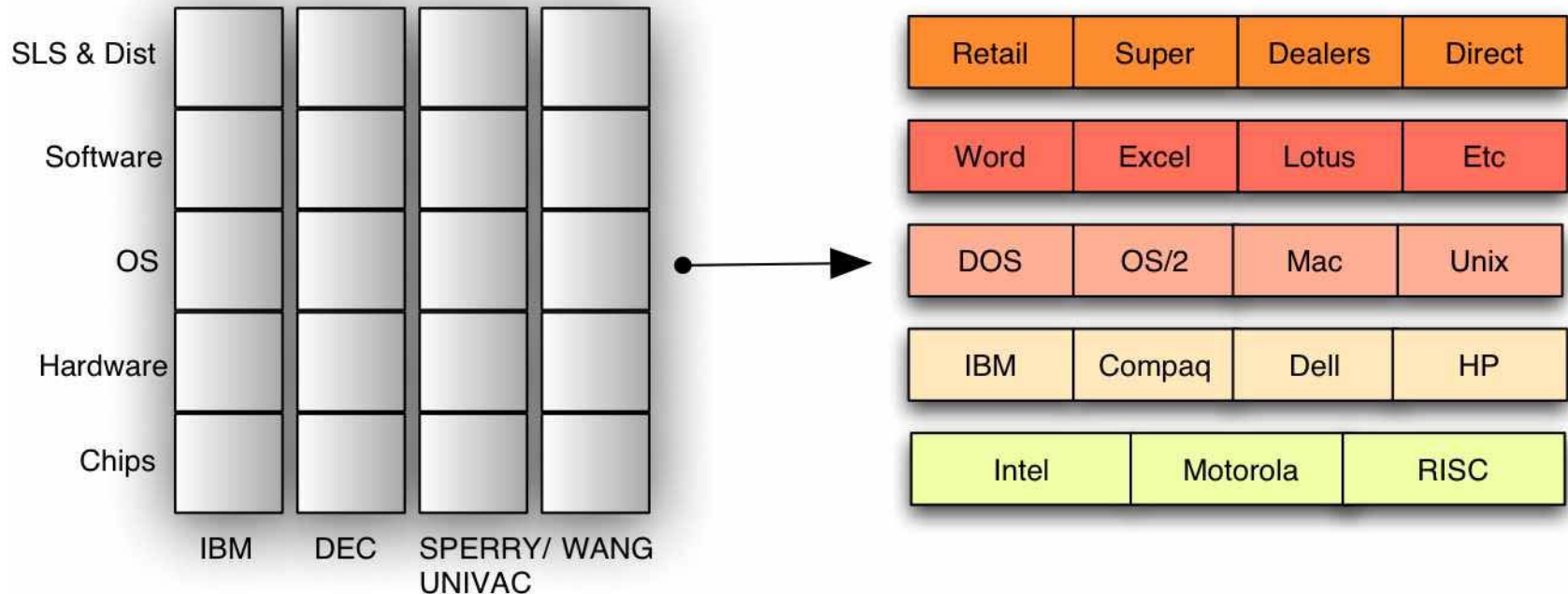
**We introduce a downstream production function**

# 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!

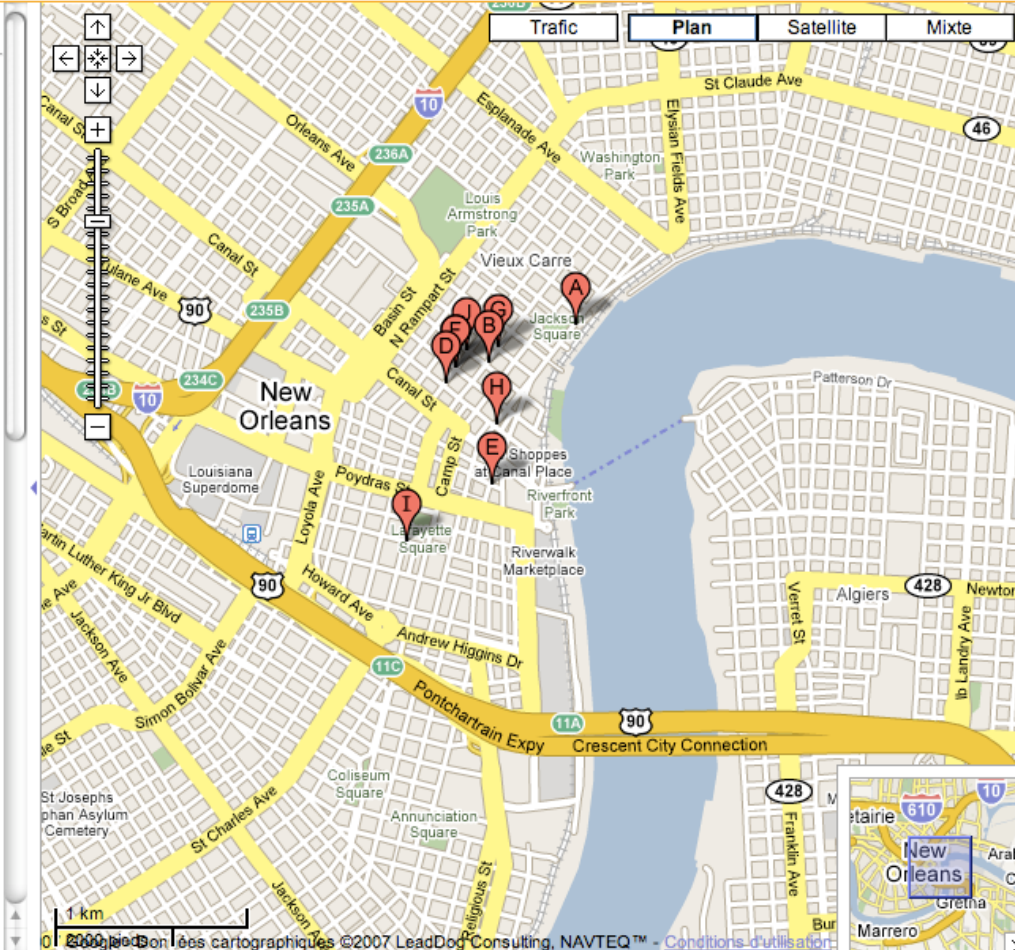
Résultats Mes cartes

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

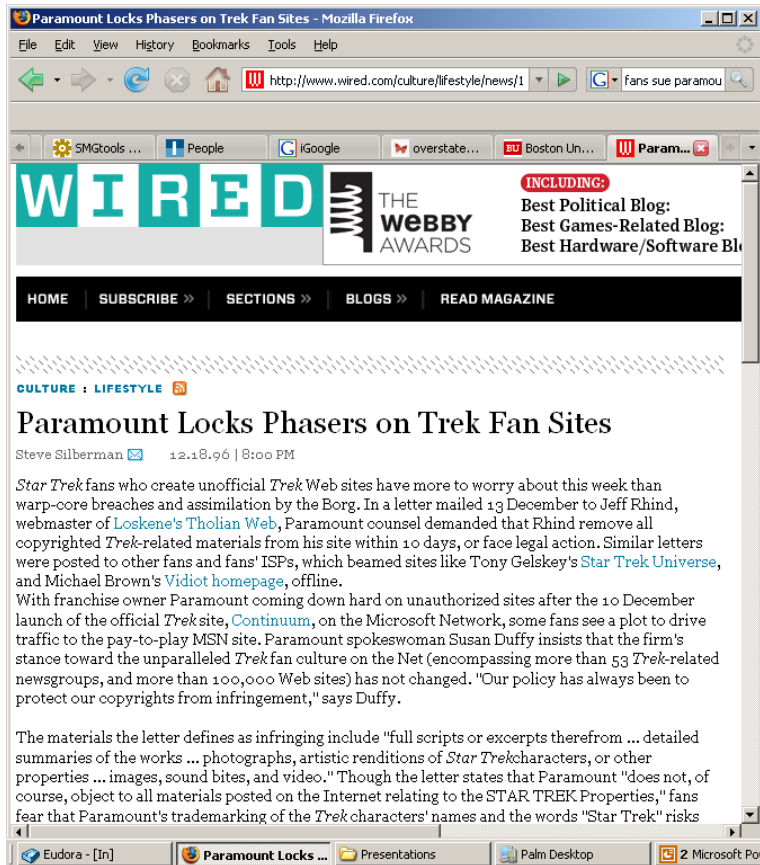
- A** [Cafe Du Monde Coffee Stand: French Market](#) - plus d'infos »  
800 Decatur St, New Orleans, LA, USA  
(504) 525-4544 - ★★★★★
- B** [Brennan's Restaurant](#) - plus d'infos »  
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(504) 525-9711 - ★★★★★  
Catégorie : Restaurants
- C** [Arnaud's 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



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# 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

File Edit View History Bookmarks Tools Help

http://www.youtube.com/forbiddenkingdom

The New York Times ... MIT Webmail The Free Expression ... Fanfic Symposium: Hi... YouTube - forbi... Radiohead/ Remix/ N...

## FORBIDDEN KINGDOM

04.18.08

Videos | Playlists | Groups | Subscriptions

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Videos Watched: **59**

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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.

#15 - Most Subscribed (All Time) - Sponsors

#23 - Most Viewed (Today) - Sponsors

#32 - Most Viewed (This Week) - Sponsors (more)

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Home View **The Forbidden Kingdom**

Re-mix **THE FORBIDDEN KINGDOM** videos. Lionsgate is allowing you to take special scenes from **THE FORBIDDEN KINGDOM** movie and re-mix them with your own videos, add music, and use cool new transitions between scenes.

**START REMIXING**

YouTube

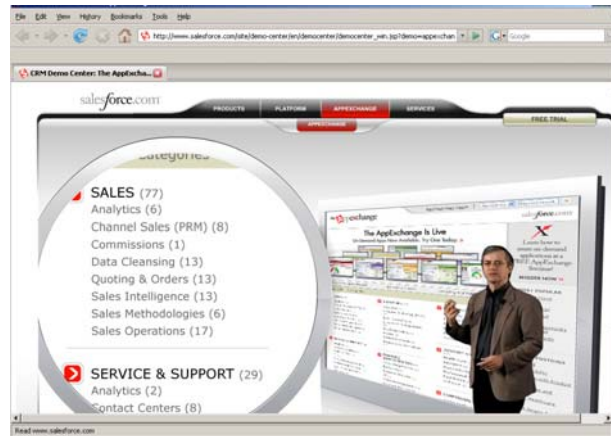
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# Ecosystem Led Innovation



Microsoft allows anyone to develop - takes 30%



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

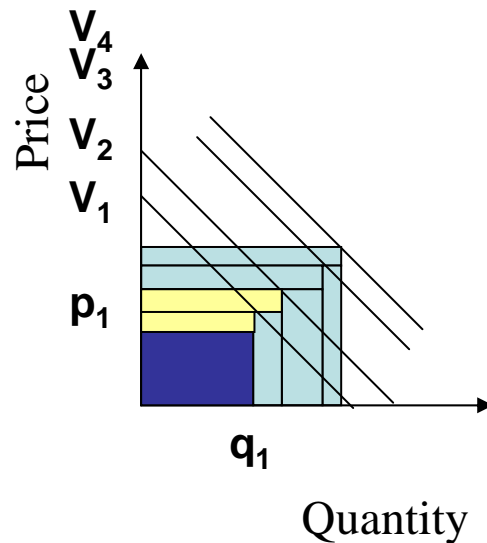


Apple invited developers onto iPhone - takes 30%.

# The Model

We need a platform and multiple rounds of innovation.

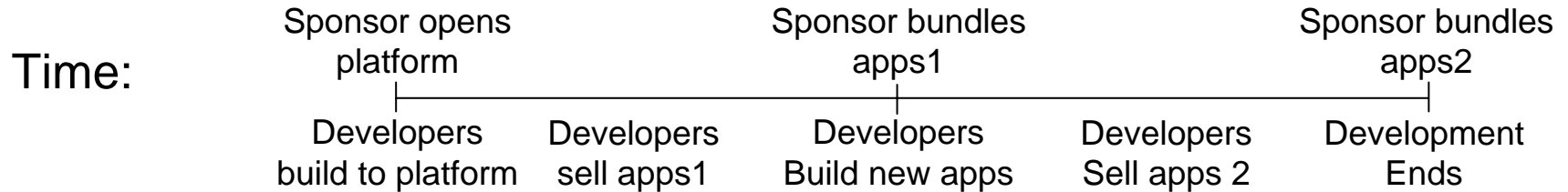
# Intuition – Standing on the shoulders of giants



- 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  $\sigma V$  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.

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

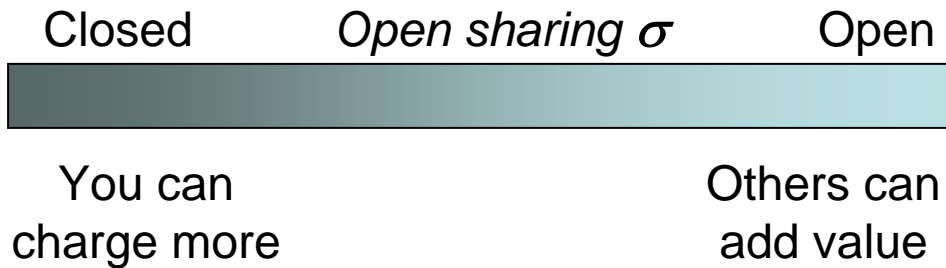
# How should a firm manage the platform ecosystem?

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

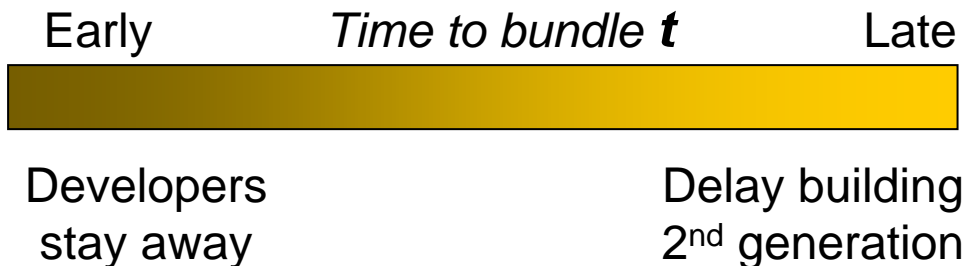


**Consider:** Multithreading, Disk Compression, Internet Browsing, Streaming Media, Instant Messaging, ...

# Platform Questions



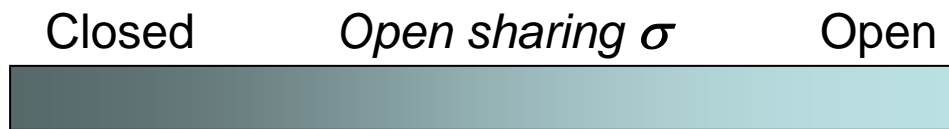
- How open should the platform be?



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



# Platform Answers



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

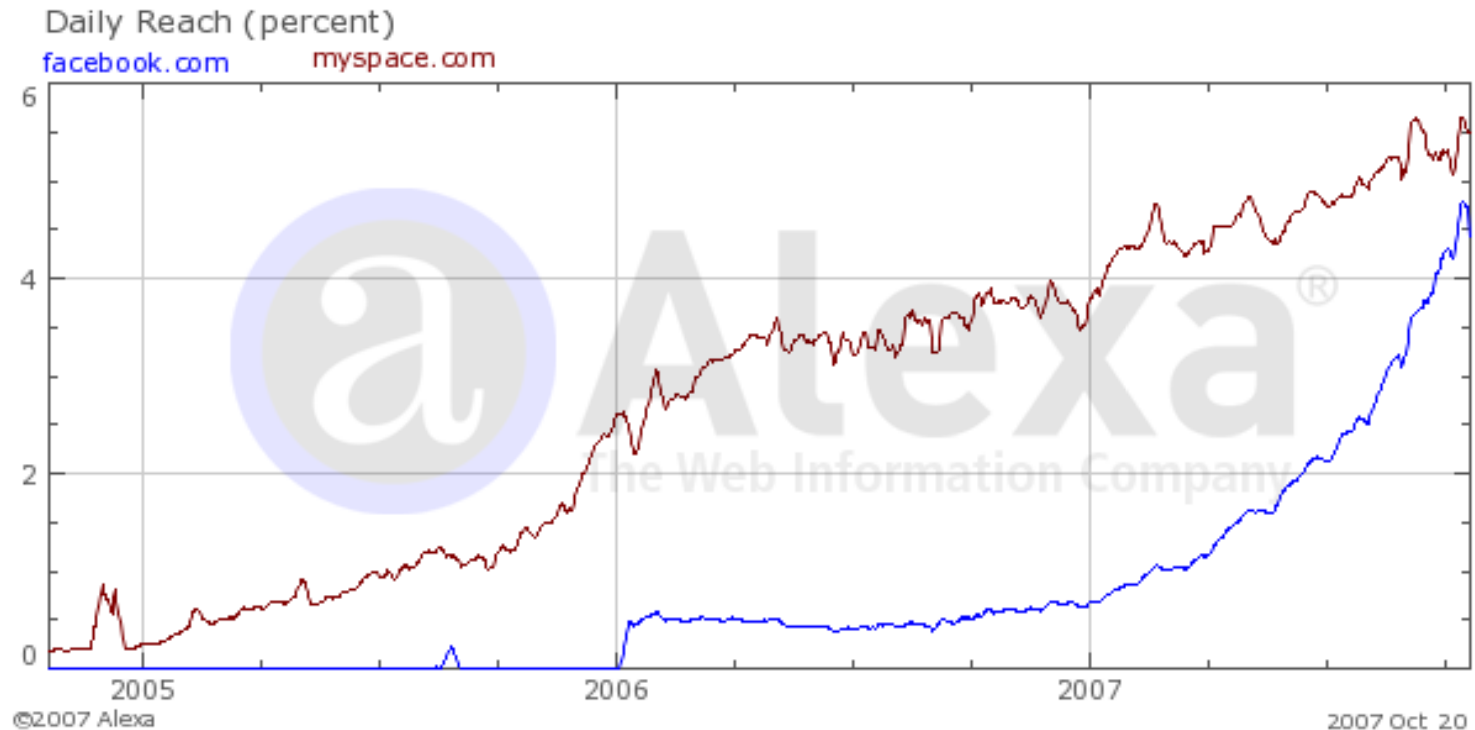
- Open enough so that opportunity cost is proportional to growth in value (times elasticity of output)



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

- Fold in new features at point in time when the value of 2<sup>nd</sup> generation output passes 1<sup>st</sup> 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

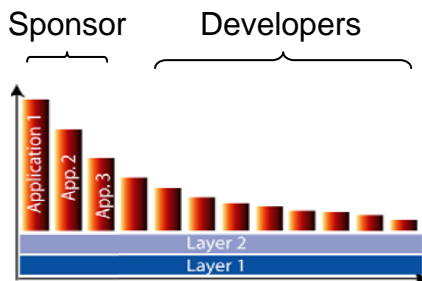
- No sacrifice of  $(1-\sigma)$  platform profits.
- Selectively open whole platform, increasing integration and developer added value (systemic innovation)

## 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

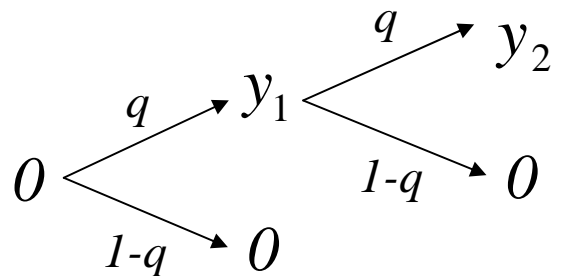


# How does technological risk affect openness?

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!**

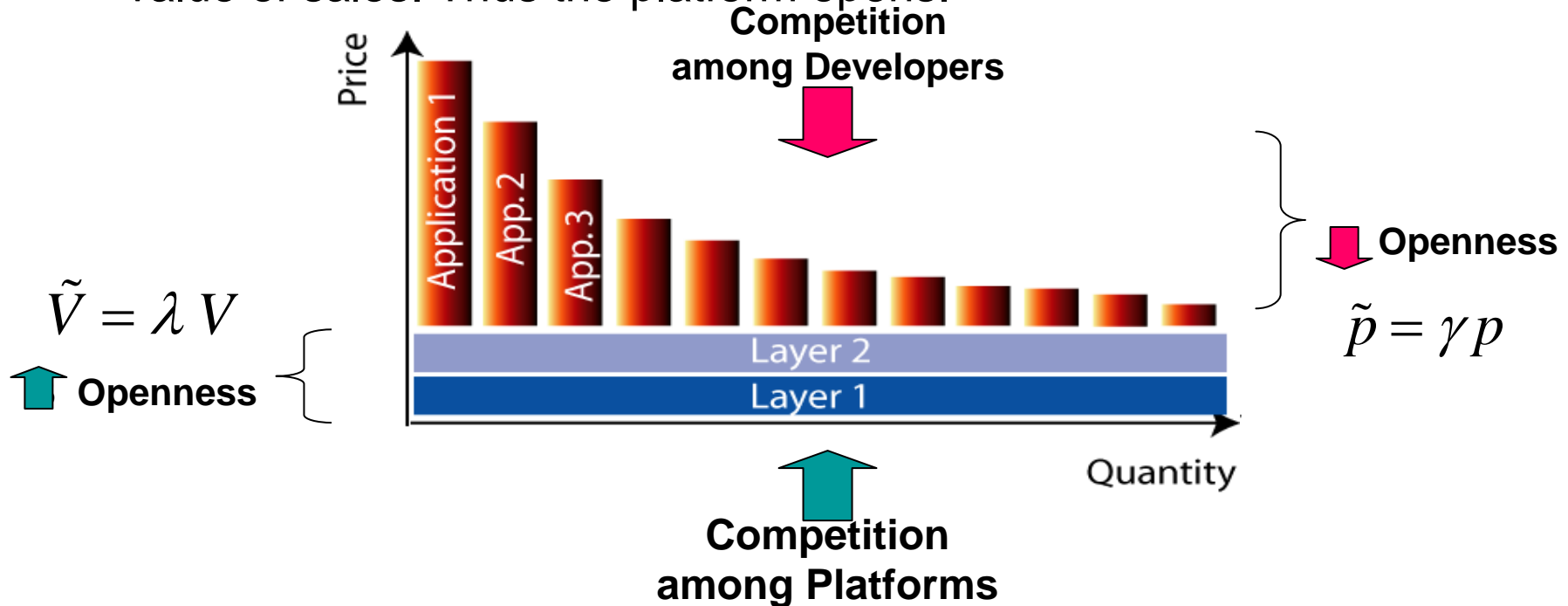
If people can't profit, they won't invest.

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 profits fall, 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	$(\pi^{DD}, \pi^{DD})$	$(\pi^{DC}, \pi^{CD})$	$\pi^{DD} > \pi^{CD}$
	Coop	$(\pi^{CD}, \pi^{DC})$	$(\pi^{CC}, \pi^{CC})$	$\pi^{DC} > \pi^{CC}$

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>
- “Opening Platforms: How, When & Why”  
<http://ssrn.com/abstract=1264012>
- “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.  
<http://ssrn.com/abstract=1177443>

Papers also available from [gparker@tulane.edu](mailto:gparker@tulane.edu) and [mva@bu.edu](mailto:mva@bu.edu)

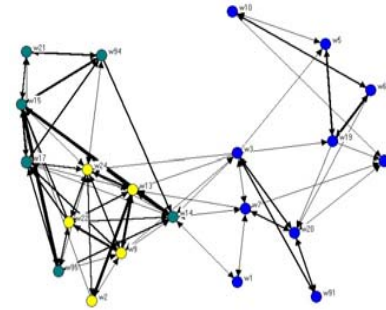
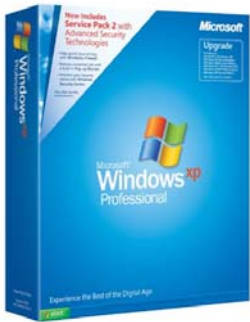
# Information Economics Research

Products &  
Network Effects

Communications  
Markets (Anti-Spam)

Information &  
Productivity

IP Law &  
Policy



Thank you!