



CPI COMPETITION POLICY
INTERNATIONAL

Volume 7 | Number 1 | Spring 2011

Are “Closed Systems” an Antitrust Problem?

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Are “Closed Systems” an Antitrust Problem?

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Closed computer systems have come under attack as harmful to freedom, innovation, and competition. Open computer systems, in contrast, are said to promote such values. This article assesses the specific claim that closed systems, compared to open systems, are inherently anticompetitive. It concludes that competition policy arguments against closed systems are at best inconclusive and that closed systems should not be put in an antitrust suspect class.

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I. Civic and Economic Criticisms of “Closed Systems”

In his influential book *The Future of the Internet and How to Stop It*¹ Jonathan Zittrain argues that we are headed for a future in which general purpose computers, which he calls “generative systems,” will be replaced by locked-down, tethered computing appliances:²

“The PC revolution was launched with PCs that invited innovation by others. So, too, with the Internet. Both were generative: they were designed to accept any contribution that followed a basic set of rules (either coded for a particular operating system, or respecting the protocols of the Internet. . . . But the future unfolding right now is very different from the past. The future is not one of generative PCs attached to a generative network. It is instead one of sterile appliances tethered to a network of control.”³

An important civic virtue of generative systems is that they invite and require participation.⁴ Much like open source software, generative systems do not draw sharp lines between consumers and producers, users and developers, because the tools of production are available to all. As a participant in a generative, open system, every user is a potential developer, much as every citizen in a democratic society is a potential lawmaker.

Zittrain is not alone in his critique of closed systems. In *The Master Switch*, Tim Wu chronicles the history of the information sector in the United States since the birth of AT&T. According to Wu, “[h]istory shows a typical progression of information technologies: . . . from a freely accessible channel to one strictly controlled by a single corporation or cartel—from open to closed system.”⁵ Open systems promote “a world in which most goods and services are free or practically free, thereby liberating the individual to pursue self-expression and self-actualization as an activity of primary importance.”⁶ Closed systems, in contrast, appeal to the consumer, not the creator. They are built to control the users, not to empower them, steering users towards “mass conformity.”⁷

Critics of closed systems generally view open systems as inherently superior in economic terms as well. For example, Zittrain argues that “[g]enerative systems facilitate change” specifically in the form of disruptive innovation.⁸ Disruptive innovation is commonly triggered by amateurs,⁹ who are not constrained by the business imperative of having to make a profit.¹⁰ Because

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of their disruptive nature, generative PCs and the Internet “overwhelmed their respective proprietary, non-generative competitors: PCs crushed stand-alone word processors and the Internet displaced such proprietary online services as CompuServe and AOL.”¹¹ Timothy Berners-Lee agrees: “[C]losed, ‘walled gardens,’ no matter how pleasing can never compete in diversity, richness and innovation with the mad, throbbing Web market outside their gates.”¹² Jonathan Rosenberg similarly claims: “At Google we believe that open systems win. They lead to more innovation, value, freedom of choice for consumers, and a vibrant, profitable, and competitive ecosystem for business.”¹³

SOME CRITICS GO ONE STEP FURTHER, NOT MERELY CLAIMING THAT CLOSED SYSTEMS ARE LESS COMPETITIVE THAN OPEN SYSTEMS, IN WHICH CASE WE COULD REASONABLY EXPECT THE MARKET TO TAKE CARE OF THEM BUT, MORE SPECIFICALLY, ANTICOMPETITIVE.

Some critics go one step further, not merely claiming that closed systems are less competitive than open systems, in which case we could reasonably expect the market to take care of them but, more specifically, anticompetitive. As such, closed systems undermine the corrective dynamism of the market, which, in turn, justifies regulatory intervention. Wu, for example,

singles out Apple as the company he “fear[s] the most,”¹⁴ and that “despite the attention to Google’s monopoly, . . . is likely to run into antitrust problems first.”¹⁵ According to Wu, “unreasonably exclusionary” in the context of a monopolization offense “translates readily to a single word: ‘closed.’” In contrast, an open systems strategy “translates in antitrust language to ‘non-exclusionary.’”¹⁶ Wu approvingly cites Tom Conlon, who puts it more bluntly: “Once we replace the personal computer with a closed-platform device . . . , we replace freedom, choice and the free market with oppression, censorship and monopoly.”¹⁷

This article examines the specific claim about the supposed anticompetitive properties of closed systems.¹⁸

II. What’s Open, What’s Closed? Easy Labels Don’t Provide Ready Answers

What is a closed system? In antitrust law and economics, “systems” are often thought of as “collections of two or more components together with an interface that allows the components to work together.”¹⁹ Examples include applications and operating systems, nuts and bolts, video games, and gaming consoles. Often the components have little value in isolation but substantial value when combined with complementary system components (e.g., DVDs are useless without a DVD player and vice versa).

It is less clear what makes a system closed as opposed to open. First, there is a problem with the definitional scope of “open” and “closed.” A fully open system is an oxymoron because systems are, by definition, different from their environ-

ment and must therefore be closed in some respects.²⁰ If there is no locus of differentiation, i.e. if all parts of system A and system B are fully interchangeable, then neither A nor B is a system in any meaningful sense. Similarly, it is hard to come up with an example of a fully closed system, because even the most locked-down, tethered appliance must at least connect with the power grid. Open versus closed is therefore not a binary distinction but a matter of degree. All real-world systems are open in part and closed in others.

Second, computer systems or stacks consist of various layers—hardware, operating system, software, and content—each of which can be more or less open. Should a system like Microsoft Windows that is open at the content and software layers but closed at the operating system layer be labeled open or closed? Zittrain²¹ and Wu say “open,”²² the Free Software Foundation says “closed.”²³ What about platforms such as the Macintosh that are open at the software layer but closed at the operating system and the hardware layers? Zittrain says “open,”²⁴ Wu, Farrell, and Weiser say “closed.”²⁵ Everyone seems to agree that the Kindle, iPod, and TiVo are closed,²⁶ even though they all depend entirely on third party contributions—i.e., openness—at the content layer. Lastly, there is the vexing case of the iPhone/iPad. According to Zittrain, the iPhone was closed from June 2007 to February 2008.²⁷ After that, it turned into a “hybrid system.”²⁸ According to Wu, the iPhone remains “closed” to this day, despite the fact that there are over 100,000 iPhone developers who have created more than 300,000 applications, resulting in over 10 billion downloads.²⁹

As an analytical tool the labels “open” and “closed” are of limited utility, because they cannot adequately capture the complexity of selective openness at various layers of a system within their single binary distinction. Addressing the central antitrust issue requires that we move past the “ready labels” and focus on whether specific vertical restraints at all levels result in anti-competitive exclusion and foreclosure.

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III. The Treatment of Vertical Integration, Vertical Restraints, and Refusals to Interconnect

Vertical arrangements have a long, stormy, and well-documented history in antitrust law and economics. Until the late 1970s, courts and agencies were generally hostile towards vertical arrangements.³⁰ Modularity and open market structures, in which “[m]any firms compete in selling their individual components”³¹

at all levels of production, were the normative ideal. Against that baseline, closed organizations, in which “a single firm, or a small set of firms working hand in glove with one another, undertakes all those activities,”³² were suspect. The hostility towards vertical arrangements led to highly restrictive merger decisions such as *Brown Shoe*³³ or the *per se* illegality of intra-brand territorial distributor restraints.³⁴

Of course, the courts were correct in recognizing undeniable benefits from modularity, such as the ever more efficient production of components and resulting lower prices, superior component performance, and the gradual erosion of entry barriers.³⁵ However, focusing on the benefits of modularity to the exclusion

IF ANTITRUST CONCERNS REGARDING CLOSED SYSTEMS ARE REALLY CONCERNS ABOUT THE COMPETITIVE EFFECTS OF VERTICAL ARRANGEMENTS, AND VERTICAL ARRANGEMENTS ARE AFFORDED GREAT LENIENCY BY THE COURTS, WHAT IS THE BASIS FOR THE RECURRING CRITICISM OF CLOSED SYSTEMS AS POTENTIALLY ANTICOMPETITIVE?

of considering its costs left the courts with an incomplete picture. In its path-breaking 1977 *Sylvania* decision, the Supreme Court acknowledged that modular market structures are also vulnerable to systemic market failures stemming from transaction costs, lack of coordination, opportunism, free-riding, and double marginalization among others.³⁶ Once courts in the 1980s started taking both the benefits and the costs of modularity into account, it became clear that restrictions on access and other vertical restraints are usually a response to such market failures and only in exceptional circumstances driven by aspirations of anticompetitive exclusion.³⁷

Modern antitrust doctrine therefore recognizes that vertical restraints as such are not in an antitrust suspect class. To the contrary, most vertical restraints are pro-competitive, or else the marketplace would punish the firm imposing them. Only if the incumbent has significant market power and the restraint results in meaningful foreclosure can vertical restraints possibly have anticompetitive effects. As a consequence, courts today almost universally apply the rule of reason to all vertical restraints.³⁸

That leaves us with a puzzle. If antitrust concerns regarding closed systems are really concerns about the competitive effects of vertical arrangements, and vertical arrangements are afforded great leniency by the courts, what is the basis for the recurring criticism of closed systems as potentially anticompetitive? Before we can answer that question, we need to address one further complication. Computer platforms, after all, are not quite like nuts and bolts or restraints on bicycle distributors. There is something special about orchestrating the interactions of millions of users—and tens if not hundreds of thousands of hardware- and software developers, content providers, etc. What is it?

IV. Computer Platforms: System and Component Competition

On February 8, 2011, Stephen Elop, CEO of Nokia, sent an email to his employees, shortly before entering into a broad-based alliance with Microsoft to deploy the Windows Mobile operating system on Nokia handsets:

“The battle of devices has now become a war of ecosystems, where ecosystems include not only the hardware and software of the device, but developers, applications, ecommerce, advertising, search, social applications, location-based services, unified communications and many other things. Our competitors aren’t taking our market share with devices; they are taking our market share with an entire ecosystem. This means we’re going to have to decide how we either build, catalyse or join an ecosystem.”³⁹

Elop’s analysis reflects a shift in focus of the competitive interaction from devices to platforms (or ecosystems) and, further, a realization that platforms consist of broad coalitions of participants. Specifically, computer platforms generally consist of (1) the system sponsor, (2) various contributors, and (3) the users.⁴⁰ The system sponsor often contributes, among other things, the underlying platform technology (e.g., the operating system), developer tools, services to facilitate platform transactions (e.g., hosting and billing), platform governance, and related IP.⁴¹ Contributors include hardware and software developers that create platform-specific products, content providers (e.g., publishers, record labels), and services (e.g., Facebook, Twitter, Foursquare). In many instances, the platform sponsor also contributes to the platform by selling its own applications. The users, finally, include buyers of devices, applications, and services and everyone who uses indirectly monetized services on a given platform for free (e.g., Google or Bing search users).

There are two relevant realms of competitive interaction that are connected yet conceptually distinguishable: competition *among* ecosystems and competition *within* a given ecosystem, in other words, inter- and intra-system competition. System sponsors are the primary agents of inter-system competition (sponsor A versus sponsor B). Contributors are the primary agents of intra-system competition (e.g., developer A versus developer B). Problems arise if sys-

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tem sponsors wear multiple hats. In addition to being system sponsors, they may be application developers, hardware vendors, or service providers. This raises the familiar issue of non-integrated single-level competition versus vertically integrated multi-level competition. For example, complaints of platform sponsors giving their own applications an edge through “private” operating system application programming interfaces (“APIs”) or more powerful development tools fall into this category.⁴²

This concern, however, is limited to intra-system competition, because applications written for system A generally do not compete head-to-head with applications for system B, irrespective of whether the developer is vertically integrated or not.⁴³ That said, vertical arrangements within a given platform are not irrelevant in the inter-system context—far from it. Vertical integration within platform A can be among the most important competitive differentiators vis-à-vis platform B if it improves the overall value of the platform for all constituents, including the users. Examining the dual nature of intra-platform rules, promulgated by the platform sponsor, and their simultaneous impact on inter-system competition is key to our assessment of platform competition. It is to those effects that we now turn.

V. Intra-platform Rules with Inter-platform Effects

Every platform needs rules, if only to define the boundary between the system and its environment. Packets sent across the Internet must adhere to the TCP/IP protocols for delivery. In order to write an application for Linux, one must compile it to the Linux APIs. That much is uncontroversial. Some rules, however, go beyond open and well-documented technical standards and more directly limit participation in a given platform. For example, the online job board TheLadders only lists jobs that pay \$100,000 or more and charges job seekers a \$35 fee for applying to a job listing, sharply departing from the industry norm that the job seeker side of the platform is free.⁴⁴ TheLadders uses price as a means to limit user participation. Similarly, Microsoft requires would-be game developers for the Xbox or the Xbox Live Arcade to go through a multi-stage approval process before granting permission to distribute a game.⁴⁵ Why would a multi-sided platform

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limit participation or contributors and users? Given the presence of indirect network effects, isn't more always better?

At first blush, it appears so. Recall that multi-sided platforms generate value by facilitating transactions between at least two constituencies that stand to gain from interacting with one another. Internet search engines are a good example. Google's Jonathan Rosenberg summarizes the business model as follows:

“Users go where the information is so people bring more information to us. Advertisers go where the users are, so we get more advertisers. We get more users because we have more advertisers because we can buy distribution on sites that understand that our search engine monetizes better. So more users more information, more information more users, more advertisers more users, more users more advertisers, it’s a beautiful thing, lather, rinse, repeat, that’s what I do for a living.”⁴⁶

The European Commission adopted the “more is always better” reasoning in its 2010 *Microsoft/Yahoo!* decision and observed that “[i]n order to be successful, a search engine operator will try to attract as many participants on both sides of the platform as possible.”⁴⁷ Why then would any platform sponsor impose rules to *limit* participation—if not for some anticompetitive purpose?

The answer is that some platforms are much more sensitive than Internet search engines to negative externalities created by too many or by the wrong participants. The potential for market failure, in other words, is significant.⁴⁸ Consider the effects of crowding in a two-sided, low-tech platform setting.⁴⁹ An overcrowded nightclub is no fun for male or female patrons—the two constituencies that the venue seeks to connect. To minimize the resulting externalities (as Yogi Berra put it: “No one goes there anymore. It’s too crowded”), nightclubs limit admission and enforce that rule at the door. Now consider the impact of low quality contributions, the negative effects of which are not fully internalized by the contributor. Drunken or rowdy guests spoil the fun for both sides in a nightclub, which is why disorderly patrons are either denied access or are removed once they start being obnoxious. That too is a rule promulgated and enforced by the platform sponsor.

The same principles apply to computer platforms. As a rule, the developers go where the users go, and the users go where the developers go. The resulting positive feedback effect was the basis for the court’s finding of an “application barrier to entry” in the *U.S. v. Microsoft* case.⁵⁰ However, if there are too many applications in the same category, choosing the right one can become costly and time consuming for the users.⁵¹ The incremental search costs for users resulting from crowding on the developer side can be significant.⁵² In addition, if users cannot readily judge the quality of an application before buying it, then they may be unwilling to pay more than an average price for any application. As a result, low-quality contributions by some developers drive down the price for all applications, reduce the value of the platform for both users and competing developers, and diminish the developers’ incentives to invest in high-quality applications. A downward spiral ensues.⁵³

Thus, for many platforms more is not always better. The greater the potential for market failure, the greater the value that a platform sponsor can realize for all participants by imposing rules that limit or exclude those contributions that would diminish the overall value of the platform. In fact, most intra-platform

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restraints likely fall into that category. Such intra-platform restraints are not designed to exclude would-be contributors that happen to also compete with the platform sponsor. Rather, the point of platform rules is to “help coordinate other players [who contribute to the platform] to achieve a better outcome than would be achieved in ungoverned production.”⁵⁴ In other words, the purpose of these intra-platform restraints is to make the platform more competitive vis-à-vis other platforms.⁵⁵

VI. Taxonomy of Common Platform Rules

In the computer platform context, there are common categories of intra-platform restraints with inter-platform effects, including rules about minimum quality, security, privacy, consistency, and technology.

A. QUALITY AND CONTENT RULES

Intra-platform rules ensuring quality are ubiquitous. In the gaming console space, Microsoft, Sony, and Nintendo all require developers to complete a multi-step process from concept approval to final testing to ensure the quality of a game prior to its release.⁵⁶ The problem that the sponsors seek to solve is that low-quality contributors do not fully internalize the costs that they impose on the more committed platform participants and might therefore have incentives to release poor products, turn a quick profit, and have other platform constituents suffer the consequences. Quality control has thus long been recognized as a bona fide business justification for vertical restraints and refusals to deal.⁵⁷ In the franchise context, franchisors are free to impose detailed “brand standards” on a franchisee’s business operations, even though such restraints clearly limit the dimensions of competition among franchisees and possibly between franchisees and the franchisor as well.⁵⁸

Content restraints are special cases of intra-platform quality rules. For example, Google’s sponsored search network AdWords has extensive “Content Guidelines” that prohibit advertisers from promoting liquor, tobacco, “the promotion of revisionist concepts,” etc.⁵⁹ Apple’s App Store Guidelines impose similar restrictions on iOS developers, rejecting applications that “portray[] realistic images of people or animals being killed or maimed, shot, stabbed, tortured or injured;” that “depict violence or abuse of children;” or that contain pornographic material.⁶⁰ Those rules have at times been singled out for criticism.⁶¹ However, the basis for such content restrictions—a newspaper would call them editorial

policies—is not to avoid competition but to create and maintain a distinctive platform identity or brand. Legislating and enforcing content rules are attempts by the platform sponsor to balance the interests of various constituencies with the goal of maximizing the overall value of the platform to better compete against rival platforms.

B. SECURITY RULES

Malware, i.e. malicious code that is executed on a machine unbeknownst to its user, is among the most serious threats to any computer platform.⁶² Malware can be used to steal a user's banking information and passwords or to press a user's PC into the service of a botnet to distribute spam or participate in distributed denial of service attacks. The first major malware incident on a mobile platform was reported in March 2011, when Google confirmed, “that 58 malicious applications were uploaded to Android Market, and that they were downloaded onto around 260,000 devices.”⁶³

Platform sponsors have long struggled with the problem of online security. Some are promoting *ex post* solutions, e.g., Microsoft offers a virus- and malware scanner as a free download.⁶⁴ Going one step further, Google's Android operating system includes a “kill signal,” to remotely remove infected applications from users' devices.⁶⁵ The problem with all *ex post* solutions is, however, that they cannot, by definition, protect against new threats, and that removing an infected application does not reliably disinfect already compromised devices. Apple has taken a different approach to improving security on iOS devices by screening all applications for malware prior to releasing them for download into the App Store.

RELATIVE PLATFORM SECURITY
IS AN IMPORTANT COMPETITIVE
DIFFERENTIATOR.

Relative platform security is an important competitive differentiator, as evidenced by scores of news articles and blog posts comparing the relative benefits of Android's *ex post* approach to the security benefits of Apple's *ex ante* approach, in the wake of the Android malware incident.⁶⁶ Such differentiation is once again realized through intra-platform developer restraints⁶⁷ and, in the case of Apple, the vertical integration of the App Store into the iOS. Viewing intra-platform security rules as restraints on developers only, without considering the effects on other platform participants and on inter-platform competition, would thus result in an incomplete and misleading assessment of their competitive effects.

C. PRIVACY RULES

Online privacy policies and privacy-respecting architectures have increasingly become a factor of competitive differentiation as well. In September 2008, Google cut back the retention period for IP addresses on server logs from 18 months to 9 months “to protect user privacy.”⁶⁸ Yahoo! responded quickly by cut-

ting back its retention time from 13 months to 90 days.⁶⁹ More recently, user privacy concerns—backed by the threat of regulatory intervention—led to numerous changes in Facebook’s privacy policies.⁷⁰ DuckDuckGo, an Internet search engine, has made user privacy its tagline (“We don’t track you!”) in an attempt to differentiate its service from Google.⁷¹ Similarly, FTC Commissioner Thomas Rosch has identified the need to balance consumer privacy and vigorous competition “as the most significant issue on the horizon in the high-tech sphere.”⁷²

Platforms compete along the privacy dimension through (a) privacy policies between the sponsor and the users and (b) sponsor-imposed intra-system restraints on developers and content publishers. These agreements and restraints seek to balance the privacy interests of users against the monetization interests of developers and advertisers. Clearly, such intra-platform rules translate into inter-platform competition for users and developers.⁷³

D. TECHNOLOGY RULES

Platform sponsors must determine what technologies to include in their platforms. For example, Microsoft had to decide what graphics library to include in the Xbox. That choice is made with both the contributors and the users in mind. The platform technologies must be able to deliver a compelling experience to the users but, in order to do so, they must first win the support of the developers. In the case of the Xbox, Microsoft chose to build the platform around its own DirectX graphics engine rather than OpenGL, a rival graphics library with broad developer support.

Can such choices be exclusionary? In the case of a “startup” platform, the answer will almost always be no. If there is no market power in the platform market, then the sponsor should be free to integrate whatever technologies it pleases, including its own. Now suppose that the platform becomes highly successful and achieves monopoly power. Would a requirement to keep using the sponsor-provided platform technologies at the expense of rival technologies be exclusionary?

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In most instances, the answer will be no as well. Even for those technology mandates that could amount to exclusionary conduct under Section 2, there will often be compelling business justifications for a platform sponsor to manage the overall technology path by limiting alternative choices by developers and other contributors. Consistency of the user experience across applications can be a compelling reason, in particular if the platform vendor introduces a new, distinctive interface. So are privacy and security concerns, as discussed above. Similarly, maintaining a stable, predictable platform core simplifies application development, as developers do not have to customize their software for different hardware configurations.⁷⁴

Other technology restrictions—e.g., native development-only requirements—that prohibit developers from using cross-platform intermediation layers may also be justified. Intermediation layers sit between the platform’s operating system APIs and the applications. Instead of writing applications directly for a given operating system, developers write applications for the intermediation layer, which then connects to the operating system. The main benefit of cross-platform intermediation is that developers can run the same code on multiple platforms. Without cross-platform intermediation, developers would have to “port” their programs from one platform to another, which—depending on the program—can be rather time and labor intensive.⁷⁵ Why would a platform sponsor want to limit the use of such intermediation layers?

From a platform sponsor’s perspective, there are two related concerns.⁷⁶ First, widespread use of an intermediation layer by developers may require the platform sponsor to delay operating system or hardware innovation until the vendor has made the intermediation layer compatible with the upgrade. Second, many new operating system or hardware features may not be adopted by developers and thus remain invisible to users until the vendor chooses to expose the new features to developers in the intermediation layer.

These concerns are particularly serious for smaller and/or highly innovative platforms. Suppose that an intermediation layer runs on platforms A, B, and C. Platform C accounts for 5 percent of the layer’s installations and is innovating rapidly. In that case, the vendor’s incentives to upgrade the intermediation layer in lockstep with C is significantly weaker than the incentives of native platform C developers. The intermediation layer vendor’s incentive is to maintain maximum compatibility across platforms, not maximum quality on any given platform.

Sponsors of platforms whose success depends on rapid innovation may thus have strong business justifications for requiring developers to write native applications and not use intermediation layers, as rapid platform innovation and close-in-time exposure of new features to users are key attributes of inter-platform competition.⁷⁷

SPONSORS OF PLATFORMS WHOSE SUCCESS DEPENDS ON RAPID INNOVATION MAY THUS HAVE STRONG BUSINESS JUSTIFICATIONS FOR REQUIRING DEVELOPERS TO WRITE NATIVE APPLICATIONS AND NOT USE INTERMEDIATION LAYERS.

VII. Calibrating Antitrust Policy in the Systems Competition Context

Our initial question whether “closed” systems are inherently anticompetitive can be restated as follows: “Is there a reason to believe that intra-platform restraints imposed by the platform sponsor on various contributors are commonly exclu-

sionary?” To that question, the answer is no. Is it possible that such restraints can lead to anticompetitive exclusion? Yes, but not unless the platform has significant market power vis-à-vis rival platforms.

A. AS A POLICY MATTER, “OPEN” IS NOT NECESSARILY BETTER THAN “CLOSED”

From a competition policy point of view, the assumption that “open” is necessarily preferable to “closed,” requires some qualification.

First, we should not lose sight of the fact that the two great information monopolies of the Internet Age (as of Spring 2011), Microsoft and Google, have both been sponsors of open systems. Both firms succeeded in dominating broad horizontal layers of their respective stacks: the PC and the internet. Microsoft Windows, protected by the applications barrier to entry that its open developer access policies enabled, monopolized the operating system layer.⁷⁸ Google has become the “current custodian of the [internet’s] Master Switch”⁷⁹ as the dominant provider of algorithmic and sponsored search.⁸⁰ Less “open” platforms such as Facebook, Apple, and Twitter have remained in much more narrow verticals that dissatisfied customers and competitors can more easily avoid.

Second, while an “open monopolist” will generally be preferable to a “closed monopolist” from an antitrust policy standpoint, it is by no means clear that open systems are preferable to closed systems in competitive markets. For example, in the 1980s, before the Windows/Intel systems came to dominate the PC

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space, there was intense competition among vertically integrated home computing firms, including Sinclair, Altair, Tandy, Commodore, Atari, Texas Instruments, Sharp, Apple, and many more, each of which sold “the whole widget.” The competing systems were incompatible, which limited their value to users and developers alike.

However, for the same reason, innovation by the platform sponsor was not limited to a single layer of the system architecture. Each firm competed on the value of the entire ecosystem. The rapid pace of innovation that users and developers enjoyed in this golden age of closed computer systems competition remains somewhat underappreciated in today’s discussion. Yes, the open Windows/Intel PC blew away the competing walled gardens in much the same manner that the open internet blew away CompuServe, Prodigy, and AOL. But the new “open” era, for all its undeniable benefits, also ushered in decades of monoculture—replacing a wildly diverse collection of ecosystems, teeming with radical innovative experiments at all levels, with relative heterogeneity.

B. MONOPOLY POWER IS A THRESHOLD ISSUE FOR ANY CONCERNS OVER “CLOSED” SYSTEMS

Intra-system restraints are most comparable to vertical restraints such as franchise regulations and brand standards. Some rules may also resemble selective refusals to deal and cases about technological innovation that breaks or limits compatibility with third-party contributions. All these doctrinal categories share a market power requirement, either as part of a Section 1 rule of reason inquiry or as part of a Section 2 monopolization case. Without significant market power and the threat of a high level of market foreclosure, there is no basis for imposing antitrust liability on a platform sponsor’s “intra-platform legislation.”

This fundamental point does not always receive proper attention. For example, in *The Master Switch*, Wu proposes a “Separations Principle” to keep closed systems from taking over the information sector.

“[A Separations Principle] would mean that those who develop information, those who own the network infrastructure on which it travels, and those who control the tools or venues of access must be kept apart from one another. . . . [The resulting priorities for antitrust enforcement] must be both the prevention and dissolution of large-scale vertical mergers in the communications industry.⁸¹”

The Separations Principle amounts to a general rule against vertical integration in the information sector irrespective of market power, foreclosure, and efficiencies. Such a sweeping rule requires extraordinarily strong justifications, which Wu fails to provide. In fact, our analysis of the competitive effects of open and closed systems does not suggest that closed systems pose anywhere near the level of concern that would justify such a radical expansion of antitrust market regulation.⁸²

C. THERE ARE NO SHORTCUTS FOR A FINDING OF MONOPOLY POWER

Users and developers engage with platforms over time. They join a platform with certain expectations about its evolution, make follow-on investments in time, money, and expertise, periodically recommit (e.g., when a new device is rolled out or an operating system gets a major version release), or move on to other platforms.

Plaintiffs have taken snapshots of this fluid multi-party platform relationship and recast it as a simple two-step purchasing pattern. First, or so the argument goes, users and developers choose among available platforms (inter-platform

choice). Second, following the platform commitment, they choose from among the options available on the platform (intra-platform choice). The choice sets for each step may be very different. For example, a developer seeking to enter the mobile application business may choose among Android, Apple, RIM, Windows Mobile, WebOS, and other platforms. Clearly, there is abundant choice at the inter-platform level. Once the developer has committed to a platform, however, its options within that platform may be limited by platform rules, technologies, the platform’s user base, etc.⁸³

Under this snapshot approach, the two-step purchasing pattern then serves as the basis for applying a *Kodak*-style single-product aftermarket theory.⁸⁴ The platform is the foremarket, and everything else is part of various aftermarkets. To the extent that the platform sponsor participates in those aftermarkets and reserves certain business opportunities for itself (e.g., by regulating the behavior of other contributors or various forms of technological integration), it has been cast as a putative monopolist.⁸⁵

A closer examination reveals that any similarities between *Kodak*-style aftermarkets and computer platforms are superficial and uninformative.

First, while “Kodak’s sale of its product involved no contract framework for ongoing relations,”⁸⁶ users and developers enter into long-term relationships with the platform sponsor. Unlike the buyer of a copier, users and developers join evolving ecosystems with potentially tens of thousands of contributors and a “platform government” whose job it is to—more or less—actively manage the overall platform path by constantly fine-tuning the rules governing the relationship among the platform constituents. In other words, if it is reduced to a series of spot transactions, then something important about the long-term nature of platform engagement is lost.

A CLOSER EXAMINATION REVEALS
THAT ANY SIMILARITIES BETWEEN
KODAK-STYLE AFTERMARKETS AND
COMPUTER PLATFORMS ARE
SUPERFICIAL AND UNINFORMATIVE.

Second, and relatedly, buyers of copiers may have certain expectations of stability, both in terms of the functionality of the product and its general service environment. In contrast, users, developers, and platform sponsors all expect change, even with respect to core functionalities of the devices that define the platform. Copiers don’t fundamentally change over the course of their useful life, but computers do. After all, as Zittrain correctly observes, computers are generative devices. The same is true with respect to the rules governing use and contributions. End user license agreements are amended frequently and so are developer terms as the ecosystem adapts to internal and external challenges.⁸⁷

Third, the *Kodak* court was concerned about “a less responsive connection” between the equipment market and the aftermarkets for parts and services as a result of information and switching costs.⁸⁸ In other words, *ex ante* buyer ignorance about the value of third-party aftermarket contributions creates the opportunity

for *ex post* exploitation. Because of that, or so the theory goes, equipment vendors have no incentives to educate the buyer at the time of the equipment purchase.

The incentives of most computer platform sponsors are completely different. User ignorance about the value of third-party contributions is a serious problem, not a business opportunity. As a result, platform sponsors aggressively advertise developer contributions. The iPhone is more attractive because “[t]here is an app for that.” Android is more attractive because “Droid does apps.” Microsoft advertises third party games for the Xbox. Sony and Nintendo do the same. Platform sponsors that are not merely selling “a device” but the value of the entire ecosystem have strong incentives to create highly responsive connections between the platform and third party contributions—to the point that a temporal distinction between the two (“first platform, then third-party contribution”) becomes artificial at best and misleading at worst. “Joining a platform” means entering a web of evolving, long-term relationships that jointly create the competitive value of a platform. It is that value that determines the initial platform choices of users and developers and that underwrites their continued support.

AFTERMARKET THEORIES
ARE LIKELY TO MISCHARACTERIZE
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OF COMPUTER PLATFORMS
AND SUGGEST MONOPOLY
PROBLEMS WHERE THERE
ARE NONE.

As a result, aftermarket theories are likely to mischaracterize the competitive environment of computer platforms and suggest monopoly problems where there are none.⁸⁹ Courts have reacted to a similar “false positive” problem in the context of franchise agreements by rejecting aftermarket theories where the source of the franchisor’s power is based on an agreement.⁹⁰ Computer systems deserve at least the same level of deference. There are no shortcuts to a finding of real, as opposed to imputed, inter-platform market power.

D. ADVERSE EFFECTS OF INTRA-PLATFORM RESTRAINTS ON ONE CONSTITUENCY MUST BE BALANCED AGAINST EFFECTS ON OTHER CONSTITUENCIES AND AGAINST INTER-PLATFORM EFFECTS

The antitrust evaluation of open and closed platforms should focus on real (not aftermarket–imputed) market power in the inter-platform space and the net competitive effect of the intra-platform rule(s) under consideration.

- (1) If there is no meaningful inter-platform market power, then regulatory intervention is unwarranted. There is no reason to view intra-platform rules less favorably than other vertical intra-brand restraints.
- (2) If there is significant inter-platform market power, then any meaningful competitive effects from the intra-platform rule *vis-à-vis* the restrained platform constituency should be balanced against (a) benefits that the rule confers upon other platforms constituencies and (b) its positive effects (if any) on inter-platform rivalry.⁹¹

At bottom, the bad reputation of closed systems or walled gardens in the “open versus closed” debate is quite undeserved. Walled gardens generally benefit their environments—both in the real world and the digital realm. The primary purpose of a garden wall, after all, is to shelter plants from wind and frost, not to keep intruders out.⁹² In the protected space of the garden, flowers can grow that would not otherwise survive in the wild. Walled gardens thus deliberately create a microcosm that is different from the surrounding ecosystem. Therefore, as long as the garden does not take over the entire ecosystem, walled gardens increase, not reduce, overall diversity. From a competition policy perspective, enjoying the fruits of a walled garden is generally not a guilty pleasure. ▼

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- 1 Jonathan Zittrain, *The Future of the Internet And How To Stop It* (2008) (“Future”), available at <http://futureoftheinternet.org/>.
 - 2 Ed Felten, *iPad to Test Zittrain’s ‘Future of the Internet’ Thesis, Freedom To Tinker* (February 4, 2010), available at <http://www.freedom-to-tinker.com/blog/felten/ipad-test-zittrains-future-internet-thesis>
 - 3 Zittrain, *Future*, *supra* note 1 at 3.
 - 4 *Id.* at 90.
 - 5 TIM WU, *THE MASTER SWITCH: THE RISE AND FALL OF INFORMATION EMPIRES*, p. 6 (2010) (“The Master Switch”).
 - 6 *Id.* at 296.
 - 7 *Id.* at 296 - 97. Another civic virtue of generative systems is their greater resilience against government control, because there is no single point of failure, no single door that the governments of the world could knock on to silence unwelcome speech. Zittrain, *A Fight over Freedom at Apple’s Core*, *FINANCIAL TIMES* (February 3, 2010), available at <http://www.law.harvard.edu/news/2010/02/04-zittrain-apple.html>. The recent experiences in China, Egypt, Iran, Libya, and Tunisia, and the U.S. government’s response to the release of U.S. diplomatic cables by Wikileaks have brought this particular aspect of the “open versus closed” debate into the spotlight. However, as Adam Thierer persuasively argues, “[i]nstead of imposing restrictions on code or coders to limit regulability, we should instead place more constraints on our government(s).” Adam Thierer, *The Case for Internet Optimism, Part 2: Saving the Net from its Supporters*, in: BERIN SZOKA & ADAM MARCUS, *THE NEXT DIGITAL DECADE*, p. 148 (2010), available at http://nextdigitaldecade.com/ndd_book.pdf. In any event, the close connection to civic values and underlying political philosophies is no doubt a reason for the occasional rhetorical overheating of the debate.
 - 8 Zittrain, *Future*, *supra* note 1 at 79.
 - 9 *Id.*, at 89.
 - 10 “[T]here’s a lot of stuff I would do for free that I wouldn’t do for a pittance.” Cory Doctorow (<http://www.craphound.com>), quoted in: Matt Cowan & Georgina Prodhon, *Wikipedia founder sees biggest impact yet to come*, *REUTERS* (January 11, 2011), available at <http://www.reuters.com/article/2011/01/14/us-wikipedia-wales-idUSTRE70D31X20110114>.
 - 11 Jonathan Zittrain, *Protecting the Internet Without Wrecking It: How to Meet the Security Threat*, in: BERIN SZOKA & ADAM MARCUS, *THE NEXT DIGITAL DECADE*, p. 98 (2010).

- 12 Tim Berners-Lee, *Long Live the Web: A Call for Continued Open Standards and Neutrality*, SCIENTIFIC AMER. (November 22, 2010), available at <http://www.scientificamerican.com/article.cfm?id=long-live-the-web>.
- 13 Jonathan Rosenberg, *The Meaning of Open*, Official Google Blog (December 21, 2009), available at <http://googleblog.blogspot.com/2009/12/meaning-of-open.html>. That view is not universally shared. See, e.g., Brian Prentice, *The Truth of Open*, Gartner Blog Network (December 22, 2009), available at http://blogs.gartner.com/brian_prentice/2009/12/22/the-truth-of-open/. ("The truth is that closed systems still win. Open systems, practically speaking, are basically good for making others lose.")
- 14 Tim Wu, quoted in: Nick Bilton, *One on One: Tim Wu, Author of The Master Switch*, N.Y. TIMES (November 14, 2010), available at <http://bits.blogs.nytimes.com/2010/11/14/one-on-one-tim-wu-author-of-the-master-switch/>.
- 15 Tim Wu, *How Apple's Closed Ways Could Land It Into Antitrust Trouble*, TECHCRUNCH (November 20, 2010), available at <http://techcrunch.com/2010/11/20/apple-antitrust/>.
- 16 *Id.*
- 17 Tom Conlon, *The iPad's Closed System: Sometimes I Hate Being Right*, popsci.com (Jan. 29, 2010), available at <http://www.popsci.com/gadgets/article/2010-01/ipad's-closed-system-sometimes-i-hate-being-right>. The "open v. closed" debate is not limited to computer systems. In the context of the proposed acquisition of NYSE Euronext by Deutsche Börse AG, Commissioner Joaquin Almunia stated: "I tend to prefer models that are not a vertical silo. . . . This creates more competition, more opportunities and this [i.e., NYSE's] more open business model—together with interoperability—from the competition point of view is the preferred one." Aofi White, *Deutsche Boerse, NYSE Deal Faces Lengthy EU Antitrust Review, Almunia Says*, Bloomberg.com (March 22, 2011), available at <http://www.bloomberg.com/news/2011-03-22/deutsche-boerse-nyse-deal-faces-lengthy-eu-review-competition-chief-says.html>.
- 18 The civic and political aspects of the open versus closed debate are beyond the scope of our discussion. Of course, a neat separation of economic and civic matters is not always possible, but focusing on one aspect of a phenomenon does not deny the existence or the significance of other aspects. One can, without contradiction, support open systems as a matter of civic commitment and, at the same time, conclude that antitrust regulation is not the right tool to promote their adoption.
- 19 Michael Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERS. 93 (1994), available at http://socrates.berkeley.edu/~scotch/katz_shapiro.pdf.
- 20 NIKLAS LUHMANN, SOCIAL SYSTEMS (1996); G. SPENCER-BROWN, LAWS OF FORM (1969).
- 21 Zittrain, Future, *supra* note 1 at 16-17.
- 22 Wu, *The Master Switch*, *supra* note 5 at 279 ("The victory of PCs and Windows over Apple was viewed by many as the defining parable of the decade; its moral was 'open beats closed.'").
- 23 See, e.g., John Sullivan, *Free software is a matter of liberty, not price*, Free Software Foundation (March 7, 2011), available at <http://www.fsf.org/about/> and *Windows 7 Sins* (last accessed March 5, 2011), available at: <http://en.windows7sins.org/>.
- 24 Zittrain, Future, *supra* note 1 at 16 ("Windows PCs, like the Mac OS and Linux counterparts . . . welcome code from any source.").
- 25 Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J. LAW & TECH. 85, 92

- (2003), available at <http://ssrn.com/abstract=452220> or doi:10.2139/ssrn.452220 (“Apple [with the 1984 Macintosh] relied on a closed business model.”). Wu, *The Master Switch*, *supra* note 5 at 276-78 (Steve Jobs’ “decision to close the Macintosh contributed significantly to making Bill Gates the richest man on earth.”).
- 26 See, e.g., Zittrain, *Future*, *supra* note 1 (Locked-down devices include “iPods, most video game consoles, e-book readers like the Amazon Kindle, and cable-company set-top boxes); at 64 (TiVo as “information appliance”); at 77 (“[I]t is nearly impossible for the Linux PC inside a TiVo to run anything but the code that TiVo designates for it”); Joe Brockmeier, *Amazon, Open the Kindle before Apple eats your lunch*, ZDNET (October 2, 2008), available at <http://www.zdnet.com/blog/community/amazon-open-the-kindle-before-apple-eats-your-lunch/114> (“Since the Kindle is a closed platform, Amazon misses out on driving sales through add-on applications that could add value to its device.”)
- 27 Zittrain, *Future*, *supra* note 1 at 2-3. In February 2008, Apple opened the iPhone to third-party software developers.
- 28 Zittrain, *A Fight over Freedom at Apple’s Core*, *supra* note 7 (“The iPhone’s hybrid model of centrally controlled outside software is already moving beyond the smart phone.”).
- 29 See Wikipedia entry for “App Store,” available at http://en.wikipedia.org/wiki/App_Store (last accessed March 10, 2011).
- 30 See e.g., Joseph Farrell & Philip J. Weiser, *supra* note 25, at 87 (2003); HERBERT HOVENKAMP, *THE ANTITRUST ENTERPRISE: PRINCIPLE AND EXECUTION*, pp. 182, 207 (2005).
- 31 Joseph Farrell, Hunter K. Monroe, & Garth Saloner, *The Vertical Organization of Industry: Systems Competition versus Component Competition*, 7 *J. ECON. & MANAG. STRAT.* 143, 144 (1998).
- 32 *Id.*
- 33 *Brown Shoe v. United States*, 370 U.S. 294 (1962).
- 34 *U.S. v. Arnold, Schwinn & Co.*, 388 U.S. 365, 379 (1967).
- 35 Joseph Farrell & Philip J. Weiser, *supra* note 25 at 95 (“Modular industry structures enable independent firms to introduce innovations into an established environment. An open architecture can facilitate innovation in individual components, spur market entry, and result in lower prices.”).
- 36 *Continental T.V. v. GTE Sylvania*, 433 U.S. 36 (1977); *Business Electronic Corp. v. Sharp Electronics Corp.*, 485 U.S. 717, 725 (1988).
- 37 William E. Kovacic & Carl Shapiro, *Antitrust Policy: A Century of Economic and Legal Thinking*, 14 *J. ECON. PERSPECTIVES* 43, 53-54 (2000), available at <http://faculty.haas.berkeley.edu/shapiro/century.pdf>.
- 38 *Leegin Creative Leather Products, Inc. v. PSKS, Inc.*, 551 U.S. 877 (2007). Doctrinally, tying, a vertical inter-brand restraint, still exists as a per se offense, hence the hedge (“almost universally”). However, tying is per se illegal only in name, as per se tying first requires proof that the supplier possesses significant market power over the tying product. That, of course, renders the per se label all but meaningless. The point of a per se offense is that the conduct is illegal irrespective of market power. See generally, AREEDA & HOVENKAMP, *ANTITRUST LAW* ¶1702 (2011 Online Edition).
- 39 Quoted in Chris Ziegler, *Nokia CEO Stephen Elop rallies troops in brutally honest ‘burning platform’ memo?*, ENGADGET (February 8, 2011), available at <http://www.engadget.com/2011/02/08/nokia-ceo-stephen-elop-rallies-troops-in-brutally-honest-burnin/>.

- 40 See Thomas Eisenmann, Geoffrey Parker, & Marshall Van Alstyne, *Opening Platforms: How, When, Why?* 3 (2008 Working Paper), *available* at <http://ssrn.com/abstract=1264012>.
- 41 The sponsor may be a single firm, as is usually the case with proprietary platforms, an organization (e.g., the Mozilla Foundation), or a loosely organized group of contributors (e.g., Linux).
- 42 For examples from console game development, see DAVID EVANS, ANDREI HAGIU, & RICHARD SCHMALENSEE, *INVISIBLE ENGINES: HOW SOFTWARE PLATFORMS DRIVE INNOVATION AND TRANSFORM INDUSTRIES*, p. 130 (2006) (“Invisible Engines”).
- 43 The availability of (killer-) application X on platform A, however, may well be an important element of inter-platform competition. E.g., every mobile computing platform is going out of its way to advertise the availability of Facebook and Twitter clients.
- 44 See www.theladders.com (last accessed, March 10, 2011). The vast majority of the literally hundreds of competing platforms only charge the employers.
- 45 See, e.g., Microsoft, “Developing for Xbox LIVE Arcade,” *available* at <http://www.xbox.com/en-US/Community/Developer/DevelopingForLiveArcade> (last accessed, March 5, 2011).
- 46 Jonathan Rosenberg, quoted in: Google, *Inside the Black Box Technology and Innovation at Google* (February 27, 2008), *available* at <http://bit.ly/jrosenberg2008>.
- 47 Case No COMP/M.5727—Microsoft/Yahoo! Search Business (2010), ¶¶ 47-48.
- 48 Kevin J. Boudreau & Andrei Hagiu, *Platform Rules: Multi-sided Platforms as Regulators*, Working Paper 3, 5 (2008), *available* at <http://ssrn.com/abstract=1269966>. (“Hypothesis 1: Markets around [Multi-Sided Platforms] are riddled with externalities and other sources of coordination problems.”).
- 49 Evans, Hagiu, & Schmalensee, *INVISIBLE ENGINES*, *supra* note 42 at 3.
- 50 *U.S. v. Microsoft*, 253 F.3d 34, 55 (D. C. Cir. 2001).
- 51 A same-side effect of crowding, akin to a pecuniary externality, is “too much competition” among developers, making competing platforms with fewer users relatively more attractive. As a result, there may be same-side intra-platform limits to growth that a platform sponsor may seek to minimize, e.g., by limiting the number of applications in a given category.
- 52 Significant enough to provide a business opportunity for application discovery services such as Chomp, *available* at <http://www.chomp.com>.
- 53 See, e.g., RICHARD IPPOLITO, *ECONOMICS FOR LAWYERS*, p. 284 (2005). This particular type of market failure in which bad products drive out good products as a result of information asymmetries is sometimes referred to as the “lemons problem.”
- 54 Boudreau & Hagiu, *Platform Rules*, *supra* note 48 at 5.
- 55 If nightclub A imposes intra-platform restraints on contributions by turning away disorderly patrons, it does so to compete more effectively against other nightclubs. If nightclub A gains a reputation for “safety,” then nightclub B will either have to impose similar rules (“we’re just as safe if not safer”), differentiate its offering through more lenient rules (“everyone’s welcome”), or differentiate its offering through rules emphasizing different aspects of the nightclub experience (“A may be safer, but B is more fun”).

- 56 Evans, Hagiü, & Schmalensee, *Invisible Engines*, *supra* note 42 at 125-136. The specter of Atari’s downfall in 1982–83, caused in part by low-quality third party cartridges and the poor performance of the Pac-Man and E.T. titles on the VCS 2600, still haunts the gaming industry. STEVEN KENT, *THE ULTIMATE HISTORY OF VIDEO GAMES*, pp. 236, 238-39 (2001). See also Boudreau & Hagiü, *Platform Rules*, *supra* note 48 at 1.
- 57 See, e.g., *U.S. v. Microsoft Corp.*, 253 F.3d 34, 59 (D.C. Cir. 2001); *Aspen Highlands Skiing Corp. v. Aspen Skiing Co.*, 472 U.S. 585, 608-12 (1985).
- 58 See generally, HOVENKAMP, *THE ANTITRUST ENTERPRISE*, pp. 204-6 (2005).
- 59 See Google’s Advertising Policies Content Guidelines, *available* at <http://adwords.google.com/support/aw/bin/static.py?hl=en&topic=28436&guide=28435&page=guide.cs> (last accessed March 3, 2011).
- 60 Apple App Store Review Guidelines at §§ 15-16, 18-19.
- 61 See, e.g., Tim Bray, *Now a No-Evil Zone*, tbray.org (Mar. 15, 2010) (“The iPhone vision of the mobile internet’s future omits controversy, sex, and freedom, but includes strict limits on who can know what and who can say what. . . . I hate it.”), *available* at <http://www.tbray.org/ongoing/When/201x/2010/03/15/Joining-Google>.
- 62 Zittrain, *Future*, *supra* note 1 at 36-61.
- 63 Jason Kincaid, *Google Responds To Android Malware, Will Fix Infected Devices And ‘Remote Kill’ Malicious Apps*, *TECHCRUNCH* (March 5, 2011), *available* at: <http://techcrunch.com/2011/03/05/android-malware-rootkit-google-response/>.
- 64 <http://www.microsoft.com/security/pc-security/windows7.aspx>.
- 65 Jason Kincaid, *Google Responds*, *supra* note 63.
- 66 See, e.g., Dan Goodin, *Android Malware attacks show perils of Google openness*, *THE REGISTER* (March 4, 2011), *available* at http://www.theregister.co.uk/2011/03/04/google_android_market_peril/; Joseph Menn, *Google Disables Android Malware*, *FINANCIAL TIMES* (March 7, 2011), *available* at: <http://www.ft.com/cms/s/0/f04a88b8-48ea-11e0-af8c-00144feab49a.html#axzz1GcEHOURW>. As to online payments for app purchases, convenience and security are the users’ primary concerns, see *THE NIELSEN COMPANY*, *THE STATE OF MOBILE APPS 5* (2010), *available* at <http://blog.nielsen.com/nielsenwire/wp-content/uploads/2010/09/NielsenMobileAppsWhitepaper.pdf>.
- 67 See, e.g., *Apple App Store Review Guidelines*, §2.4 (“Apps that include undocumented or hidden features inconsistent with the description of the app will be rejected”).
- 68 Peter Fleischer, Kane Horvath, & Alma Whitten, *Another step to protect user privacy*, *Official Google Blog* (August 9, 2008), *available* at <http://googleblog.blogspot.com/2008/09/another-step-to-protect-user-privacy.html>.
- 69 Anne Toth, *Your data goes incognito*, *YODEL ANECDOTAL* (December 17, 2008), *available* at <http://ycorpblog.com/2008/12/17/your-data-goes-incognito/>
- 70 Facebook’s privacy policy is *available* at <http://www.facebook.com/policy.php> (last visited March 12, 2011). For a summary of reactions to recent changes see e.g., Brennon Slattery, *Facebook’s Privacy Changes Get Mixed Reviews*, *PC WORLD* (May 27, 2010), *available* at http://www.pcmag.com/article/197359/facebook_privacy_changes_get_mixed_reviews.html.
- 71 <http://duckduckgo.com/privacy.html> (last accessed, March 1, 2011).

- 72 J. Thomas Rosch, Intel, Apple, Microsoft, and Facebook: Observations on Antitrust and the High-Tech Sector 20 (November 18, 2010), *available* at <http://ftc.gov/speeches/rosch/101118fallforum.pdf>.
- 73 Privacy restraints also reflect differences in the relative bargaining power of platform constituencies across platforms. For example, Apple's relatively strong commitment to user privacy is undoubtedly influenced by the fact that payments from users account for 93 percent of Apple's revenues. (See Apple, Inc. 2010 Annual Report, filed Sep. 29, 2010 on Form 10-K, p. 33.) By the same token, Google's relatively weak privacy rules reflect the business reality that 97 percent of Google's revenues come from advertisers. (Google, Inc. 2009 Annual Report, filed Feb. 12, 2010 on Form 10-K, p. 37).
- 74 Evans, Hagiu, & Schmalensee, *INVISIBLE ENGINES*, *supra* note 42 at 197, 331 ("[S]tandardizing software platforms tends to help both users and applications developers").
- 75 Much depends on the developer's skill and the project design. All else being equal, native development will yield better performance. Thus, many developers who target multiple platforms design their projects for easy portability from the ground up, which is considered good programming practice. For example, John Carmack, the legendary id Software programming lead, ported Quake to OpenGL by himself in a weekend. DAVID KUSHNER, *MASTERS OF DOOM*, p. 227 (2004).
- 76 Probably the best-known example of a platform sponsor attempting to limit the use of an intermediation layer involved Microsoft's attacks on Java in the mid-1990s. According to the D.C. Circuit, Microsoft feared that Java, combined with the Netscape browser, could erode the applications barrier to entry and, further down the road, mature into an alternative to the Windows operating system itself. Some of Microsoft's anti-Java actions were thus found to constitute unlawful monopoly defense under Section 2. With the benefit of hindsight, we now know that this concern was most likely overblown. Moreover, the Microsoft case is somewhat atypical, as intermediation layers are usually more limited than Java and even less likely to evolve into replacements of full-fledged operating systems. *U.S. v. Microsoft*, 253 F.3d 34, 74-77 (D. C. Cir. 2001).
- 77 In this context, see Michael Katz & Carl Shapiro, *Systems Competition*, *supra* note 19 at 95 ("It is tempting, but misleading, to view incompatibility as just another coordination failure. Although compatibility has obvious benefits, obtaining and maintaining compatibility often involves a sacrifice in terms of product variety or restraints on innovation."); Joseph Farrell & Philip J. Weiser, *Modularity*, *supra* note 25 at 99 ("Innovation can require changing the platform/application interface, which can be a slow process if an industry relies on open standards and open interfaces. In such cases, hand-in-glove coordination between the platform sponsor and one or more complementors can accelerate innovation.")
- 78 *U.S. v. Microsoft*, 253 F.3d 34, 57 (D. C. Cir. 2001).
- 79 Wu, *The Master Switch*, *supra* note 5 at 279.
- 80 U.S. DOJ, Yahoo! Inc. and Google Inc. Abandon Their Advertising Agreement (November 5, 2008), *available* at <http://www.justice.gov/opa/pr/2008/November/08-at-981.html>.
- 81 Wu, *The Master Switch*, *supra* note 5 at 304, 311.
- 82 See also, Adam Thierer, *Thoughts on Wu's Master Switch, Part 6*, *TECHLIBERATION* (November 2, 2010), *available* at <http://techliberation.com/2010/11/02/thoughts-on-wu-s-master-switch-part-6-his-audacious-information-industrial-policy/>.
- 83 This stylized view ignores multi-homing by both users and developers, which is common on platforms where users value variety relatively more than compatibility, e.g., gaming consoles. See, e.g., Evans, Hagiu, & Schmalensee, *Invisible Engines*, *supra* note 42 at 139.

- 84 Eastman Kodak v. Image Technical Services, 504 U.S. 451, 486 (1992). Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of Kodak*, 63 ANTITRUST L.J. 486 (1995). For a critical assessment, see Daniel M. Wall, *Aftermarket Monopoly: Five Years After Kodak*, ANTITRUST 32 (1997).
- 85 See, e.g., Apple, Inc. v. Psystar Corp., 673 F. Supp. 2d 931, 1200 (N.D. Cal. 2009) ("Psystar alleges that, by tying or other exclusionary behavior, Apple seeks to dominate a distinct aftermarket, the market for Mac OS-compatible hardware systems."); Dattel Holdings v. Microsoft Corp., 712 F.Supp.2d 974, 980 (N.D. Cal. 2010). ("[A]ftermarket for Xbox 360 accessories.")
- 86 Alan Silberman, *The Myths of Franchise Market Power*, 65 ANTITRUST L.J. 217 (1996).
- 87 See, e.g., Apple, Inc. v. Psystar Corp., 586 F. Supp. 2d 1190, 1201 (N.D. Cal. 2008), where the court rejected a single-product aftermarket, because the EULA "specifically restricts the use of Mac OS to Apple-labeled computer hardware systems. Consumers, therefore, knowingly agree to the challenged restraint."
- 88 Eastman Kodak Co. v. Image Technical Services, 504 U.S. 451, 473 (1992) ("[T]he existence of significant information and switching costs . . . could create a less responsive connection between service and parts prices and equipment sales.")
- 89 Dan Wall, *supra* note 84 at 33 ("Aftermarkets . . . present something of an anomaly: a frequently recurring set of conditions that when assessed according to orthodox antitrust analysis point to what should be a rarity, namely monopoly.")
- 90 Queen City Pizza, Inc. v. Domino's Pizza, Inc., 124 F. 3d 430, 440 (3rd. Cir. 1997) ("[P]laintiffs here knew that Domino's Pizza retained significant power over their ability to purchase cheaper supplies from alternative sources because that authority was spelled out in detail in section 12.2 of the standard franchise agreement. Unlike the plaintiffs in Kodak, the Domino's franchisees could assess the potential costs and economic risks at the time they signed the franchise agreement. . . . Kodak's sale of its product involved no contractual framework for continuing relations with the purchaser. But a franchise agreement regulating supplies, inspections, and quality standards structures an ongoing relationship between franchisor and franchisee designed to maintain good will. These differences between the Kodak transaction and franchise transactions are compelling.")
- 91 In the context of a Section 2 inquiry, such intra-platform and inter-platform benefits are part of a platform sponsor's business justifications. In many cases, the mere existence of a non-pretexual business justification should suffice to render a monopolization claim implausible. In those instances, no elaborate balancing test is required. In appropriate cases, the reasoning in *Allied Orthopedic Appliances v. Tyco Healthcare Group*, 592 F.3d 991 (9th Cir. 2010) suggests even greater deference to the sponsor's decisions: "To weigh the benefits of an improved product design against the resulting injuries to competitors is not just unwise, it is unadministrable. There are no criteria that courts can use to calculate the 'right' amount of innovation, . . . A seemingly minor technological improvement today can lead to much greater advance in the future." *Id.*, 1000.
- 92 See Wikipedia entry for "Walled Garden," available at http://en.wikipedia.org/wiki/Walled_garden (last accessed, March 3, 2011).