

# Competition Policy for Information Platform Technology

Dan Wielsch

## 1. Modularity and open architectures

Some of the most important technologies in recent time, the computer and the internet, are modularised systems. They are made up of various components each of which can be optimised according to its own terms, thereby allowing higher complexity in the system as a whole. This splitting up into modules can only work if the components involved are interoperable.

The internet can be described as consisting of four layers (physical, logical, application, and content),<sup>1</sup> with the logical layer and its basic protocols (TCP/IP) at the centre because they enable the computers in the network to “understand” each other, to interoperate with each other.

Computers are modularised systems as well. The computer environment includes hardware and software, each of which can in turn be divided into components (hardware into CPU, bus technology, etc.; and software into operating systems and applications).

In both computers and the internet, the introduction of open architectures revolutionised the pertaining field. The computer industry—on which I will focus here—previously functioned on the basis of integrated proprietary architecture. Initially, IBM and other vertically integrated companies dominated the market, and customers typically chose among single-vendor systems, normally relying, for example, on IBM peripherals to go with the IBM mainframes. In order to keep its system closed, IBM kept secret and proprietary the interfaces between the different parts of its system. But when IBM introduced its PC (personal computers), it used (it is still unclear today why) an open architecture model; it relied on Microsoft and Intel to produce key components for its system and allowed them to license these components

to other computer makers.<sup>2</sup> This transition to openness in the interfaces facilitated innovation in a way unprecedented in the integrated structure. Independent firms could now enter into the respective markets for components and become highly specialised in their fields. The result was lower prices and better products, because these entrants were driving innovation in these products.<sup>3</sup> Innovation is now vested in many hands in a variety of different layers. Modularity, at least when combined with openness, allows companies respond to individual customer needs and introduce new products faster by upgrading individual subsystems without having to redesign everything.<sup>4</sup>

## 2. The problem of “leveraging” in modular technology

The merits of open modularity are at the same time the cause of its vulnerability. The danger in modularised systems is that the control of one layer of the system can be leveraged into an adjacent layer. Because the components are coupled by interfaces, dominance and control in one layer can affect at least the directly linked layers and their respective product markets. In the case of platforms—defined as any standard for an information product that other companies rely on to supply a complementary product<sup>5</sup>—this risk is magnified by the

2 See Farrell and Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age* (Economics Department Working Papers, UC Berkeley, 2002, Paper E02-325,) at 7–8, available at <http://repositories.cdlib.org/iber/cpc/CPC02-035/>.

3 See Farrell and Weiser (n.2 above) at 11.

4 See Christensen, “The Rules of Innovation” (June 2002) *Technology Review* 33 at 36 (“Under these conditions, outsourcing titans like Dell and Cisco Systems can prosper—because modular architectures help them be fast, flexible and responsive.”)

5 See Weiser, *Networks Unplugged: Towards A Model of Compatibility Regulation Between Information Platforms* (paper presented at the 29th Annual Telecommunications Policy Research Conference, 2001, available at <http://arxiv.org/html/cs.CY/0109070>, an earlier version of Weiser, “The Internet, Innovation, and Intellectual Property Policy”, (2003) 103 *Columbia Law Review* 534), at 4, for this definition of an “information platform”, noting that “in most cases, that complementary product will be an application or peripheral”, but that in addition to this vertical compatibility as to complementary products there is also a dimension of horizontal compatibility as to “rival information platforms”. See also Weiser, “Law and Information Platforms”, (2002) 1 *J. Telecomm. & High Tech. L.* 1 at 3.

1 See Werbach, “A Layered Model for Internet Policy” (2002) 1 *Journal on Telecommunications & High Technology Law* 37 at 57–64.

fact that the architecture of a platform is a decisive parameter for the possibilities of an "application".<sup>6</sup>

The danger of "leveraging" is directly addressed by the law of antitrust; therefore, antitrust is of special importance in modularised or layered complex systems.

This makes sense as antitrust operates with the general or default assumption that the market is best at co-ordinating decentralised and dispersed knowledge, and that interference is necessary only when the very conditions for the operation of the market itself are distorted by too much power, *i.e.* control, in the hands of single players. Antitrust might work as a kind of assistance for the evolutionary process by which each layer will autonomously explore the range of its possibilities and its own mix of openness and closure. In addition this assistance is kept to a minimum because the requirements for triggering antitrust interference are quite high. It will only intervene when it is necessary.

### 3. Likelihood of dominance in markets for platform technology

Information products in the sense described are made up by standards. This provides for network effects. Each individual's demand for a product is positively related to the usage of other individuals.<sup>7</sup> The greater the number of users who adopt a given operating system, for example, the greater the number and variety of application programs that are likely to be available that can run on that platform. The increased pace of software development will enhance the value of the particular operating system and therefore increase the demand for it.<sup>8</sup>

In the presence of such network effects, compatibility issues can fundamentally affect the nature of competition. This becomes clear when one considers that, under conditions of compatibility, the increased adoption of one vendor's program does not create a competitive advantage for that vendor relative to its rivals because the rivals' programs also benefit from the larger network size. In contrast, when programs are incompatible, different programs constitute different networks with the consequence that an increased adoption of the particular program creates a larger network for that

program but not for competing programs.<sup>9</sup> Under such circumstances, when one firm has a significantly larger community of users than its rivals it has an incentive to adopt competitive strategies that support the existence of a single standard—the one it owns—by preventing the products of rivals from achieving compatibility.<sup>10</sup>

To a certain extent the markets for information platform products are inclined to generate dominant standards. When this happens, it changes the mode of competition enormously. Competition between rival platforms, *i.e.* rival standards, becomes extremely difficult because the potential entrant will find it hard to acquire a critical mass of users for its new product because of the large installed base of the dominant firm. The pattern of competition therefore will often shift from competition "for the standard" to competition "within the standard". And even this form of competition will be influenced by the strategies the dominant player is pursuing. Since he holds the proprietary rights to the standard (in form of copyrights or patents), he controls the compatibility of products relying on his standard. By having command over the interfaces, he can strategically control the dissemination and use others can make of the standard.

### 4. Mandating access through antitrust

As indicated above, antitrust law will be called upon when a dominant firm abuses its power and is not behaving in accordance with the duties adhering to its monopoly position. The remedy in such cases will often consist of limiting the intellectual property (IP) rights of this firm by mandating access to the dominant standard. This was the approach taken in recent cases which shall now be discussed.

#### a. *Intergraph v Intel*

Initially, Intergraph—an OEM (Original Equipment Manufacturer), primarily producing graphics workstations—based its computers on processors for which the company owned the patents ("Clipper" technology). Intergraph later discontinued further development of its own Clipper processor and switched to using processors from Intel which is a monopolist in the CPU

6 For instance, developers of application software depend heavily on the features provided by the "Application Programming Interfaces" (API) which expose routines or protocols that perform certain widely used functions.

7 See Rubinfeld, "Antitrust Enforcement in Dynamic Network Industries" (1998) 43 *Antitrust Bulletin* 859 at 861.

8 See Rubinfeld (n.7, above), at 862.

9 See Katz and Shapiro, "Antitrust in Software Markets" in *Competition, Innovation and the Microsoft Monopoly: Antitrust In the Digital Marketplace* (Eisenach and Lenard ed, 1998), p.56.

10 See Rubinfeld (n.7 above), at 862.

market.<sup>11</sup> In turn, Intel designated Intergraph with the status of a "strategic customer", providing Intergraph with prototype CPUs and trade secret advance technical information so that Intergraph was able to adapt their computers to new Intel CPUs (central processing units) before their official release. Intel did so, however, under non-disclosure agreements that were terminable at will.

Later on, Intergraph claimed that Intel had infringed Intergraph's Clipper patents. As negotiations about a licence for the patents failed, Intel cut off its supply of trade secret information and prototypes. The purpose of this retaliation was to make Intergraph cross-license its Clipper patent to Intel on a royalty-free basis.<sup>12</sup> In response to this, Intergraph began to sue Intel for infringement of the Clipper patents and also moved to enjoin Intel from cutting off its special benefits. As Intel opposed this motion, Intergraph amended its complaint to charge Intel with violation of the antitrust laws.

The District Court held that Intel had misused its monopoly power in violation of s.2 of the Sherman Act and granted a preliminary injunction requiring Intel to continue its supply practice.<sup>13</sup> This means that Intel retained the right to charge Intergraph for access to its IP, as long as it did so in a non-discriminatory manner, *i.e.* as long as it provided access to Intergraph "at the same time", "in the same manner", and on "the same terms" as it did to Intergraph's "similarly situated competitors".<sup>14</sup>

The court reasoned that because of its monopoly power in the microprocessor market, Intel had affirmative duties not to misuse its monopoly power and to compete in a manner that does not unreasonably or unfairly harm competition, and that Intel had violated these duties on the grounds of several theories of antitrust liability. Among other things, the court argued that antitrust laws impose on firms controlling an essential facility the obligation to make the facility available on non-discriminatory terms. Holding that

reasonable and timely access to critical business information that is necessary to compete is an essential facility, the court concluded that timely access to Intel's CPU prototypes and secret technical information about them were essential facilities because they are not available from alternative sources, cannot feasibly be duplicated and Intergraph could not compete effectively in the relevant markets without access to them.

It further argued that Intel was liable under a monopoly leveraging claim because it had unlawfully used its monopoly power in the microprocessors market to foreclose or restrain competition by Intergraph in the market for graphic subsystems. Intel had already entered that market and had clearly announced plans to expand in that market while at the same time denying Intergraph access to the CPUs and technical information it needed to compete. Finally, the court emphasised that the fact that Intel's proprietary information and pre-release products are subject to copyright and patents did not confer on it a privilege to violate or an immunity from antitrust laws.

On appeal, the Federal Circuit Court of Appeals vacated the injunction.<sup>15</sup> The decision was based on the overarching rationale that in order to incur Sherman Act liability, there had to be the presence of a competitive relationship in the market where the monopolistic behavior was alleged. According to the Federal Circuit, Intergraph and Intel did not compete in any of the relevant markets, neither in the market for microprocessors nor in the graphics subsystems market.<sup>16</sup> Nor does the essential facility doctrine depart from the requirement of a competitive relationship. A non-competitor's asserted need for a manufacturer's business information does not convert the withholding of that information into an antitrust violation.<sup>17</sup> The same rationale destroys the "leveraging" theory: that monopoly power in one market provides a "competitive advantage" in another market is only a violation of the Sherman Act

11 At the time of the trial, Intel had a market share of 80% in the world CPU market. Barriers to entry into the CPU market are high, because of a large number of Intel and non-Intel patents on CPU technology; sunk costs of design and manufacture; economies of scale; network effects, or the need to ensure compatibility with complementary software products (such as Windows operating system), an issue that Intel had mastered by virtue of Windows/Pentium intellectual property cross-licensing arrangements with Microsoft (the "Wintel" alliance).

12 Note the contrast with the *Xerox* case (below, n.18): in the *Intergraph* case the refusal to license was not absolute; rather, the licence was conditioned on the licensee's willingness to grant a royalty-free licence to its intellectual property.

13 See *Intergraph Corporation v Intel Corporation* 3 F. Supp. 2d 1255 (N.D. Ala. 1998).

14 See Wagner, "The Keepers of the Gates: Intellectual Property, Antitrust, and the Regulatory Implications of Systems Technology" (2000) 51 *Hastings L. J.* 1073 at 1291-1292.

15 See *Intergraph v Intel Corporation* 195 F.3d 1346 (Fed. Cir. 1999).

16 See n.15, above: Intergraph was not present in the processor market by virtue of its Clipper patents. The patent grant is a legal right to exclude, not a commercial product in a competitive market. Intergraph had abandoned the production of the Clipper and stated no intention to return to it. And firms do not compete in the same markets unless they have the actual or potential ability to take significant business away from each other because of the interchangeability of their products. Conversely, even if Intel was planning to enter the workstation market, there was neither evidence nor suggestion of monopoly power of Intel in that market.

17 The Federal Circuit emphasised that no court had taken essential facility beyond the situation of competition with the controller of the facility, whether the competition is in the field of the facility itself or in a vertically related market that is controlled by the facility.

when there is an adverse effect in the second market. There is no *per se* theory of future antitrust violation which would prohibit downstream integration by a monopolist into new markets.

Although the Federal Circuit therefore overruled the District Court's decision, it did not contradict the approach taken by the lower court. Had Intel been an actual competitor to Intergraph in the workstations market, the original decision probably would have had to be affirmed, since the decision of the appellate court does not indicate any other reasons to reverse the trial court.

The District Court's decision represents a well-founded balance between strong property rights and open access to information, an issue that pervades IP law in general.

First, it made clear that IP rights are not exempt from antitrust scrutiny. Although these entitlements grant exclusionary rights to innovators, they do not grant the right to engage in anti-competitive behaviour. This is important to note because some courts appear to have declared that the anti-competitive effect of a patent or copyright holder's refusal to deal can never give rise to antitrust liability, unless the holder uses his statutory right to refuse to deal to gain a monopoly in a market beyond the scope of the patent.<sup>18</sup> The courts in these cases suggested that the scope of the patent defines an antitrust immunity for IP holders that applies irrespective of the effect of the IP holder's conduct on consumer welfare.<sup>19</sup>

But in contrast to these decisions, the Supreme Court recognised in *Kodak* that a patentee's refusal to deal is not immune from the antitrust laws.<sup>20</sup> On the basis of the Court's *Times-Picayune* decision, the Supreme Court concluded that a patent holder cannot exploit its patent to expand its dominant position into a different market.

18 See *Independent Service Organization Antitrust Litigation (Xerox)*, Re 203 F.3d 1322, 1327 (Fed. Cir. 2000) (acknowledging the "right of the patentee to refuse to sell or license in markets within the scope of the statutory patent grant" and stating "that, absent exceptional circumstances, a patent may confer the right to exclude competition altogether in more than one antitrust market" and declining to "inquire into [the patentee's] subjective motivation for exerting his statutory rights, even though his refusal to sell or license his patented invention may have an anticompetitive effect, so long as that anticompetitive effect is not illegally extended beyond the statutory patent grant"); see also *Townshend v Rockwell Int'l Corp.* 55 U.S.P.Q.2d 1011, 1026 (N.D. Cal. 2000) (stating that "because a patent owner has the legal right to refuse to license his or her patent on any terms, the existence of a predicate condition to a license agreement cannot state an antitrust violation").

19 See Semeraro, "Regulating Information Platforms: The Convergence to Antitrust" (2002) 1 J. Telecomms. & High Tech. L. 143, 153.

20 See *Image Technical Services, Inc. v Eastman Kodak Co* 504 U.S. 451, 479 (1992).

Accordingly, the Court has long recognised that IP rights, such as patents, do not immunise the patent holder from the antitrust laws, particularly where more than one market exists.<sup>21</sup> The District Court's opinion on this is also in accordance with the Antitrust Guidelines for the Licensing of IP (IP Guidelines), issued jointly in 1995 by the US Department of Justice and the Federal Trade Commission, which state that, regardless of the form of property,

certain types of conduct . . . may have anti-competitive effects against which the antitrust laws can and do protect. Intellectual property is thus neither particularly free from scrutiny under the antitrust laws, nor particularly suspect under them.<sup>22</sup>

Having set aside any assumption of IP immunity, the District Court in *Intergraph* defined the parameters within which IP rights operated in that case. By its order to continue access to the critical business information, the court established that Intel's proprietary rights in its microprocessor technology would be protected only by a liability rule, not by the usual property rule. Intel cannot prevent others from exploiting its property without its consent but receives financial compensation from those who do so. On this interpretation of the court's ruling, the interplay of IP and antitrust can be described as follows: when the denial of access to technology would raise serious antitrust concerns, the proprietary rights in that technology relax slightly, and the law shifts from a property-rule regime to a system of liability-rule protections.<sup>23</sup>

## b. *Re Intel Corporation*

The FTC complaint against Intel adds another important aspect.<sup>24</sup> It pivoted around the finding that Intel had cut off its supplies of chip samples and strategic information about its new products to three of its main customers (Compaq, Digital and Intergraph) in order to force these customers to grant Intel licences related to

21 See Ronald S. Katz and Adam J. Safer, "Should One Patent Court Be Making Antitrust Law For the Whole Country?" (2002) 69 *Antitrust L.J.* 687 at 702.

22 US Department of Justice & Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (1995), s.2.1, available at [www.usdoj.gov/atr/public/guidelines/ipguide.htm](http://www.usdoj.gov/atr/public/guidelines/ipguide.htm). This does not mean that there are no important differences between IP and other forms of property. For the position that the antitrust laws should apply fully to IP but that their application must take important special characteristics of IP into account, see Robert Pitofsky, (2001) 16 *Berkeley Tech. L.J.* 535.

23 See Wagner (n.14 above), at 1084–1086.

24 *Intel Corporation*, Re No.9288, Complaint (FTC, June 8, 1998), available at [www.ftc.gov/los/1998/06/intelfin.cmp.htm](http://www.ftc.gov/los/1998/06/intelfin.cmp.htm).

processor technology. The focus therefore was on the impact of Intel's refusal to license in the markets for processors in which Intel was indeed competing with other firms.<sup>25</sup> What was alleged by the FTC was a pattern of refusing to deal with multiple buyers unless they granted blanket access to their IP rights.<sup>26</sup>

In the proceedings, Intel argued that an overabundance of processor patents threatened to stifle innovation since a processor manufacturer might be subject to multiple demands by holders of these patents ("patent minefield"). This risk could only be neutralised by pursuing cross-licensing policies. This position is not unsound. In fact, the law normally treats royalty-free cross-licensing agreements as pro-competitive because they free both parties to compete on the merits without being restricted by overlapping or blocking patent rights. To the extent Intel really was attempting to avoid being "held up" by patentees making unreasonable claims, its demand for a licence was regarded by some commentators not only as legitimate, but as pro-competitive.<sup>27</sup>

On the opposite side, the FTC argued that Intel's exclusionary conduct effectively undermined the patent rights of firms dependent on Intel and reduced their incentives to develop new technologies that might compete with Intel processors. In a s.2 argument, the FTC reasoned that Intel had maintained its monopoly power in the CPU market through exclusionary conduct that was not reasonably necessary to serve any legitimate, pro-competitive purpose, with the specific intent of monopolising both the current generation and future generation of CPUs.<sup>28</sup>

The FTC's argument becomes clearer when one considers that the courts had focused only on the downstream market and simply noted the absence of Intergraph in the upstream market for CPUs. But it should not be overlooked that the CPU market is more complex than a single market.<sup>29</sup> Instead, three distinct

upstream markets can be identified in accordance with the IP Guidelines: (1) the existing market for CPU products; (2) the market for current CPU technology; and (3) the innovation market in which future CPU technology is being developed.<sup>30</sup> Intel's behaviour was therefore anti-competitive because it coercively extended its lawful monopoly power over existing CPU products into the market for future CPU technology and goods, and used its patents to prevent others from engaging in lawful follow-on innovation.

The case was finally resolved by a consent decree in which Intel agreed not to stop dealing with companies merely because they sought to vindicate their intellectual property rights.<sup>31</sup>

However, the case raises the question whether a proprietor should be forced to license its IP rights on the grounds of the "probable" anti-competitive effects of its refusal on the relevant market. The answer depends on whether protection of future innovation is conceived as a "good" deserving so much protection as to justify setting aside the idea that an IP holder is entitled to any returns it can get on its rights. If the FTC's approach is accepted, it follows that, despite IP rights, there are situations in which a firm with monopoly or market power may be required to create its own competition.<sup>32</sup>

Objections against this idea claim that antitrust complaints must be based on empirical evidence and that neither the case law nor economic analysis has yet articulated workable quantitative criteria to calibrate the incentives to induce an optimal amount of innovation.<sup>33</sup>

25 Other than in the litigation before the courts, the FTC complaint was brought on the basis of a fuller factual record: Digital Equipment Corporation, unlike Intergraph, was at the time a direct competitor of Intel in the processor market through its Alpha chip.

26 See Herbert Hovenkamp *et al.*, *IP and Antitrust* (2002), s.13.4d.

27 *ibid.*

28 See *Intel Corporation, Re No.9288*, Agreement Containing Consent Order (FTC March 17, 1999), available at [www.ftc.gov/os/1999/03/d09288intelagreement.htm](http://www.ftc.gov/os/1999/03/d09288intelagreement.htm).

29 See Debra A. Valentine, *Abuse of Dominance in Relation to Intellectual Property: U.S. Perspectives and the Intel Cases* (Prepared Remarks before The Israel International Antitrust Conference, November 15, 1999), available at [www.ftc.gov/speeches/other/duisraelin.htm](http://www.ftc.gov/speeches/other/duisraelin.htm).

30 See IP Guidelines (n.22 above), ss.3.2.1–3.2.3.

31 Nevertheless, Intel reserved the right to end relationships with companies for a variety of legitimate business reasons. See FTC Consent Order (n.28 above).

32 See David Balto, "Protecting Competition from the abuse of Monopoly Power: The Intel Case" (1999) 16 *Computer Lawyer* 4 at 9.

33 Sergio Baches Opi, "The Application of the Essential Facilities Doctrine to Intellectual Property Licensing in the European Union and the United States: Are Intellectual Property Rights Still Sacrosanct?" (2001) 11 *Fordham Intellectual Property Media & Entertainment Law Journal* 409 at 447. He argues that antitrust complaints must be based on empirical evidence rather than on speculative assumptions about the "possible" or "probable" effects of a refusal to license in the relevant innovation market. However, if what antitrust laws are trying to protect is the process of innovation, and this process may take place before a product has even been created and put into the market, then agencies and courts will often have scant empirical evidence about innovation markets, since companies prefer not to disclose much information on their innovations. Moreover, the anti-competitive impact of a refusal to license on R&D is difficult to establish because a negative effect can often only be determined after such work has been completed.

### c. *United States v Microsoft*

The *Microsoft* case<sup>34</sup> concerns possibly the most prominent example of a platform, the operating system for PCs. In the market for this product, Microsoft possesses monopoly power, in the form of its “Windows” products. The lawsuit against the company was brought on several grounds for antitrust liability, some based on s.2 and some on s.1 of the Sherman Act. In particular, Microsoft was charged with having violated s.2 by engaging in a variety of exclusionary acts to maintain its monopoly by preventing the effective distribution and use of products that might threaten that monopoly.

#### i. *Preventing rival browser competition*

One of the charges brought under s.2 was that Microsoft placed certain restrictions in its agreements licensing Windows to Original Equipment Manufacturers (OEMs) which prohibited the OEMs from removing any desktop icons, folders, or “Start” menu entries; altering the initial boot sequence; or otherwise altering the appearance of the Windows desktop. Using these restrictions, Microsoft was able to control the usage share of browsers competing with its own browser “Internet Explorer” (IE), since having an OEM pre-install a browser on a computer is the most cost-effective method of distributing browsing software.<sup>35</sup> By controlling the browser market, Microsoft was able to protect its monopoly in the operating systems market.

The reason for the relation between the two markets is based on the fact that browsers are middleware products which expose their own APIs. If a browser reaches a critical mass of users it will attract developers of application software who can begin to rely upon the browser’s APIs for basic routines rather than relying upon the API set included in Windows. Ultimately, if developers write applications relying exclusively on APIs exposed by browsers, their applications would run on any operating system on which the middleware was also present. Netscape therefore wrote its Navigator

browser for multiple operating systems. Now, if a consumer could have access to the applications he desired regardless of the operating system he uses, simply by installing a particular browser on his computer, then he would no longer feel compelled to select Windows in order to have access to those applications; he could select an operating system other than Windows based solely upon its quality and price. Therefore, Microsoft’s efforts to gain market share in the one market for browsers served to meet the threat to its monopoly in the other market for operating systems by keeping rival browsers from gaining the critical mass of users necessary to attract developer attention away from Windows as the platform for software development.<sup>36</sup>

Since the licence restrictions prevented OEMs from removing visible means of user access to IE and since it is not practical for OEMs to install a second browser in addition to IE, they prevented many OEMs from pre-installing a rival browser. This conduct was held to be anti-competitive. Microsoft reduced rival browsers’ usage share not by improving its own product but, rather, by preventing OEMs from taking actions that could increase rivals’ share of usage. The court explicitly rejected Microsoft’s argument that these licence restrictions were legally justified because the company would simply exercise its rights as holders of valid copyrights. It made unmistakably clear that intellectual property rights do not confer a privilege to violate the antitrust laws.<sup>37</sup>

Microsoft did not limit its effort to shut out rival browsers to the means of managing its IP rights; it also pursued the same goal by technological means. Among other things, it bound IE to Windows technologically<sup>38</sup> by commingling code specific to browsing in the same files as code that provided operating system function, so that any attempt to delete the files containing IE would, at the same time, cripple the operating system. The court, sensitive to the fact that technology can function as a substitute for legal arrangements, condemned this practice as well. This bundling of separate functions prevented OEMs from removing IE, and deterred them from installing a second browser which would mean increased product testing and support costs and would amount to questionable use of the scarce and valuable space on a PC’s hard drive. Microsoft’s general claim regarding the benefits of integrating the browser to pursuing “deeper levels of technical integration”

34 See *United States v Microsoft Corp.* 253 F.3d 34 (D.C. Cir. 2001); and for the trial court see 87 F. Supp.2d 30 (D.D.C. 2000) (Conclusions of Law); 97 F. Supp.2d 59 (D.D.C. 2000) (Final Judgment).

35 One might also bundle the browser with internet access software distributed by an Internet Access Provider (IAP)—a behaviour Microsoft also engaged in. In exclusive agreements with IAPs Microsoft promised to provide easy access to IAPs’ services from the Windows desktop in return for the IAPs’ agreement to promote IE exclusively and to keep shipments of internet access software using Netscape Navigator under a specific percentage, typically 25%. The Court of Appeals affirmed the District Court’s decision holding that Microsoft’s exclusive contracts with IAPs are exclusionary devices under s.2, see *United States v Microsoft Corp.* 253 F.3d 34, 68–71 (D.C. Cir. 2001).

36 See *United States v Microsoft Corp.* 253 F.3d 34, 60–61 (D.C. Cir. 2001).

37 *ibid.*, at 63.

38 For instance, it also excluded IE from the “Add/Remove Programs” utility, thereby discouraging OEMs from distributing rival products.



appeared to be highly suspect because of the danger it posed for an unrestricted evolution of different technology modules.

### *ii. Preventing competition from rival JVMs*

Furthermore, the court condemned Microsoft's actions to prevent Sun's Java technology from developing as a viable cross-platform threat.<sup>39</sup> The contracts the company had entered with Independent Software Vendors (ISVs) conditioned receipt of Windows proprietary technical information upon the ISVs' agreement to promote Microsoft's Java Virtual Machine (JVM) exclusively. This had a significant impact on the overall distribution of Sun's JVMs. Like the actions against Netscape, this was an attempt to minimise the size and trajectory of a rival's product share, now in JVMs instead of browsers. The aim behind this was again to take away the incentive for application developers to avail themselves of interfaces exposed by the nascent Java platform.

Again Microsoft also used technological means to stifle competition—this time by trying to eliminate the interoperability of the middleware. It deceived Java developers by distributing software development tools created to assist ISVs in designing Java applications which included certain functions that could only be executed properly by Microsoft's JVM. Thus, Java developers who were made to believe they wrote cross-platform applications ended up producing applications that would run only on the Windows operating system.

### *iii. Structural and conduct remedies against Microsoft*

The District court chose a combination of structural and conduct remedies as an appropriate remedy for these violations of the antitrust laws. First, it ordered Microsoft to divide into two firms, one selling Windows and the other selling applications such as IE. This divestiture was certainly an extreme intervention into the company's property rights. Hence, it was strongly debated whether the breaking-up of Microsoft may be disproportionate compared to the infringements found by

the District Court.<sup>40</sup> Of greater interest are the conduct remedies ordered. They appear to be a more appropriate and proportionate consequence for Microsoft's use of its property rights. For instance, decree s.3.b, entitled "Disclosure of APIs, Communications Interfaces and Technical Information", requires Microsoft to disclose to third-party developers, in a timely and non-discriminatory manner, the APIs and other technical information necessary to ensure that software effectively interoperates with Windows. Section 3.c, entitled "Knowing Interference with Performance", imposes a prohibition on modifying its operating system to interfere with or degrade the performance of non-Microsoft programs. Finally, s.3.e, entitled "Ban on Exclusive Dealing", forbids Microsoft from entering contracts which oblige third parties to restrict their development, production, distribution, promotion or use of non-Microsoft platform-level software.<sup>41</sup> These provisions mandate central elements of an open access regime: effective access and non-discrimination. In the course of further proceedings the parties entered into a settlement agreement which indeed sets forth a number of restrictions upon Microsoft's conduct.<sup>42</sup> And indeed the conduct remedies ordered by the trial court reappear as elements in the provisions of that settlement (s.3.b is mirrored in III.D, s.3.c in III.H, and s.3.e in III.A).

Whatever the concrete form of an access regime may be, a functional open-access regime required that Microsoft should not be able to use its rights in the platform standard to deny other innovators the ability to develop compatible products.<sup>43</sup> Such rules appear to be adequate mechanisms to protect the evolution of alternative platforms in the field of module technology.

## **5. Towards a comprehensive competition policy**

If the market for modularised information technology worked like markets in which companies offer rival

39 Java is a set of middleware technologies developed by Sun Microsystems. They include a set of programs written in the Java language, called the "Java class libraries", which expose their own APIs, and a Java Virtual Machine (JVM) which translates bytecode into instructions to the operating system. Java thus poses a potential threat to Windows' position as the ubiquitous platform for software development, because programs calling upon the Java APIs will run on any machine with Java class libraries and a JVM. See *United States v Microsoft Corp.* 253 F.3d 34, 74 (D.C. Cir. 2001).

40 Assuming that the objective of equitable relief is to restore the competitive structure and consumer welfare that would have developed absent Microsoft's anti-competitive conduct, it is reasonable to argue that the divestiture goes beyond what is necessary to restore this status quo ante. See John E. Lopatka and William H. Page, "A (Cautionary) Note on Remedies in the Microsoft Case" (1999) 13 *Antitrust* 25 at 27.

41 See *United States v Microsoft* 97 F. Supp.2d 59, 65–69 (D.D.C. 2000) (Final Judgment).

42 See *United States v Microsoft* 2002 U.S. Dist. LEXIS 22858 (D.D.C. 2002) (Final Judgment), and for the court's approval of the conduct restrictions see *United States v Microsoft* 231 F.Supp.2d 144 (D.D.C. 2002).

43 See Wagner (n.14 above), at 1128.

products and compete purely on their respective merits, concerns about open access and interoperability would be a less compelling question. But because many of those markets are networks that lend themselves to a single, dominant standard, the emergence of proprietary ownership of a standard creates special concerns.<sup>44</sup> In particular, the cases in question show that network markets may require special approaches to ensure that competition and innovation proceed free from harmful disturbances; competition *and* innovation, because those “customers” who are for example “locked-in” on these markets are often business entities which build complementary products and need access to the standard platforms in order to further develop their products.

#### *a. Caveats about antitrust enforcement in “new economy” markets*

On the other hand, a complete commitment to openness may undermine the very goal of an open access policy, *viz.* to promote innovation. Imposing sharing requirements in whatever form on a company’s invention<sup>45</sup> undermines *ex ante* incentives to invest.<sup>46</sup> An inventor must be allowed to appropriate the benefits of her invention, lest she decides not to innovate at all. Moreover, sharing requirements, or any other facilitation of co-operation, can also discourage other companies’ investment in the search for a rival standard. These reservations recommend caution when limiting IP rights through antitrust law.

In particular, antitrust enforcement should consider the peculiarities of the industry in which the IP rights are used. Indeed, even though the two sets of laws coexist in the service of long-run, dynamic efficiencies, and even though they share the goal of encouraging innovation,<sup>47</sup> they attempt to do so in different ways. Antitrust operates by ensuring that market forces provide firms with incentives to offer new (*i.e.* better) products at lower prices, whereas IP laws directly create incentives to innovate products (and processes) of higher quality at lower prices. Whether these different means result in conflicts and how the regimes are harmonised in such cases depends on the peculiar structure of the industry in which the respective issues arise.

In fact, it is argued that antitrust enforcement in “new economy” markets should be very cautious. In industries in which continual innovation is important to

social welfare, interfering with the acquisition and enforcement of IP rights, while pro-competitive in the short run, could actually harm social welfare in the long run by reducing innovation.<sup>48</sup> The court in the *Microsoft* case was well aware of this as reflected in a remarkable note on the extent to which antitrust doctrines, that evolved in the “old economy”, for example the s.2 monopolisation doctrines, should apply to firms competing in dynamic technological markets characterised by network effects.<sup>49</sup>

The argument that inflexible enforcement of old economy antitrust in the new economy could be harmful pivots around the “serial monopoly” hypothesis which suggests that in the “new economy”, monopoly is the natural market structure, but technological innovation ensures that all monopolies are just temporary. Innovation in technology-driven markets is so rapid and revolutionary that no market leader, even with strong network effects, can defend its position for long against numerous new entrants with “killer applications”. Firms compete through innovation for temporary market dominance, from which they may be displaced by the next wave of product advancements<sup>50</sup> (“leapfrogging”). This Schumpeterian competition proceeds sequentially over time rather than simultaneously across a market; it is a competition “for the market”, and not “within the market”.

From the perspective of IP law, such market characteristics seem to recommend a robust IP regime because firms will be more willing to invest when they anticipate that they will be allowed to exploit their innovation. Their incentive to innovate is greatest when there is little threat of imitation.

From the perspective of antitrust, these characteristics may imply that the traditional market definition/market share antitrust analysis is not appropriate in this sector. Such an “old economy” mode of analysis is bound to find barriers to entry even when they are necessary to fuel investment in innovation. This is because markets subject to strong economies of scale and network effects based on risky R&D investments do require high operating margins protected by short-term barriers to entry, or else investment would dry up.<sup>51</sup> Imposing “old economy” antitrust will deprive the successful firm of its

44 See Weiser, *Networks Unplugged* (n.5 above), at 4.

45 What all the standard defining products were at the beginning.

46 See Weiser, *Networks Unplugged* (n.5 above), at 7.

47 See Hovenkamp *et al.* (n.26 above), s.1.3a.

48 See Lemley, “Intellectual Property Rights and Standard-Setting Organizations” (2002) 90 *California Law Review* 1889 at 1938.

49 See *United States v Microsoft Corp.* 253 F.3d 34, 49–50 (D.C. Cir. 2001).

50 *ibid.* (citing Shelanski and Sidak, (2001) 68 *University of Chicago Law Review* 1 at 11–12).

51 See Evans and Schmalensee, *Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries* (NBER Working Paper No.8268, 2001), available at [www.nber.org/papers/w8268](http://www.nber.org/papers/w8268).



temporary monopoly rents. Indeed, inherent in the serial monopoly hypothesis is the argument that an innovator needs a period of monopoly in order to recoup its investment in innovation. If competitors were able to immediately enter the market and become fully competitive in the static sense, then prices would drop and profits would be driven to zero, thus eliminating future incentives to innovate.<sup>52</sup> In this view, the period of monopoly for each innovator is in fact a reward to such innovators and the temporary monopoly rents are merely the quasi-rents to a social beneficial activity—much as patent protection helps generate quasi-rents for a limited period of time.<sup>53</sup> The logic of this approach is then that antitrust enforcement in the form of non-enforcement would substitute for IP.

But such line of argument underestimates the risk that today's platform monopolist will try to inhibit the rise of the next monopolist and thereby turn itself into a permanent monopolist. He can do so by distorting the process from which the threat of new entrants derives: the process of innovation. As seen in the Intel proceedings, one strategy is to withhold access to the dominant platform unless the inventor licenses its own know-how. If the inventor agrees, this may be an efficient solution after the fact, but the prospect of this outcome will discourage efficient independent innovation. As seen in the *Microsoft* case, another strategy is to undermine the distribution channels and the technological interoperability of today's complementary applications that might have become tomorrow's platform competitors.

As post-Chicago proponents of a strategic analysis of "predatory behaviour" have pointed out against the Chicago School's static view of neoclassical price theory under which a monopoly can do no more than make the most of its existing monopoly (*cf.* "fixed-sum" theory of monopoly), the danger is that a firm might try to change the structural conditions it faces in order that it may receive greater profits in the future. By changing those underlying conditions, the monopoly may well be able to leverage itself into a position even more powerful than the one from which it started.<sup>54</sup> In addition to these active attempts at strategic foreclosure, there may well be structural barriers to prevent (re)entry once a rival has been eliminated or severely disadvantaged.

## b. Interplay of IP and antitrust

The discussion of the peculiarities of "new economy" markets built around IP rights reveals a dilemma: Inappropriate antitrust intervention in the form of an early imposition of compatibility provisions and open interfaces can thwart innovation and competition just as an overly relaxed antitrust enforcement runs the risk that a firm uses the dominance of its platform to extract considerable monopoly rents and to leverage its power into adjacent markets, *viz.* layers.

But the way in which the problem is articulated seems already to point to a strategy for approaching the issue. Competition policy must know when to encourage rivals to compete for establishing a standard and when to acknowledge that there cannot be competition between standards, but only competition within a dominant one.<sup>55</sup> Once a particular standard has emerged on a platform, relying on that standard seems the only commercially reasonable way to compete.<sup>56</sup> To facilitate such competition, antitrust needs to ensure that interoperability is not denied as a means of precluding competition.

Although an antitrust remedy in these cases is surely a forceful instrument, it seems to belong to a second-best world. Antitrust comes into play in the presence of market power, and this is often at a late stage, *i.e.* when competition has already shifted to intra-platform competition because a certain platform has evolved as dominant. By that point, much harm to the processes of competition and innovation may already have been done. For instance, with respect to the browser war between Microsoft and Netscape, it was noted that the possibility of judicially overseen relief came too late to help Netscape.<sup>57</sup> And the individual fate of Netscape is just one aspect of a larger process which has left the entire browser market under the control of Microsoft.

IP law is different. It has its own means for facilitating and mandating access, and it can do so at an earlier stage. Most notably, IP law may (i) decline to protect interfaces at all, or it may (ii) allow access to a platform standard through "reverse engineering".<sup>58</sup>

52 See Faulhaber, "Access#Access1+Access2" (2002) *The Law Review of Michigan State University-Detroit College of Law* 677 at 701.

53 *ibid.*, at 707.

54 See Langlois, "Technology Standards, Innovation, and Essential Facilities: Toward a Schumpeterian Post-Chicago Approach" in *Dynamic Competition and Public Policy* (Ellig ed., 2001) pp.199–201.

55 See Weiser, *Networks unplugged* (n.5 above), at 7.

56 See Farrell, "Arguments for Weaker Intellectual Property Protection in Network Industries" in *Standards Policy for Information Infrastructure* (Kahin and Abbate ed., 1995), p.373.

57 See James, "The Real Microsoft Case and Settlement" (Fall 2001) *Antitrust* 58, at 61 ("By most accounts, Microsoft has essentially won the browser war; relief to revive Netscape Navigator as a middleware threat may have been too little, too late.")

58 In addition, it is worthwhile noting that the use of IP entitlements themselves can be pro-competitive. The latter happened, for example, in cases where an IP owner has used its IP rights to ensure that software that used a standard was interoperable, and to oppose efforts to "split" the standard (see

### *i. Declining complete protection for interfaces*

Indeed it was argued in the field of systems technology that IP law should not protect program elements that control the interface between modules at all, thus allowing unlimited access to such components by competitors.<sup>59</sup> And at least to the extent that the existence or scope of an IP right in a standard is undetermined, courts have eventually considered network effects in deciding whether or not to grant a new or stronger form of IP protection to the standard-setter.<sup>60</sup>

In *Lotus*, a case addressing the horizontal access issue, the First Circuit decided that Borland could incorporate Lotus 1-2-3's command hierarchy to build a rival spreadsheet program (Quattro), reasoning that the command hierarchy was not copyrightable at all because it was a "method of operation" of the 1-2-3 program.<sup>61</sup> In his concurrence, Boudin J., offering a competition policy rationale, recognised that the establishment of a standard (here a user interface and command hierarchy for spreadsheets) merited protection in order to encourage innovation. But at the same time he made clear that complete protection could limit consumer welfare.<sup>62</sup> When a first mover like Lotus had already received a

substantial reward for being first, IP protection may recede and allow others access to the industry standard so as to allow for competition.<sup>63</sup> The way in which IP protection "recedes" is of course variable. It might be by holding that the standard is not protectable by copyright (as the majority did) or by saying that the entrant's use of it is privileged by referring to the "fair use" doctrine (as implied by Judge Boudin). What is relevant to note is that IP treatment of interfaces crucially affects the nature of competition and how it does so.<sup>64</sup>

As implied by Boudin J.'s concurrence,<sup>65</sup> if we were truly to permit competition within *de facto* standards, we would have to deny all forms of IP protection to the interfaces that allow access to such standards.<sup>66</sup>

### *ii. Permitting "reverse engineering"*

Another tool of IP law which may provide for access to information platforms is "reverse engineering" which allows a finished product to be worked backwards to determine how it was actually made. This legal tool can facilitate the opening of a standard in order to enhance competition on aftermarkets for applications of the dominant firm's platform product. It also confers on potential competitors a significant self-help option for firms that may otherwise be defeated in the marketplace before a conduct remedy, overseen either by a regulatory agency or a court administering an antitrust remedy, can take effect.<sup>67</sup> The permission of reverse engineering definitely changes the parameter of competition and innovation because it provides a quasi-compulsory licence for a platform. By allowing access to a standard, IP law creates an incentive for the standard-holder to license its product to rivals at an amount equal to the

Lemley, n.48 above, at 1938–1939). Such a use was made by Sun in its litigation against Microsoft over the compatibility of Sun's Java platform (see *Sun Microsystems, Inc v Microsoft Corp.* 999 F.Supp. 1301 (N.D. Cal. 1998); and also section 4c, above.). Microsoft's development of its own proprietary version of Java that runs only on Windows troubled Sun because a Windows-specific version of Java would essentially allow Microsoft to destroy the cross-platform compatibility of the Java platform. Such disruption of Java's platform independence would raise antitrust concerns because it would undermine the promise Java holds for operating-systems competition. Sun's reservation of its IP rights in Java therefore provided it with the means to prevent unauthorised alteration of the standard and to preserve the integrity of a cross-platform standard that might otherwise be fragmented. Sun's approach of "proprietary pollution control" has itself been questioned by some proponents of open information platforms because it suggests the danger that a developer committed to maximising interoperability may change its tack if its technologies succeed in the marketplace and may suddenly impose new, restrictive terms ("intellectual property ambush"), see Shaffer Van Houweling, "Cultivating Open Information Platforms: A Land Trust Model" (2002) 1 *J. Telecomms. & High Tech. L.* 309, at 316.

59 See Menell, "The Challenges of Reforming Intellectual Property Protection for Computer Software" (1994) 94 *Colum. L. Rev.* 2644 at 2652–2653.

60 See Lemley and McGowan, "Legal Implications of Network Economic Effects" (1998) 86 *California L. Rev.* 479 at 531, with further reference.

61 See *Lotus Development Corp v Borland International, Inc.* 49 F.3d 807 (1995).

62 *ibid.*, at 821 (Boudin, J., concurring) ("But if a better spreadsheet comes along, it is hard to see why customers who have learned the Lotus menu and devised macros for it should remain captives of Lotus because of an investment in learning made by the users and not by Lotus. Lotus has already reaped a substantial reward for being first; assuming that the Borland program is now better, good reasons exist for freeing it to attract old Lotus customers: to enable the customer to take advantage of

a new advance, and to reward Borland in turn for making a better product. If Borland has not made a better product, then customers will remain with Lotus anyway.")

63 See Weiser, "The Internet, Innovation, and Intellectual Property Policy" (2003) 103 *Colum. L. Rev.* 543 at 604–605.

64 See Lemley and McGowan (n.60 above), at 533.

65 See *Lotus Development Corp v Borland International, Inc* 49 F.3d 807, 822 (1995) (Boudin, J., concurring) ("Indeed, to the extent that Lotus' menu is an important standard in the industry, it might be argued that any use ought to be deemed privileged.")

66 See Lemley and McGowan (n.60 above), at 533, with further reference in n.231. The authors themselves, at 533–537, ask for a more nuanced approach taking into account the nature of the network effect ("operating systems exhibit network effects because application programmers need to write compatible software, while user interfaces exhibit only the "learning effect" of saving users from having to learn how to operate multiple systems"); the status of present IP protection ("it is much more difficult to find a case considering network effects arguments as a reason to depart from or modify established intellectual property law").

67 See Weiser (n.63 above), at 551–552.

cost of reverse engineering the platform standard and creating an independent invention.<sup>68</sup>

A case that illustrates the practical reality of this self-help opportunity is that of RealNetworks, whose RealPlayer enables users to appreciate digital music or video content on the internet. The company announced that it had reverse engineered Microsoft's rival Windows Media Player in order to ensure that users could use the RealPlayer for any content developed for the Media Player.<sup>69</sup> Both RealNetworks' and analysts' evaluations of the initiative suggest that the step is a reflection of defensive action against an otherwise probable dominance by Microsoft.<sup>70</sup>

### iii. Coordination of IP and antitrust law

In allowing access to platforms, IP law would have to be applied with the same kind of caveat as antitrust law. It should be careful not to discourage the search for alternative platforms. Allowing all firms immediate access to the initial standard at the outset of a potential standards competition may seduce potential rivals to take advantage of an already developed standard as opposed to creating their own, and thus risks entrenching a single standard and precluding valuable competition. IP law as well as antitrust law should avoid the trap of thinking that any refusal to allow compatibility is anti-competitive.

How can IP law take account of these demands? One possibility is to partially incorporate antitrust analysis. IP law could insist on preconditions before concluding that a company's proprietary control of an information platform requires corrective action in form of permitting reverse engineering of a proprietary standard or refusing its protection.<sup>71</sup>

So long as a company lacks market power, it should be permitted to enforce its IP rights to prevent horizontal access. This lack of market power can be shown by recent entry into the market and swings in the market share, both of which demonstrate that a tipping of the market is unlikely to occur. Since the imposition of access amounts to forcing the right-holding company to collaborate with competitors, one may also make reference to the "Antitrust Guidelines for Collaborations Among Competitors" in order to assess the danger of granting access from the perspective of competition.

They provide, for example, a safe harbour for ventures with less than twenty percent market share.<sup>72</sup>

In cases where the IP rights-holder possesses significant market power, the analysis of whether the firm's control of a user interface or platform standard will enable it to establish dominance could be made along the lines of the "Horizontal Merger Guidelines",<sup>73</sup> which are used in evaluating a proposed merger. The relevant question would be whether, disregarding the possibility of reverse engineering by firm A to gain access to firm B's standard, there is a substantial likelihood that firm B would be able to exercise market power in the relevant market<sup>74</sup>—for example, the market for internet media players in the case of RealNetworks and Microsoft.

That such a kind of evaluation as to whether or not to implement a limited access right is manageable for courts is demonstrated by the fact that courts often have to engage in complex market analysis in antitrust cases. Analysis of the competitive structure of the relevant markets would simply have to be integrated in the IP law rationale. Nor should the openness of IP law to such an approach be underestimated. It has been observed that, in the past, IP law has not integrated economic thought to the same degree as antitrust law.<sup>75</sup> As this is about to change,<sup>76</sup> the odds for the interplay of IP and antitrust law on common ground are not too bad.

## 6. Conclusion

Modularisation is a powerful principle in technology. It frees functionality from physicality and allows the building of more complex systems that are able to run more advanced applications. At least given conditions of open architecture, it is possible that there are markets

68 See Weiser (n.63 above), at 548.

69 See J. Hu, "Real takes the open-source route", *CNET News.com*, July 22, 2002, available at <http://news.com.com/2100-1023-945406.html>.

70 *ibid.*

71 See Weiser (n.63 above), at 593.

72 See US Department of Justice & Federal Trade Commission, *Antitrust Guidelines for Collaborations Among Competitors* (2000), available at [www.ftc.gov/os/2000/04/ftcdojguidelines.pdf](http://www.ftc.gov/os/2000/04/ftcdojguidelines.pdf).

73 See US Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines* (1992), available at [www.ftc.gov/bcl/docs/horizmer.htm](http://www.ftc.gov/bcl/docs/horizmer.htm).

74 See US Department of Justice & Federal Trade Commission, *Horizontal Merger Guidelines*, s.0.2 (defining "the ultimate inquiry in merger analysis: whether the merger is likely to create or enhance market power or to facilitate its exercise").

75 See Lemley and McGowan (n.60 above), at 541.

76 See for example Samuelson and Scotchmer, "The Law and Economics of Reverse Engineering" (2002) 111 *Yale L.J.* 1575; Lunney, "Fair Use and Market Failure: Sony Revisited" (2002)

82 *Boston University Law Review* 975.

for the technology of each module. A great number and variety of actors on these markets will realise the evolutionary gain of open modularised systems architecture. The danger, however, of having a complex system built along interdependent vertical layers is that power structures on one layer could leverage into an adjacent layer, thereby distorting the process of market-driven evolution on this layer. Besides the problems of this “leveraging within” modularised systems, it seems worthwhile to pay attention also to a “leveraging across” modularised systems. Such a “cross-leveraging” of power can be detected in the *Microsoft* case. The company engaged in anti-competitive behaviour on the browser market by (mis-)using its dominant position in the operating systems market. Microsoft thus captured the market for internet browsers which can be viewed as “functional equivalents” of operating systems. It thereby leveraged power not just from one market to another but from one modularised information system to another. This implies that we should pursue a comprehensive competition policy for information systems and

carefully assess potential impacts *across* systems. Ultimately, it draws our attention to the connectedness and interdependence of the phenomena in the information environment.

The emergence of market power on a certain layer is latent because markets for information platform products are inclined to generate dominant standards, due to network effects. Dominant firms have the incentive to adopt competitive strategies that prevent other firms from achieving compatibility with their products at all, or that only allow compatibility under conditions that will maintain their monopoly over the platform. Antitrust law can force access to platform standards and thus promote competition “within” the standard platform technology. However, antitrust litigation may come too late, *i.e.* when the dominance of one firm already has harmed consumer welfare. IP law can help at an earlier stage. But in doing so, it must incorporate an antitrust-like market analysis in order not to discourage the search for alternative platforms in a competitive process.