

STANDARDS, COMPETITION AND INNOVATION - A STOCKHOLM NETWORK POLYBRIEF

The importance of standards in our developing industrial society is growing as technology moves into increasingly complex territories, and competing companies are inclined to establish common ground. This common ground helps to ensure that the assortment of technological possibilities is kept to a necessary minimum, whilst also establishing a widespread level of compatibility and quality¹. Standards offer a shared language that technologies use to communicate with one another, allowing for greater interaction between products or components. This can mean improved interoperability, interconnectivity, and commoditisation – all buzzwords for a more beneficial market. Standards across different country borders can also break down barriers to trade and create a large common market for businesses and consumers to participate in, whilst also reducing the regulatory burden on companies.

Furthermore, while innovations themselves often become market standards, the establishment of industry standards can also unlock innovative efforts above and around these standards.² Hence, although this will look different in different contexts, standards help to promote both competition and innovation in high technology industries. In 1981, International Business Machines (IBM) launched the IBM Personal Computer (IBM PC), which was designed to compete within a growing market of personal computers. So successful was the IBM PC that it soon became the standard for personal computers in the market and almost all computer products needed to be IBM compatible in order for consumers to be able to use them. The creation of IBM PC as the standard hardware for personal computers allowed for the establishment of Microsoft's Disk Operating System (MS-DOS), and the subsequent graphical user interface Windows 95, as the standard operating system.

HOW ARE STANDARDS SET?

Sometimes a standard will be established informally through the market by virtue of a product or protocol's dominant position, forcing other technologies to comply in order to compete. These *de facto* standards will be determined either by a specific company's product or by the collaboration of a number of companies to create a product that will represent a common interface, around which all products and services need to conform in order to maximise their potential in a market. There are numerous familiar examples of *de facto* standards, from wireless fidelity to the typical size that clothes makers use to sew on shirt buttons for men and women. It would be impractical for a company to manufacture a product that did not conform to the industry standard, for example by requiring customers to use batteries that are not easily available or by producing a product that cannot easily interact with the technology that most people have.

For instance, the Video Home System (VHS) cassette recorder was created in the 1970s by the electronics corporation Japan Victor Company (JVC). It offered entertainment producers the opportunity to produce copies of their films and television programmes onto a cassette that could interact with VHS recorders. However, the Sony Corporation had also produced a cassette recorder, called the Betamax system, which would require different cassettes than the VHS. As a result, a "standards war" began with both companies

¹ Blind, K and Thumm, N. *Interrelation between Patenting and Standardisation Strategies: Empirical Evidence and Policy Implications* (2004), p. 2.

² ICTSD, "Addressing the Interface between Patents and Technical Standards in International Trade Discussions", Policy Brief Number 3, February 2009, p.2.

trying to increase the uptake of their video recording systems in order to establish theirs as the standard. Ultimately, VHS won out and entertainment products were manufactured onto VHS cassettes until the late 1990s, when they were eventually replaced by the digital versatile disc (DVD).

Formal standards are those that are established either by governments or by standards organisations and are usually set out in published documents outlining the technical specification designed to be used as a rule. Standards set by government will be mandatory and are established through the regulatory process. Alternatively, formal standards can also be set through voluntary consensus by companies and negotiated by standards development organisations (SDO), though these usually lack a legislative authority and so cannot be accurately described as *de jure* standards. Setting formal standards in this way has sometimes been described as bringing together "commercial, academic and regulatory interests which, through this complex interaction, identify the need for common specifications especially for network-based technology, elaborate, develop and diffuse technical specifications"³.

WHO SETS STANDARDS?

There are numerous standards organisations operating at every level, from international organisations (see International Organisation for Standardisation), regional organisations (see European Committee for Standardisation), to national organisations (see British Standards Institution). In addition, standards organisations are also arranged by sector in order for them to establish industry-specific standards, such as the Institute of Electrical and Electronics Engineers Standards Association (IEEE-SA) or the Audio Engineering Society (AES).

Groupe Spécial Mobile (GSM) is an association of hundreds of mobile operators and related companies created by the European Conference of Postal and Telecommunications Administrations (CEPT) in 1982 to establish a standard mobile technology for Europe. GSM developed a system which put together the expertise and technology of the companies within its organisation and it was this system that was eventually established by the European Telecommunications Standards Institute as the most popular standard for mobile telephone systems in the world. The technology used for wireless fidelity (Wi-Fi) is based on the standard developed by the Institute of Electrical and Electronics Engineers. Compatibility and compliance with the standard is managed by the non-profit Wi-Fi Alliance, which also owns the "Wi-Fi" logo that is used by approved technologies. Other examples of collaborative approaches to standards setting are also seen in the creation of the Universal Serial Bus (USB) standard and the Moving Picture Experts Group (MPEG) standard.

INTELLECTUAL PROPERTY RIGHTS AND OPEN STANDARDS

In the discussion on standards, a distinction is often made between standards based on proprietary efforts and standards based on collaborative or open efforts. Proprietary-based standards include those standards that are transferred or diffused using intellectual property rights (IPRs), including patents, copyrights, trademarks, etc. Companies owning the rights to a particular standard may license the knowledge and use of the standard to other companies seeking to develop products based on or using the standard. This may or may not involve charging them a royalty or fee. For instance, Qualcomm, which holds the rights to several components of the code division multiple access (CDMA) standard, a standard air interface design for commercial cellular wireless networks, utilises royalty bearing licenses to distribute its portfolio. It has

³ European Community. *Interaction between Standardisation and Intellectual Property Rights* (Joint Research Centre, 2004), p. 42.

negotiated licenses with over 155 companies that sell 3G mobile telecommunications products.⁴ The group of companies that developed the USB specification operate a similar strategy – companies can implement the USB standard (i.e. obtain a vendor ID number or permission to use the logo in their products) by purchasing a license from the USB Implementers Forum.⁵

In this context, IPRs act as an incentive for companies to invest in the creation of new standards, by guaranteeing them either a temporary advantage in the market or commercial return from royalties. License fees are especially important for companies that sell inputs rather than a full product. This is often the case for ICT and network industries, which involve a great deal of vertical specialisation and a large number of companies relying on existing knowledge to create applications and further innovations.

Standards based on proprietary efforts are often contrasted with so-called “open” standards. The exact meaning of open standards is a highly contested issue, with different communities having different understandings of the concept. For many, including most SDOs, openness means that anyone who wants to implement a standard can do so on reasonably equal terms (this is commonly known as FRAND – fair, reasonable and non-discriminatory – or just RAND).⁶ It also means that the development of standards, particularly by SDOs, is transparent and achieved by consensus.⁷ For instance, this position is taken by the American National Standards Institute (ANSI). For others, particularly the “open source” community, open means that a standard can be freely adopted and implemented.⁸ Some institutions and programmes at the EU level endorse this view, for instance the IDABC programme, which promotes royalty-free software standards as a crucial component of achieving interoperability in European e-government services.⁹ Nonetheless, across different parties, open standards tend to refer to standards that are publicly accessible – meaning that creators of standards cannot sell or give them to others selectively or exclusively. Furthermore, for many parties this does not mean that the standards are available at no charge or without IPRs attached. However, it is understood that the terms of the license should be non-discriminatory and reasonable to be considered open. According to these basic elements – standards should be publicly accessible on FRAND terms – there are a wide range of standards that are considered open.

Take, for example, the source code for Google’s Android mobile operating system, based on the Linux operating system – it is entirely open to mobile device and telecommunications companies at no cost. In contrast, there are patent pools, which are generally managed and licensed by a neutral third-party administrator, so that the licensors do not have a say or even know who the licensees are. Licenses for MPEG standards (including MPEG-2 and MPEG-4) are managed in this way, via the patent pool MPEG LA, which also pools patents on a range of technologies.¹⁰

All of the standards discussed here – including open and proprietary-based – are legitimate and important depending on the circumstances. Opening standards to the public can allow for greater competition in implementation and the development of new and better standards and end products. And, proprietary-based efforts are important for incentivising the creation of path-breaking innovations and market standards.

⁴ Qualcomm, “LTE/WiMAX Patent Licensing Statement”, December 2008,

http://www.qualcomm.com/common/documents/licensing/LTE-WiMax_Patent_Licensing_Statement.pdf (Accessed 25 February 2010).

⁵ USB Implementers Forum, Developers Area, <http://www.usb.org/developers> (Accessed 22 February 2010).

⁶ Simcoe, T., “Open Standards and Intellectual Property Rights”, *Open Innovation: Researching a New Paradigm*, OUP, 2005, p.8.

⁷ ICTSD (2009), p.3.

⁸ Simcoe (2005), p.8.

⁹ Taylor, G., “The European Interoperability Framework v2 and Open Standards – A European Perspective, Open Forum Europe, 2008, <http://www.openforumeurope.org/library/Speeches/EiFeuropeanview/download> (Accessed 22 February 2010).

¹⁰ MPEG LA, About, 2009, <http://www.mpegla.com/main/Pages/About.aspx> (Accessed 22 February 2010).

THE DEBATE BETWEEN OPEN AND PROPRIETARY-BASED STANDARDS

Nonetheless, a heated debate exists between proponents of open and proprietary-based standards. In this debate, “open” is often equated with “free” and “proprietary” with so-called “closed” efforts. One argument is that because open source efforts allow anyone to access standards at no cost, they promote more competition and better innovation than proprietary-based efforts. Furthermore, because IPR-based standards offer access at a price, they are sometimes considered to be barriers to competition and innovation, and as such, closed standards. Crucially, a distinction is rarely made between proprietary standards that are not publicly accessible and those that are accessible for a fee.

In fact, based on the definitions provided above, proprietary-based and “closed” standards (i.e. not publicly accessible) are not necessarily synonymous. Neither are open standards and those that are free. Rather, many standards involving IPRs are publicly accessible at a reasonable, transparent and non-discriminatory price – hence, they are open. Many patent pools, like MPEG LA mentioned above and the Open Patent Alliance for the field of WiMAX technology (4G wireless technology),¹¹ are a good example of this. And many standards typically considered to be open (i.e. which do not involve conventional licensing structures) are still based on an IP model of some form. For instance, “defensive patent pools” work similarly to SDOs in that they aggregate a set of standards for public use with the intent that users can implement the standards without facing litigation; however, in the case of “defensive patent pools” – such as RPX, an aggregator serving companies competing in the Long Term Evolution (LTE) market (the interface component of 4G cellular wireless standards) – member companies pay an annual fee to access all the standards.¹² In the case of RPX, members can access over 1,000 standards for a fee that is considerably less than purchasing each individual license, but the IPR regime of the rights owners is still protected. Google’s Android technology is not IPR-free either. It is available to users under an Apache License, under which copyright is still preserved and while vendors may access the technology for free, they can add proprietary extensions without making them open to the open source community.¹³

NEW GOVERNMENTAL APPROACHES

With global competition and the convergence of new technologies only set to increase in the 21st century, the issue of standards and standard development is becoming a growing focus of policymakers. For instance, the European Commission has created an Expert Panel for the Review of the European Standardization System (EXPRESS), charged with identifying strategies for strengthening the framework for standardisation in Europe and globally. The EXPRESS committee released a report in February 2010 and its recommendations are now being widely discussed among different policymakers and stakeholders. Led by Malcolm Harbour, chair of the Committee on the Internal Market and Consumer protection, the European Parliament has also taken a special interest in the standardisation issue and the Commission’s EXPRESS report. In North America, the American National Standards Institute is reviewing the EXPRESS report’s recommendations and discussing the issues raised in the report in the context of the US standards community.¹⁴

¹¹ Open Patent Alliance, About the 4G Open Patent Alliance, 2010, <http://openpatentalliance.com/about> (Accessed 22 February 2010).

¹² RPX, How it Works, 2010, http://www.rpxcorp.com/svc_howitworks.html (Accessed 22 February 2010).

¹³ Apache Software Foundation, Frequent Questions about Apache Licensing, 2009, <http://www.apache.org/foundation/licence-FAQ.html#CLA-Usage> (Accessed 22 February 2010).

¹⁴ American National Standards Institute, “ANSI and ESO Leaders Meet in Madrid to Address High-Priority Issues for U.S. and EU Standards Systems”, 1 March 2010, http://www.ansi.org/news_publications/news_story.aspx?menuid=7&articleid=2459 (Accessed 3 March 2010).

CONCLUSION

This policy brief has sought to introduce the wider issue of standards and describe some of the fundamental debates about how standards are and can be set. Clearly, the discussion on standards and how standards are established – through formal bodies, IPRs or through non-proprietary means – will only intensify as both the public and private sector seek to promote innovation and competition even more in the future. The examples discussed throughout this brief demonstrate that open standards, even open source standards, can be compatible with proprietary standards. Indeed, the dichotomy between proprietary-based and open standards need not exist. Both kinds of standards are crucial for maintaining forward momentum in the development of information, communication and network technologies, and in many cases they work together. Policymakers and members of different standards communities should seek to balance the different approaches to standard creation discussed here, and not emphasise one at the expense of the other, if they intend to optimise innovation and competition.