

Emerging coordination mechanisms for multi-party IPR holders: linking research with standardization*

Abstract

The standards setting process relies to an increasing degree on successfully integrating up-to-date research and development results (R&D). The successful interaction between research and standards can provide important social benefits. But, to do so, a number of challenges need to be faced. One key and persistent challenge is to provide the conditions in which the cross-purposes of formal standards-setting bodies and intellectual property rights can equitably be accommodated. This means balancing the collective gains to be reaped from the elaboration of a common standard against the individual gains to be allocated to relevant individual rights-holders. This discussion paper focuses on approaches to the reemerging tension between intellectual-property-rights and standards. It points to the importance that successful approaches can have to improve the interaction the between research and standardization activities. It then goes on to consider the (re)emergence of two approaches that are indicative of the changing relationship between intellectual property rights and standards-setting bodies.

Authors:

Eric J. Iversen, Nifu Step, Norway & The Australian Innovation Research Centre, University of Tasmania.

Rudi Bekkers, Dialogic innovatie & interactie. The Netherlands.

Knut Blind, Fraunhofer Institute for Systems and Innovation Research. Germany

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““It is not enough to consider IP rights in a vacuum; we must consider them as they are actually used in practice. And that means considering how SSO rules affect IP incentives in different industries.” Lemley 2002: 2.

1. Introduction

The relationship between intellectual property rights and formal standardization is as tense now as it has ever been. A series of current conflicts¹ indicate that the tensions that first emerged between intellectual property rights and standardization during the 1980s and 90s are again under strain. The re-emergence of confrontation between these two cornerstones of the modern economy threatens the successful integration of new research into influential standards. This indicates that there is an increasing need to improve coordination in and between the research and the standards environments. Improvement entails enhancing positive socio-economic outcomes from the coordination of research and standardization activities while mitigating negative dimensions (e.g. club effects, regulatory capture).

This paper discusses a set of approaches to coordinate the private interests broadly associated with research investments and the collective interests implied by formal standards-setting processes. It differentiates between traditional approaches to secure ex ante disclosure of intellectual property rights in formal standards-setting bodies (SSBs) from other, more actor-oriented approaches. Based on the earlier work of the respective authors on the IPR issues in SSBs, this paper moves on to discuss the significance of two alternative mechanisms to coordinate intellectual property rights in this environment: patent pools and new uses of Non-Assertion Covenants. We start by taking stock of the issues that arise between IPRs and SSBs in terms of the literature and in terms of evidence of the emerging tensions. We then review some evidence that alternative approaches to the straining relationship are needed, before looking at two notable examples: adaptations of patent-pooling arrangements and the novel use of Non-Assertion Covenants.

2. Emergence of the conflict

Formal committee-based standardization and IPRs are complimentary economic institutions whose international foundations reach back to the beginnings of modern economies². Tension between them however is only relatively recent. It grows out of the fact that the roles of IPR regimes and formal Standards Setting Bodies are inherently complementary in the changing frame of the innovation system. The complementary relationship has increasingly been strained during the past 2-3 decades as the use— and the conditions of use— of each have ‘co-evolved’ along with technological and

¹ Especially the cases involving Rambus and Qualcomm respectively (see below)

² The treaties on which the International Telecommunications Union and on which the World Intellectual Property Organization are respectively based were entered into in the second half of the 19th century at the international level, while the history of patenting especially goes much further back in individual countries. It is a coincidence that the ITU and WIPO buildings (both UN organizations) face each other in Geneva.

regulatory factors, especially competition law.³ The result has in the emergence of a fault-line along which divisive confrontations have periodically emerged in different guises. It is important to the overall innovative system to keep the variety-creation and selection processes in balance (Carlsson, and Stankiewicz, 1992; David and Foray, 1995) yet the fault-line threatens this balance. The increasing strain between Standards Setting Bodies and intellectual property rights can thus be seen as an emerging area of dis-coordination at a key juncture of the innovation system (Iversen, 1996; 2000; Blind and Iversen, 2004).

Background issues

To address this issue, and to begin to think of the conflict in terms of the impact on the interaction of research and standardization activities, we review the general trade-off that underlies the conflict.⁴ The fact that formal standardization operates in a state of trade-off with intellectual property rights has been focused on in the literature since at least the late 1980s⁵. A pioneering work (Farrell, 1989) presented the question in terms of the costs and benefits of compatibility in network industries, indicating that stronger IPR may unduly strengthen the position of an individual 'vested interest' at the cost of delaying or undermining a socially beneficial outcome based on a common standard solution.⁶ In this analysis, the question involves equitably allocating the collective gains to be reaped from the elaboration of a common standard against the individual gains to be allocated to relevant individual rights-holders. But its wider implications can be amplified in situations involving competing technologies in the face of increasing returns and lock-in (Arthur, 1989).

The expectation that the relationship between intellectual property and formal standardization is becoming increasingly tense is found throughout the 1990s. Weiss and Spring (1992) indicated that IPR issues could arise at different stages of the standardization process, and that 'anticipatory' standardization (Cargill, 1989) could itself produce new technologies with posed ownership question. Based on the GSM experience, Miselbach and Nicholson (1994) spelled out some of the emerging issues in the telecoms environment, while Lea and Shurmer (1994) indicated how the changing regulatory environment strengthens the potential for conflict here. Looking at the complementary role between intellectual property and standardization, Iversen (1994; 1995) anticipated that conflicts would increase in number and in scope, with Iversen

³ In the sense of Nelson (1994). See Iversen (1994; 1996; 2001) for the case that increased conflict of increased scope is to be expected as a function of the 'co-evolution' of institutional, regulatory, and technological factors.

⁴ This is in addition to the literature whose primary focus is on standardization. For surveys of different dimensions of this literature, see David (1987); Hawkins et al (1995); Schmidt & Werle (1998); Farrell & Klempner (2004); Blind (2004).

⁵ For a survey of issues and the literature see Blind et al 2002; Lemley, 2002; Lin (2002)

⁶ "the more a standards body becomes an arena in which to fight over intellectual property spoils, the less likely it is to reach rapid agreement on choosing the 'best' technology, or on any choice at all. The difficulty of reaching agreement may be measured by the size of the gains that must be allocated to one party or another compared to the common benefit of reaching agreement. Thus the more protection there is, the harder it will be for formal standardization to work." (Farrell 1989: 43)

(2000) making the case that the increasing strain can be seen as a function of a Nelsonian process of 'co-evolution' of institutional, regulatory, and technological factors (2000)⁷.

The early focus, both in the literature and indeed on the approach to remedy it, has been on getting the individual right-holder to commit to the collective outcomes. Here, conclusions have been drawn about moderating the strength of IPRs (Farrell, 1989; 1995) and adjusting licensing conditions (Kleinmeyer, 1998). Since then, patents and standards have continued to proliferate and the technological and commercial environment has continued to change. The combination of factors has yielded scenarios in which allocations that might be equitable between the individual rights-holder and the collective interest can still lead to outcomes which are unsustainable. This scenario is one in which the cumulative costs that emerge from multi-right and multi-right holder scenarios. It has however been the law literature which has most consistently focused on the question (Good, 1991; 1992; Shurmer & Lea, 1995; Lemley, 2002; Lin, 2002)⁸.

The straining relationship was also mentioned in OECD's report on ICT Standardization In The New Global Context Final Report (OECD/GD (96)86), and was highlighted in as a subsection in Kahin and Abbate (1995). In this edition, Farrell (1995) extends an earlier argument (gateway interfaces) to argue for weaker IPR protection in network technologies. Kleinmeyer (1998), who focus in general on standardisation between co-operation and competition, confirms Farrell's reasoning and suggests therefore a modified licensing system and reduced terms of protection. In the volume of Kahin and Abbate, Shurmer and Lea (1995) provide an early overview of the dilemma posed by IPR to the changing telecommunication environment.

2.2. Emerging tension along the fault-line

The earliest cases of conflict between IPR holders and formal standardization activities go back to the late 1970s, early 1980s⁹. A rash of very different disagreements emerged along the fault-line since, including cases involving ATM card¹⁰, 56k Modems, VL-Bus, UMTS, digital VHF, Tetra, etc. The controversy surrounding the comprehensive GSM standards in the early 1990s brought the conflict onto an international level (Bekkers, 2001; Iversen, 1996; 2000; Haug 2002; Dupuis 2002). The pivotal Dell case in mid-90s¹¹ established in the US a presumption of search among IPR holding committee-members. Since then tensions have also moved outside the area of network technologies, which is the conflict's heartland, to affect other technological areas (Blind et al., 2002).

⁷ Thanks to Morris Teubal for this observation in 1996.

⁸ (e.g. Good (1991), Wilkinson (1991), Tuckett (1992), Buttrick (1993), Hanrahan (1995), Ask (1995) and Ellis (1995)).

⁹ The first relevant case appears to have involved a format for magnetically coding and storing information, Ansi's standard for Group Coded Recording (GCR). *Potter Instrument Co. v. Storage Technology Corp.*, 207 U.S.P.Q. (BNA) 763 (E.D. Va) cited in Mutter (2002). See also Updegrove. LAWS, CASES AND REGULATIONS. <http://www.consortiuminfo.org/laws/#dell>

¹⁰ *Stambler v. Diebold, Inc.*, 11 U.S.P.Q.2d (BNA) 1709 (E.D.N.Y. 1988), <http://consortiuminfo.org/antitrust/stdi.php>

¹¹ *In re Dell Computer Corp.*, 121 F.T.C. 616 (1996). Docket No. C-3658

The recognition of the potential for conflict has not come all at once in different countries or in different technological areas or, not least, in different SSBs. The mode to address it has however tended to be the same: to enshrine *ex ante* non-disclosure rules into the bylaws of individual standards setting bodies. Starting with ANSI, which developed guidelines in 1992 for the implementation of its IPR policy (developed in the mid-1980s), and notably followed by ETSI, whose inception was accompanied in the early 1990s by an intense and revealing row over its IPR policy (cf. Commission; Iversen, 2001), the response to the dawning recognition of the potential for conflict has tended to centre on developing and improving the intellectual property policies of SSBs. This form of response has evolved to deal with the changing dimensions of this conflict, informed by regulatory guidelines (e.g. Com92/445 sets out principles following the GSM case in Europe) and by case law (especially the influential Dell case). In addition other related administrative issues can come into play (cf. voting irregularities in the Tetra case: Bekkers, 2001. Blind et al, 2002).

Recent events have further contributed to a general environment of uncertainty by sending mixed signals, not least about the reach of IPR rules in the bylaws of individual standards setting bodies. These events also suggest that alternative approaches may be required to address conflict on this front. The first is the unprecedented Rambus case¹². In it, the FTC overturned its own earlier ruling to find (August, 2006) that this 'technology licensing company' with no production facilities, had conspired, "...to distort a critical standard-setting process and engage in an anticompetitive 'hold up' of the computer memory industry."¹³ An earlier FTC conclusion (in 2004) had, in contrast, laid the blame on JEDEC, the standards body, for inadequately addressing participant obligations about IPR disclosure in its bylaws. The change in position in the Rambus case at the FTC is only the latest in a line of contrary rulings about Rambus which stretch back to 2001. This case has raised uncertainty about how courts interpret the legal rights of individual rights holder as against the collective interest of standards-setting bodies. It pits recent patent jurisprudence, which has tended to strengthen the rights of the patent-holder¹⁴, against the membership rules of an organization, where certain SSBs like the IETF, W3C and Jedec have followed a counter tendency inspired by the open source movement to discourage the inclusion of royalty bearing IPR in its standards. Whereas the Dell Consent Consent decree in 1996 and previous rulings had established a precedence about the use of patents in relation to ongoing standards, the Rambus case has sent mixed signals, thus serving to raise uncertainty here.

A second set of events involves the mobile-environment and the European SSB (ETSI) GPRS standard, which Qualcomm claims to infringe its patents. This case has a

¹² <http://www.ftc.gov/os/adjpro/d9302/index.htm>

¹³ The unanimous opinion states "Rambus's conduct was calculated to mislead JEDEC members by fostering the belief that Rambus neither had, nor was seeking, relevant patents that would be enforced against JEDEC-compliant products. . . . Under the circumstances, JEDEC members acted reasonably when they relied on Rambus's actions and omissions and adopted the SDRAM and DDR SDRAM standards." <http://www.ftc.gov/opa/2006/08/rambus.htm>

¹⁴ See the Jaffe & Lerner (2004), and the vicissitudes of patent reform in the US.

prehistory that goes back to the late 1990s when attempts to pool UMTS patents ran into problems with Qualcomm (see Bekkers et al, 2006). In the current set of cases, Qualcomm has agreed to license the eleven patents, claiming to abide by the terms of 'fair, reasonable and non-discriminatory' FRAND required by the ETSI. (cf. Standards Blog, ConsortiumInfo.org) Nokia and other vendors have however rejected the licensing terms, leading to a spat of legal actions. Qualcomm has sued Nokia (as well as Broadcom) for patent infringement in the US and the UK, including a complaint with the U.S. International Trade Commission, while Nokia and five other entities have lodged a complaint against Qualcomm with the European Commission for excessive royalties¹⁵. At base, the conflict begs the question of what 'fair, reasonable and non-discriminatory' FRAND actually means. In August 2006, Nokia in effect asked a Delaware court to define FRAND, which is essentially the foundation for the ex ante disclosure rules of most standards-setting bodies and the regulatory framework that it builds on. The events around this case therefore further draws into question the reliability of the established approach to deal with the conflict.

3. Coordination mechanisms and their role in the R-S interface

These are only two cases, in very competitive technology markets, in an environment of over a million supported standards¹⁶ and of an ever thicker undergrowth of IPR. Two cases do not in themselves indicate that the coordination between IPRs and standardization activities is breaking down. They do draw into question whether the ex ante disclosure rules of SSBs provide a sufficiently reliable platform on which to stabilize the relationship between IPRs and SSBs. It is therefore significant that both the regulatory framework and the market have been asking this same question. Here we briefly review some the remarkable amount of debate that emerged when the US regulatory framework opened an inconclusive debate on this issue in 2002. In the next section we will move on to look at some of the alternative modes that have emerged to better coordinate intellectual property and standardization.

Regulatory review of existing approaches

In 2002 the United States Department of Justice and the Federal Trade Commission dedicated a significant portion of its joint hearings on "Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy" to the question of how to provide for a more favourable climate for the interaction between intellectual property and formal standardization activities. The hearings took place at an early stage of the Rambus case, and they focused particularly on the role of the IPR policies of SSBs. The arguments presented reveal some deep differences in opinions about the efficacy of this dominant focus to address the IPR-SSB relationship and about the role of the regulatory framework.

¹⁵ complaint before the European Commission of telecom actors on the licensing terms of Qualcomm for patents deemed essential to WCDMA technology

¹⁶ According to Consortiuminfo.org. See also Perinorm...

Although ANSI's approach and those that have followed it have exerted a harmonizing effect on the IPR policy of SSBs both in the US and elsewhere, Lemley (2002)¹⁷ observed that there are wide discrepancies in how SSBs treat IPRs. ANSI itself observed that the different conditions that emerge at the fault-line between standards and IPR make a one-size fits all approach illusory. Some testimony indicated that the overall trajectory of the SSB IPR policy is moving in the right direction (cf. Updegrove) while others point to missed opportunities and inherent flaws (Cargill, 2002). Balto & Prywes, 2002 called for FTC guidelines to correct inherent weaknesses in the general approach. Their ten recommendations were dismissed by others (Holleman, 2002) who argued that guidelines would be counterproductive. The exhaustive Lemley document does however find a set of 'unresolved issues' that confront how such intellectual property policies can be applied and enforced in an American environment.

So far no unifying guideline has been issued. However, the DOJ and FTC did jointly open (in Spring 2006) for limited licensing discussions to take place in SSBs (one of the suggestions forwarded by Balto and Prywes). In sum these differences, and the fact that the hearings took place at all, support the impression that the current approach based on the different IPR policies of SSBs has not provided the stabilizing conditions to coordinate IPR in the environment of formal standardization.

It is perhaps not surprising that this debate remains inconclusive. It is meanwhile significant that a set of alternative attempts have been emerging on the ground to resolve the tension. In addition to continued attempts to improve the IPR policies at standards-setting bodies, other mechanisms have emerged to address the need for coordinating multi-rights and multi-right-holder scenarios where a potential for 'hold-up' or simply for the cost of rights—cumulative or individual—to become prohibitive creates uncertainty. One mentioned in the literature (e.g. Graf & Zilberman, 2001) involves 'patent clearing houses' which have been forwarded in the field of the bio-agricultural research (cf. Meunier?). The patent clearing house' approach involves a mechanism for academic researcher institutions to provide for free access to rights that might affect their research. This mechanism however does not seem to be sufficiently widespread in practice yet to affect the relationship between research and standardization. Other approaches include initiatives to adjust the quality and scope of patents, such as the IEEE proposal (in Spectrum journal) to develop a "limited patent" for software (2006).¹⁸

Factors that contribute to the straining relationship

Changes in the importance and the timing of standardization in the technological cycle have been especially important contributors to the straining relationship between intellectual property rights and Standards Setting Bodies. As the regulatory framework increasingly endorsed industrial self-regulation, standardization became much more

¹⁷ ANSI pointed out the necessity of different approaches.

¹⁸ IEEE proposal (in Spectrum journal) to develop a "limited patent" for software (2006). The idea, described by VNUnet as a 'fast-track patent' would be focus only on novelty requirements and it would have a life of four-years. The novelty criterion focus would reduce the examination process, thus shortening the pendency period, while the shorter life period would improve turnover in the patent thicket. (<http://www.vnutet.com/2149745>)

important to industrial development, especially in the US. (cf FTC, 1972) This contributed to the strategic importance of standards. At the same time standardization started to move in front of the market, where it elaborated pre-commercial or “anticipatory standards” (Cargill, 1989). While this improved the timeliness of standards, especially in some key industries, the move increased the scope for conflict with IPRs in two directions. Weiss and Spring (1992) showed that conflict could emerge in three phases of the standardization process, and indicated that the development of standards could generate its own IPR, raising the question of how to divide it. Moreover, the move towards ‘anticipatory standards’ moves the coordinating influence of standards-making in the direction of technological development which increases the likelihood of the standard to enter domains where IPRs are active and strategically important (Iversen, 1996).

There are a wide set of determinants of the increasing risk. We can here distinguish between three general sets of factors:

1. Research related factors: Shorter and shorter life cycles; technology is increasingly cumulative (Ziedonis, 2002); the proliferation of patents and ubiquity in certain areas (patent-thicket area); the advent of broad-patents, see the complaint by W3C about the Eolas patent.
2. Standards-related factors: the proliferation of standards bodies, changing status of traditional bodies in a tougher ‘market for standards’, a general rise in competitive stakes internationally(cf. 3G Mobile); Ongoing convergence. Not only between telecommunication and broadcast technologies, but also between IT, media and entertainment, CE markets and so on melt together.
3. Actor-based factors: the emergence of technology-only firms where the sole focus on the development of new technology tends to upset traditional balancing acts between individual and collective interests. Reasons for this include the fact that the firm of this type has weak incentives to cross-license but strong incentives to maximize profits.

4. Coordination mechanisms and their role in the Research–Standardization interface

In this light, this section will now go on to address some general dimensions of coordination mechanisms and their potential role in promoting interaction between research and standardization activities, while Section 5 will focus on two types: patent pools and new uses of Non-Assertion Covenants.

Patent pools and related strategies such as the open-source inspired use of Non-Assertion Covenants are thus (re-)emerging to address coordination problems at the interface of research and standardization activities. The suggestion is that they are addressing an increasing need to improve coordination in and between the research and the standards environments. In this scenario, improvement entails enhancing positive aspects of coordinating research and standardization activities while mitigating negative dimensions (e.g. club effects, regulatory capture). This need is related to an assumed increase in collective activities both in the research and the standardization environments. Firms and other actors are characterized by co-opetitive forms of interaction and by the pursuit of

new coordination strategies. Some of these changes affect the relationship between R&D as it takes place in and between firms and the successful fit with relevant standardization efforts, especially as they take place in formal bodies. (Kleinmeyer, 1998) Contemporary patterns of innovation are often thought of as involving the contribution of a wider constellations of participants who are engaged in more complicated forms of collaboration than ever before. A feature of the changing environment is the emergence of a set of mechanisms which facilitate the co-production, co-dissemination, and/or co-use of new knowledge:

- Mechanisms that coordinate research activities: R&D joint ventures, publicly funded research networks, cross-licensing arrangements, etc
- Mechanisms that coordinate standardization activities: alliances, publicly funded measures, consortia, the formal standardization infrastructure, (open source) etc.
- Mechanisms that coordinate in the interaction between research and standardization frames.

4.1. The interface between research and standardization.

Current characteristics in the ‘market for technology’ (Geroski, 1995; Teece, 1981; Arora et al, 1999, 2000 etc) raise the importance of mechanisms to coordinate research and standardization activities but which also (re) introduce new concerns which affect the interrelationship between research and standardization activities. In fact, patents and standards in particular are key mechanisms in the emerging forms of interaction. Intellectual-property-rights, and particularly, “patents are designed to create a market for knowledge by assigning propriety property rights to innovators which enable them to overcome the problem of non-excludability while, at the same time, encouraging the maximum diffusion of knowledge by making it public.” (Geroski, 1995: 97) They provide the basis for licensing (cf. Arora et al, 1999). Kleinmeyer (1998), who focus in general on standardisation between co-operation and competition, confirms Farrell’s reasoning and suggests therefore a modified licensing system and reduced terms of protection.

Standards too are taking on new roles to coordinate activity in this emerging environment. Langlois (2003) concludes that formal standardization activities is a market-supporting institution that has in part taken over the coordination problems which Chandlerian management is expected to solve. “In many cases, the visible hand has indeed been socialized into technical standards that permit external mechanisms of coordination and reduce the need for rich information transfer.” (Langlois, 2003; 376)¹⁹

In particular, the situation that has emerged, in which multiple patent rights involving multiple patent-holders overlap, means that finding a balance between the individual and the collective interests becomes more complicated. This multi-rights, cumulative costs scenario has been recognized to engender the potential for the ‘tragedy of the anticommons’ (Heller, 1998; Heller & Eisenberg, 1998) in which rational individuals

¹⁹ Quoted in Rejoinder (2004; 5). He stresses that this involves many cases and not necessary most and far from all.

(acting separately) collectively waste a given resource by under-utilizing it. This may happen when too many individuals have rights of exclusion involving a scarce resource.²⁰

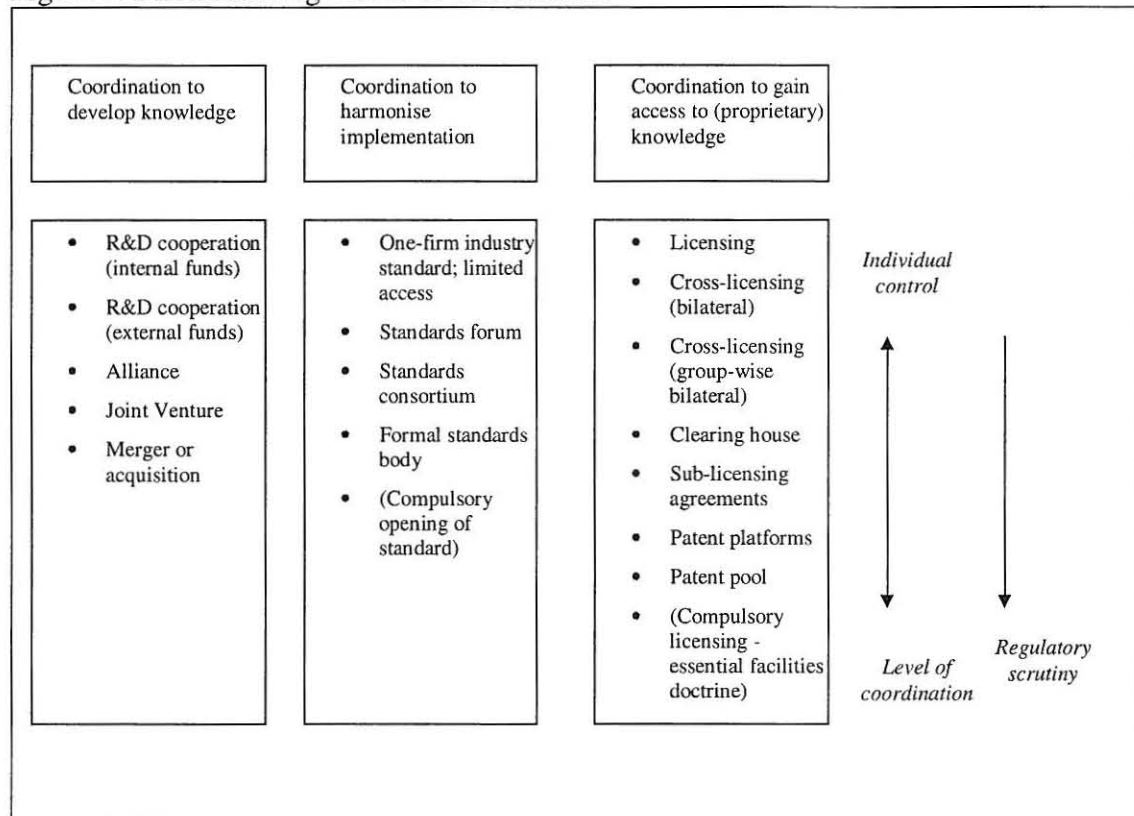
The risk of the tragedy of the anticommons (underuse) grows with the number of overlapping property rights. History teaches that formal standards are becoming prone to such situations. Any organisation that wants to implement a standard into a product, must ensure access to all essential patents (e.g. by obtaining licenses from all the holders of these patents). As a result, a standard that has many essential patents may suffer from underuse (lack of diffusion). It should be stressed that this type of underusage is different than the 'normal' type of underuse associated with the patent system (ie. the built-in trade-off in the balance between creation and usage). Coordination mechanisms are called for when the cumulative claims of individual rights-holders to control the results of their R&D makes it impossible to realize the collective interest which would accrue both to the original IPR holders and to other contributing stakeholders from further building on the shoulders of the earlier R&D results. The result that original R&D results and the potential secondary results are undermined. The risk is found in the biomedical research (which has a lot of patented procedures), discussed by Heller & Eisenberg, as well as in the relationship between standardization and research.

4.2. Modes of coordination: balance between individual and collective interests

The following figure tries to put the need for mechanisms to coordinate R&D output in the standards frame into context of the increasing diversity of mechanisms to coordinate various stages in the relationship between research and standardization activities. It distinguishes between mechanisms to address separate needs: those that coordinate collaboration to develop new knowledge, those that coordinate collaborative efforts to harmonize during the implementation of new technology, and those that along side the other two attempt to coordinate access to existing proprietary knowledge. The mechanisms are arranged according to the trade-off between control and coordination. Those that imply greater levels of individual control over outcomes are arranged at the top, moving towards greater collective coordination as one moves down towards mandatory standards, as a form of regulation (cf. Holznagel & Werle, 2002; Werle & Iversen, 2005) and compulsory licensing provisions.

²⁰ The term "tragedy of the anti-commons" was introduced by Frank Michelman and popularized in the late 1990s by Michael Heller. It has been applied to the standards case by a number of authors, see Lin (2002) for an overview.

Figure 1: Differentiating modes of coordination



5. Case-study based discussion

In this context the Interest project (EU 6th FP) surveyed a set of mechanisms that are emerging to address the relationship between intellectual property rights and standardization. Based on interviews, we briefly follow the literature to look at the re-emergence of patent pooling. We then look at the emergence of an emergent approach based on Non-Assertion Covenants. Whereas the traditional IPR policy approach to promote IPR disclosure is more a demand-based perspective from the point of view of the IP users, these alternative and complementary approaches constitute a more supply-side mechanism (IP holder). These cases contribute to an understanding of how mechanisms are evolving to address the straining relationship between intellectual property rights and Standards Setting Bodies.

5.1. Patent-pooling

The patent pool is among the alternative or complementary approaches that has received most attention both in theory as well as in practice. Although the patent pool has a long and chequered history stretching back more than 100 years, it has enjoyed something of a renaissance during the past decade or so. Patent pooling has been discussed from the point of view of addressing patent thickets (Shapiro, 2000; Merges, 1999; etc; Brenner, 2004, etc). It has recently emerged in several cases to coordinate IP of multiple stakeholders more efficiently in relation to standardization activities (cf Tirole et al, ; Lin,

2002; Updegrave, 2005²¹; Bekkers et al, 2006), from the perspectives of individual countries (Junghon, 2004) and in individual cases, like MPEG (Iversen et al, 2004).

Patent pooling arrangements are rather heterogeneous, and their application extends considerably beyond cases involving a standard. However the emergence of pooling arrangements for different flavours of DVD, MPEG, RFID and other formal or semiformal standards have become front page news. Several types of patent pools can be distinguished.

Pool model 1: Joint licensing schemes. These are initiated by a group of (usually larger) licensors of a particular technology (or standard). One of them may act as an agent for the joint licensing contract. For instance, Philips is the agent for both the DVD3 and the DAB joint licensing scheme. Most of these pools are eventually open to any holder of essential IPR to the standard in question, nevertheless, they started as a activity of a small group.

Pool model 2: Patent pools with a licensing administrator. In this type of patent pools, there is an open call for essential patents for a certain standard by an independent body. Subsequently, the body has a patent evaluation carried out (usually by an independent, third party) to determine essentiality to the standard in question. A priori, the licensors that decide to join such a pool do not know who the other licensors will be that will become a member of the pool. A good example of such a pool is the MPEG-2 pool. The licensing administrator determines whether the patents are in fact essential, sets the royalty rate for the bundles (in dialogue with the licensors), and collects the royalties and redistributes them given a pre-agreed scheme.

Pool model 3: Patent platforms. In this model, an organisational approach is adopted that deals flexible with multiple technologies (standards) and multiple product groups (employing one or more patents that are essential to a certain standard). It also aims to be more flexible towards the actual agreements between licensors and licensees. In the patent platform, there is one overall umbrella organisation, as well as multiple entities called 'PlatformCo', which each develop licensing programmes for specific standards. The aim is to have a standard offer (bundle) available (that the involved licensors cannot refuse). However, within the context of the patent platform, licensors and licensees may also agree upon other arrangements, possible involving cross licensing, the licensing of non-essential patents, and so on. To date, the 3Gplatform is the only example of such an approach.^{22, 23}

The third-generation mobile telecommunications case is a special case, in the sense that the total number of essential patents for this single standard is apparently much higher

²¹ Updegrave (2005) Patent Pools, No Action Letters and Open Source: Keeping Good Deeds Unpunished

²² In Goldstein & Kearsey (2004), the 3Gplatform founders explain the organisations model in detail.

²³ Critical comments concerning patent platforms were expressed in EETimes, (November 27, 1999), 3G intellectual property licensing strategy comes under fire, available at <http://www.eetimes.com/story/OEG19991127S0003>.

than for any other single compatibility standard, and that there are more different IPR holders than with other standards.²⁴ This increases potential problems with a too high cumulative license fee. Also, patenting is (even) more strategic than in other areas: many patents seems to be technically very, very close, suggesting that their holder deliberately tries to get multiple patents on what could be considered as one single invention.

Patent pools that bundle licensees for a specific technology, such as essential patents for a technical standard, can be called *Technology-based patent pools*. Typical features of the modern patent pool is that it makes all pooled patents available to each member of the pool, that it provides standard licensing terms to licensees who are not members of the pool, that it includes a simple, coherent menu of prices and other terms to licensees, that it allocates a portion of the licensing fees to each member according to a pre-set formula or procedure, and that it involves a consensus to license on FRAND considerations.

In the current context, where RC and (F)RAND policies show their limitations, patent pools hold some promise to help:

- (a) bring transaction costs down²⁵,
- (b) control the cumulative licensing costs, and
- (c) clear blocking patent positions and lessen access problems caused by opportunistic behaviour.

Other goals of patent pools include the avoidance of costly infringement litigation²⁶ and assure the interoperability and implementation of technical systems.²⁷ An often-overlooked aspect is the role of patent pools in that of a mechanism of information or knowledge exchange, e.g. unpatented technical information and information on the essentiality of IPRs.

Because of these potential anti-competitive effects, competition authorities look with great attention to patent pools and comparable constructions. If these authorities do not find sufficient safeguards that prevent undesirable effects from happening, they will not allow such agreements. Participants will look for ways to include such safeguards. Mechanisms that can be included by the patent pool participants to reduce the risk for anti-competitive effects.

5.2. Use of Non-Assertion Covenants

²⁴ As a comparison: the patent pool for DVB-T (proposed in 1998) covers 12 essential patents (that apparently are all essential patents) and four IPR holders and seems to cover all. (see <http://www.eetimes.com/futureofsemis/showArticle.jhtml?articleId=18300379&kc=2511>). Many other pools have much lower number of IPR holders than in 3G too.

²⁵ Here, we refer to the reduction of transaction costs associated with one-shot agreements in an environment with a repeat-play nature. Note that cross-licensing agreements can have this feature too: they often do include provisions of future IPR held by the contract parties.

²⁶ See www.essentialinventions.org.

²⁷ See www.mpegla.com.

A newer approach involves the (multilateral) uses of 'non-assertion covenants' (NAC) that have recently emerged to reduce uncertainty about IPRs in the standards environment surround the document format standards. In brief, 'Non-assertion covenants' are familiar bilateral agreements which accompany licensing agreements. However, when used as a unilateral agreements initiated by dominant players with large IPR holdings, they can significantly affect the licensing dynamics of a technology. In this case, they are used to signal to potential adopters of the standard (and to regulatory authorities who might be interested in the 'openness' of a given standard) of their intention not to assert such rights in as far as they overlap the area of an emerging standard.

The covenant is based on the principle of reciprocity, meaning that it provides the strong incentive for other rights-holders to follow suit. The successful NAC can thus defuse the IPR question altogether, both for parties to the standards activities as well as for third-parties. At the same time, the NAC can also serve to promote the adoption of the standard since it signals strong backing while it reduces uncertainty about what the terms of licensing are likely to be.

The exemplary unilateral use of such an agreement stems from the open source environment where IBM recently issued a "Statement of Non-Assertion of Named Patents against OSS"²⁸. The IBM statement, which was made in November 2005 in conjunction with the Open Invention Network (OIN) collaboration²⁹, aims ostensibly to promote innovation in the open software space by not asserting a set of 500 US patents (and related patent family) for developers and/or users of Open Source Software. This statement, whose legal scope would need to be established in a definitive court case, includes a defensive clause addressing the assertion of third party IPR not only against IBM but for any "Open Source Software developer":

The IBM statement, developed for the open source environment, provides an immediate precedence for the unilateral use of 'non-assertion covenants' (NAC) in the area standardization. Non-Assertion Covenants have emerged against this background both in conjunction with the ODF and with the competing XML Reference Schema (see Updegrove's coverage in ConsortiumInfo.org). The appearance of NACs has highlighted the question of how 'open' the competing standards are. Sun Microsystems issued its NAC to the OASIS consortium of which it is a member. The NAC spells out Sun's intentions not to enforce any of its patent claims, provided other parties don't enforce theirs for the standard, either for the current version of the ODF or any subsequent version in which it is involved in elaborating. Also, its defensive clause protects not just Sun, but any other developer, whether open source or not. The NAC represents a commitment by Sun to the standards consortium and to potential adopters of Sun's intention. This commitment can be seen to be binding since it carries the weight of Sun's member contract with the consortium. Whatever its legal merits, the role of the NAC is significant in helping to lay the basis for the OpenDocument standard's outward presentation as unequivocally 'royalty-free'. This helps to dispel uncertainty about the licensing status of the standard, which after all involves major players with large patent

²⁸ <http://www.ibm.com/ibm/licensing/patents/pledgedpatents.pdf>

²⁹ which also involves Novell, Philips, Red Hat, and Sony

portfolios, such as IBM, Sun, and Adobe. The signal that the NAC conveys both for this version and upcoming versions reduces the uncertainty of potential adopters on this important point. It also helps open source developers, who dislike the idea of having to obtain licenses (regardless of whether they are royalty free or not) for their activities.

5.3. Discussion

The relationship between intellectual property rights and standardization activities remains tense. The empirical work here acknowledges the need to find better ways to deal with those IPRs that may be deemed 'essential' to the functioning of a standard. As observed above, there are some general IPR related challenges and others related to the standards environment and to the emergence of new business-models among certain companies. The IPR related challenges include concerns about the quality of patents in general, about their applicability in software, about their potential to encumber interfaces, as well as about the way different actors use them. The emergence of this use of Non-Assertion Covenants and the re-emergence of patent-pooling arrangements can be seen against this backdrop. And it can be seen in relation to other initiatives in this area as well, including the IPR policies of individual standards development organizations (SDOs) and to the open standards moment.

The unilateral use of Non Accession Covenant illustrates the fact that new mechanisms are being tried in order to resolve the sorts of problems that can arise when a standard involves the IP of an unknown number of patent holders. That approach attempts to return the relationship between standards and patents to a time when patents were employed defensively. This approach appeals to users in the public sector, and emphasizes the importance of support. In this case, the advantages of a standard that is widely adopted outweigh the added prospect of royalty income. The NAC case attempts to circumvent this tangle of issues by using the IPR position of a dominant player to ensure the standard will remain Royalty-Free. But this is a special case and one where the markets structure, the legislative climate, and the type of technology all influence the equation.

The NAC³⁰ case is one in which the Standards body and the strategic use of the NAC are strongly aligned. Here the legal bond of the member company to the standards body provides some of the credibility of its commitment not to enforce its IPR. At the same time, the existence of this NAC helps the standards body to bill the standard as 'royalty free'. One of the concerns of SDOs involves the timely disclosure of essential IPR. Here the successful NAC actually moves a significant step beyond merely getting the holders of 'essential' IPRs to disclose in a timely fashion. Disclosure is a primary step to address the threat that IPR royalties pose to the development of a standard, and it has been addressed both in the courts since at least the early 1980s³¹ and since then by standards bodies. The NAC is the initiative of one IP holder who unilaterally acknowledges that it has rights which might be viewed as essential for the standard at hand; and it, as a matter

³⁰ Input and corrections from Updegrave and an Oasis source are gratefully acknowledged.

³¹ See the FTC vs Dell, 1996. the earliest case identified is 1981 in the US. See Iversen, Østersjøen, Thue Lie (2005).

of public record, states its intention not to claim royalties for those rights provided reciprocity from other right-holders. Of course this action by a single actor does not mean that all rights will be disclosed by all other rights-holders or that they will follow suit in licensing terms. But it does force the hand of recalcitrant rights-holders and it ideally can set a standard for the way other all rights holders behave for purposes of the given standard. Failing that, playing the NAC card may be advantageous since it would tend to flush out any royalty-bearing rights at a relatively early stage. Moreover, Sun's NAC for ODF studiously avoids referring to "Essential Claims", thus diffusing the potential for court battles as to what is and what is not essential.³²

Patent pooling mechanisms attempt to pool essential rights in order to provide an efficient mode to allocate individual gains against the collective gains of arriving at a viable standard. The patent pool may help by: (a) lowering transaction costs, (b) by verifying and then coordinating cumulative licensing arrangements and (c) and by reducing access problems caused by opportunistic behavior. Pooling mechanism can also increase transparency, lower uncertainty, lower search costs and speed up access. Here again the merit of the patent pool has to be confirmed for the specific case, based on competitive and the details of how it is arranged. Indeed there may be economies of scale in the provision of third-party patent pools. There is an interesting development of independent licensing administrators that have developed patent pools processes, including open calls and external assessment of essentiality of the patents in the pools. Using a similar pool design for each time, they do not need to go through the business review process over and over again, saving time and costs. Although this process increases the risk of having several pools for a single standard (see above), they do seem to benefit both licensors and licensees and thus also society as a whole. In fact, some pools that were initially reported to be established by one of the licensees (the joint licensing programme model) were instead brought to one of these independent license administrators.³³ This model may also be more efficient in dealing with potential litigation, which has been rising among patent pools in recent years.

In general the case work suggests that patent pools can aid the diffusion of standards. In given situations they can be used to promote a standard or a technology, and that might lead to a substantially larger market, are more likely to succeed. The higher penetration (larger market) may offset the typically lower income per license of pools compared to bilateral licensing. When such a promotion of a technology is the key objective of the parties involved, this trade-off is acceptable and a patent pool makes sense. As such, they can indirectly improve the interface between standards and research, as the more likely standards are going to be, the higher the incentive to bring research results into them. Also, with the outlook of a pool (and thus better accessibility of the IPR of others), it makes it easier for a firm to bring patent research results into a standard.

³² This dimension was brought to my attention by a source close to the ODF standards activities.

³³ For instance the DVB-T pool, see

<http://www.eetimes.com/futureofsemis/showArticle.jhtml?articleId=18300379&kc=2511>.

However, patent pools do not eliminate all problems. The two patent pool cases indicates that especially the most crucial problem, that of conflicts of interest,³⁴ is not likely to be addressed successfully by pools. Also the problem of controlling the cumulative license fee is not likely to be solved by establishing pools. Although pools may have the effect of bring down these fees, this is only to the degree that the pools at the same time increase the total market size (by the promoting function of the pool). Pools that are established with the main goal of bring down the cumulative fee (e.g. using price caps) are likely to fail, as long as one may not expect the total market to grow substantially as a result of the creating of the pool. Finally, pools also do not seem suit to cope with the question of unwilling IPR holders, patent ambushing / submarine patenting strategies, patent trolls, etc. The situation is somewhat different in the Non Assertion Covenant case as presented. Here a major IPR holder in effect seems to take on the role of a 'patent policeman' to make sure that all parties, both those involved in the standards activities and 3rd parties, will not enforce their patents for the purposes of the standard.

Innovative approaches are needed to deal with patents in standards. But just as there is no one-size fits all for the IPR policies of Standards Setting Bodies (cf. ANSI, 2002; Lemley, 2002), nor does it appear likely that there a catch-all alternative approach. Notwithstanding the cases presented above indicate that standardization may indeed benefit from innovative approaches to overcome the tragedy of the anticommons, especially if coordinated with existing approaches³⁵. At all events, there is arguably a need to supplement the traditional ex ante disclosure rules of SSBs in light of the ambiguity inherent to the RAND model. (cf. Balto & Prywes, 2002)

The rise of the 'technology-only' firms (firms with a business model to exploit IPR rather than produce, such as Rambus or Eolas) is also a challenge to traditional attempts to balance between the individual and the collective interests in a standardization environment. Because these companies do not produce products, the appeal of cross-licensing does not appeal to them. They develop new technology (ie. they are research based); their focus on maximizing license revenue is a business model that may generate traditional approaches

6. Conclusion

A series of current conflicts indicate that the tensions that first emerged between intellectual property rights and formal standardization during the 1980s and 90s are again under strain. The re-emergence of confrontation between these two cornerstones of the modern economy threatens the successful integration of new research into influential standards. It has spurred new attempts to deal with patents and other IPRs in the frame of formal standardization at the institutional level (e.g. the IPR policies of SSBs), at the policy level (areas of competition, IPR, and standardisation policy, rules), and in other multilateral contexts (patent pooling and other licensing schemes).

³⁴ Especially those between (1) business models that are dominantly based on market shares vs. business models dominantly based on licensing income and (2) conflicts resulting from stakes in different, competing technologies.

³⁵ See the Annex for an overview of some dimensions of the cases.

The question it raises is whether current approaches to disarm the conflict are sufficient or whether other approaches are necessary. This paper discusses a set of approaches to coordinate the private interests broadly associated with research investments and the collective interests implied by formal standards-setting processes. It differentiates between traditional approaches to secure ex ante disclosure of intellectual property rights in formal standards-setting bodies (SSBs) from other, more actor-oriented approaches. Based on the authors' earlier work on the IPR policies of SSBs, this paper has discussed the significance of two alternative mechanisms to coordinate intellectual property rights in this environment: patent pools and Non-Assertion Covenants.

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Annex 1 Comparison of individual patent pools and other coordination mechanisms

Case	DVD/MPEG technology		Second- and third generation mobile telecommunications (2G/3G)	Open document standards
IPR coordination initiative	3C DVD patent pool and DVD-6C patent pool ³⁶	MPEG 2 patent pool (MPEG-LA)	UMTS pool (3G patents)	Competing Non Assertion Covenants
Coordination mechanism (subtype)	Patent pool (joint licensing program)	Patent pool (Patent pool with a licensing administrator)	Patent pool (patent platform). Particularity: original ideas was that all licensees and licensors would still get into bilateral license agreements	Non assertion covenants with a 'patent policeman'
Administrator	One of the licensors	Independent licensing agency	Independent licensing agency	Dominant IPR holder
Main drivers for setting up mechanism	Promotion of the standard and the technology	Combination of promotion and reducing transaction cost	Price control, ensuring access	Ensure royalty free licensing. Signal to adopters Response to regulatory concerns
Interests of actors	Single worldwide standard agreed (at least for DVD)	Mixed, though still possible to align	Difficult to align, worldwide/regional issues	Promote the adoption of the standard
Competition	Within standard	Between standards	Between standards, between technologies	Between standards and approaches
Business models issues	Mainly production-driven business models (though this might change)	Mixed. Also issue of licensing base calculation	IPR-driven business models as well as production-driven business models	Market with a dominant player; regulator issues involved
Standardisation mode	Forum/consortia type standardisation, with no pre-agreed IPR procedures in place	(Semi-)formal	Formal bodies, IPR procedures in place	Consortia
Pool initiator	A grouping of the large licensors themselves	Independent licensing agency	Independent body (though initiative is from standardisation scope)	A set of computer and computer program companies
Setting up procedure	Closed start, later allowing other licensors to join	Open call	Open call	Unilateral
Outcome	Two pools for the same standard	For some standards: two competing licensing agencies, together offering a rather comprehensive coverage	Single pool proposal, but limited coverage (no more than approx. 5% of all essential patents)	Two standards with two NACs vying for recognition by regulators and the market. Currently in play
Relation to standardisation	Weak	Weak. Acting only after the standard is all set	Strong. It was from the standardisation sphere that the idea for a pool started	Strong. The standard forms the basis for the NAC
Number of patents	Low (few dozens)	Low to medium (few to several dozens)	Very high (>1000)	High

³⁶ For this comparison, we only take the pool into account as far as it relates to DVD-essential patents. The patents on other standards, such as the 'dash' and 'plus' standards for recordable CD's are not taken into account

Pro-competitive effects (depending on the exact conducts concerning of the pool) mostly involve promoting technology transfer. See Beeney (2002); Bekkers et al, 2006. An itemization of the effects include the following:

(P1)	Facilitating equal access to licenses for all potential licensees;
(P2)	Speeding up access to technology;
(P3)	Integration of complementary technologies;
(P4)	Reduction of transaction costs for both licensees and licensors;
(P5)	Possible clearing blocking positions;
(P6)	Avoidance of costly infringement litigation;
(P7)	A potential reduction of the cumulative license fee;
(P8)	Protection against certain strategies of patent holders (such as bundling essential IPRs with non-essential ones);
(P9)	Guaranteed non-discriminatory and equal access to all potential licensees. (At least, if agreed in the portfolio license conditions. See also the MFN clause below);
(P10)	A valuable source of information to would-be licensees (For example, the portfolio list must give a decisive answer to which patents of the participants are essential to a standard and which are not.)

The main possible anti-competitive effects include the following:

(A1)	Restrict competition between the licensors that participate in the pool, and serve as a price-fixing mechanism. This could especially be the case if substitute patents are in the pool, ultimately resulting in rising the price for products and services that utilise the pooled patents;
(A2)	Have anti-competitive effects for licensees, as it could force them to purchase patents that they normally would not have selected (for instance, if a pool were to include two cost-effective but not essential methods to manufacture a display for a mobile phone, a manufacturers would prefer to license only one of them, but the pool would force this firm to license both);
(A3)	Have anti-competitive effects for non-participating firms that hold patents that are substitutes to patents included in the pool. Since the licensee of the pool already has to pay for all patents in the pool, it might not select this competing patent, even if the latter is considered to be superior;
(A4)	Limit competition in downstream products incorporating the pooled patents, or in other markets that are somehow related to those (for instance, a patent pool for the DVD standard could potentially limit competition in the market for DVD players, in the market for DVD disks, or in the market for content that will be produced for that medium);
(A5)	Have anti-competitive effects towards other standards or technologies, as it might reduce the availability of patents that are technically or economically essential for those other standards;
(A6)	Remove incentives for further innovative behaviour. If a pool is already there, there is little to gain from developing an alternative (substitute) to one of the technologies in the pool, as licensees already pay for the one that is part of the pool (see A3, above).