PATENT POOLS: TOWARDS EFFICIENT (AND REALISTIC) COMBINATION OF PATENTS

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ABSTRACT

The current proliferation of intellectual property rights is hindering the smooth functioning of high-technology markets. When too many patents cover a single technology, licensees incur considerable transaction costs, as well as litigation risks. Patent pools constitute an effective method to address the inefficiencies associated with patent thickets, by aggregating all the patents necessary to realize a single technology. On both sides of the Atlantic, antitrust regulation provides a detailed legal framework on patent pools, focusing on the analysis of the competitive relationship among the patents combined. In this regard, the EU Commission and the US Department of Justice similarly require that patent holders include only essential patents in the pool portfolio. Several factors, however, shows the artificiality of the essentiality-based approach. For this reason, the Court of Appeals for the Federal Circuit recently departed from such formalistic models and valorized the role of pools in creating certainty in fragmented technology markets. EU competition law should inaugurate a new antitrust policy towards patent pools, so that the diffusion of new technology and sequential innovation processes would be promoted. A closer look at the current regulation may reveal alternative criteria, which would allow the incorporation of "important" improvements in the pool.

JEL: K21; L41

INTRODUCTION

The fast pace of technological progress and the increasing importance of intangible property in the last decades resulted in an explosion of intellectual property rights. The number of patents filed between 1985 and 2006 nearly doubled worldwide and this tendency continues today: after a short slowdown in 2009, patent filings grew by 7.2% in 2010.[1] This patent flood comes together with new strategic patenting behavior. In certain industries, such as semiconductors, consumer electronics and chemicals, patent protection is not only a way to safeguard innovations against imitation as it used to be. Private firms tend to build large patent portfolios for strategic reasons other than the temporary protection of their technological knowledge base. The accumulation of patents is directed, for instance, to acquire bargaining chips to be used in future licensing negotiations, to block the development of substitute products by rivals or to prevent infringement suits.[2] This proliferation of intellectual property rights is overcoming the one-to-one correspondence between products and patents that is assumed in the

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[1] *See* World Intellectual Property Organization (WIPO), "World Patent Report: A Statistical Review" (2008), <<http://www.wipo.int/export/sites/www/ipstats/en/statistics/patents/pdf/wipo_pub_931.pdf> (last visited 4 Dec. 2012); WIPO, "World Intellectual Property Indicators" (2011), <http://www.wipo.int/export/sites/www/freepublications/en/intproperty/941/wipo_pub_941_2011.pdf> (last visited 4 Dec. 2012); Organization for Economic Cooperation and Development, "Patents and Innovation: Trends and Policy Challenges" (2004), <http://www.oecd.org/dataoecd/48/12/24508541.pdf> (last visited 4 Dec. 2012). The number of applications in Japan, United States and Europe increased by 40% between 1992 and 2002, which corresponds to a doubling of the number of applications in Europe and United States and to a 15% increase in Japan.

[2] *See e.g.* Cohen, Nelson and Walsh, "Protecting Their Intellectual Assets: Appropriability Conditions and Why US Manufacturing Firms Patent (or Not)" (2000), <http://levine.sscnet.ucla.edu/archive/cohen-survey.pdf> (last visited 4 Dec. 2012). The patenting strategies of private firms varies across industries. While in the telecommunication and electronic industry, companies uses patents to improve their bargaining positions in future licensing negotiations with competitors, in the chemical sector the accumulation of patents is aimed at building a wall around innovative products or processes. *See also* Hall and Ziedonis, "The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995", 32 (1) Rand J. Econ. 101, 101-128 (2001). In the semiconductor industry, firms tend to engage in patent races in order to reduce the likelihood of being held up by competitors, as well as to negotiate access to competitive technologies on more favorable terms. *See also* Bessen, "Patent Thickets: Strategic Patenting of Complex Technologies" (2003), <http://ssrn.com/abstract0327760> (last visited 4 Dec. 2012). When technologies are complex and patent standards are low, patents do not convey exclusive ownership over a product; rather, ownership of innovations is shared, as well as the respective returns. Indeed, in complex industries, firms often engage in aggressive patenting strategies, in order to accumulate bargaining chips with a view to future negotiations with competitors. The consequent fragmentation of intellectual property rights have serious negative effects on innovation, since the rewards for innovating are shared with other patent holders and the incentive effect of lead time advantages are sharply reduced. *See also* Orsenigo and Sterzi, "Comparative studies of the use of patents in different industries" (2010), <http://is.jrc.ec.europa.eu/pages/ISG/patents/documents/OrsenigoandSterzi2010.pdf> (last visited 4 Dec. 2012). Patenting strategies are influenced by several factors: the effectiveness of patenting as an appropriation mechanism, the nature of the research and development process, the characteristics of technology, the nature of the knowledge base and the size and structure of the market.

patent literature: a single product or service may infringe on many patents. When the production of a given product requires the use of a large number of patents and the ownership of these intangible assets is subdivided among different agents, a patent thicket may emerge, that is "a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology".[3] Several commentators highlight the socially detrimental effects of patent thickets.[4] As shown by M. Heller, the attribution of too many property rights over a single resource may lead to an underutilization of the resource itself. Indeed, in order to produce a single technology, a company needs to negotiate with multiple agents, incurring significant transaction costs.[5] Moreover, the commercialization of a product covered by several intellectual property rights bears multiple royalty burdens, which must be "stacked" together to determine the total royalty that a downstream firm pays to upstream patent holders.

Excessive transaction costs and high licensing fees increase the costs of producing new technologies and, given the cumulative nature of innovation, have the potential of stifling the development of new products.[6] A proposed solution to overcome the inefficiencies posed by patent thickets is a shift towards liability rule solutions in patent law. The entitlement theory suggests that industries characterized by the need for several transactions are best served by the grant of liability rule entitlements.[7] In this way, the exchange of intellectual property rights would be facilitated since patent holders would be only entitled to damages caused by infringement or to the remuneration established by public authorities. Anyone wishing to pay this compensation might use the entitlement, without the prior consent of the owner.[8] Nevertheless, public authorities' intervention in determining the value of innovations may have devastating effects: courts or administrative authorities would place a ceiling on the amount the right holder can collect and if the value was too low, such intervention would reduce the incentives to invest in innovation.[9]

An alternative to liability rule solutions is represented by voluntary forms of cooperation among the owners of conflicting intellectual property rights. Private firms holding blocking patents may decide to share their intangible assets, granting each other the right to practice the other's patents (cross-licensing agreements).[10] However, when the total number of owners of blocking patents is high and/or patent holders are willing to offer their rights to third parties, the response to patent thickets is the formation of patent pools. Patent pools are

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3 Shapiro, "Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting", in Jaffe, Lerner and Stern, *Innovation Policy and the Economy*, 1th ed. (MIT Press, 2001) p. 119; *see also* Von Graevenitz, Wagner and Harhoff, "Incidence and Growth of Patent Thickets - The Impact of Technological Opportunities and Complexity" (2011), <http://www.sfbtr15.de/uploads/media/356.pdf> (last visited 4 Dec. 2012). The analysis of EPO databases shows that patent thickets are mostly found in nine technological areas: audiovisual technology, telecommunications, information technology, semiconductors, optics, electrical machinery, analysis, measurement, control and pharmaceuticals. The importance of technological opportunities in the industry affects differently patenting behaviors in complex and discrete industries. Greater technological opportunity will raise patenting in discrete technologies but will lower it as technologies become increasingly complex.

4 *See e.g.* Glover, "Patent thickets and innovation markets reviewed", 26 NAT'L L.J. 10, Oct. 14, 2002. Patent thickets threaten the process of cumulative innovation because they prevent new entrants from using basic technologies. *See also* Entezarkheir, "Patent Thickets, Defensive Patenting, and Induced Rand: An Empirical Analysis of the Costs and Unintended Potential Benefits of Fragmentation in Patent Ownership" (2011), <http://economics.uwaterloo.ca/grad/documents/MahdiyehJobMarketPaperMarch2010-1.pdf> (last visited 4 Dec. 2012). Patent thickets have negative direct impact on the market value of firms, even if firms are able to avoid some of the potential costs of patent thickets through defensive patenting.

5 Michael A. Heller, "The Tragedy of Anticommons: Property in the Transition from Marx to Markets", 111 *Harv. L. Rev.* 621-688 (1998). The tragedy of underuse is demonstrated by the attempt to privatize property in post-1989 Moscow store spaces. Storefronts remained unutilized, while numerous kiosks began to occupy the streets. This underutilization of storefronts occurred because initial endowments were created as disaggregated rights pertaining to different entities. When multiple owners each have a right to exclude others from using a resource, the exploitation of the resource may be hindered by bargaining failures generated by holdouts and by an increase of transaction costs.

6 Heller and Eisenberg, "Can Patents Deter Innovation? The Anticommons in Biomedical Research", 280 (5364) *Science*, 698-701 (1998). The patentability of upstream biomedical research results may stifle innovation. When too many owners hold rights on previous discoveries, this may hamper future research.

7 Calabresi and Melamed, "Property Rules, Liability Rules, and Inalienability: One View of the Cathedral", 85 *Harv. L. Rev.* 1089 (1972); see also POSNER, *Economic Analysis of Law*, 1th edition (Little Brown, 1972) 29.

8 *See e.g.* Article 31 of Trips agreement, which provides, under certain conditions, that the holder of an improvement patent has the right to obtain a compulsory license of the basic invention.

9 Merges, "Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations", 84 *Cal. L. Rev.*, 1293 (1996). *But see* Nielsen and Samardzija, "Compulsory Patent Licensing: Is It a Viable Solution in the United States?" (2007), <http://www.mttlr.org/volthirteen/nielsenandsamardzija.pdf> (last visited 4 Dec. 2012). Voluntary mechanisms cannot prevent patent system abuses in all cases. In extreme situations, permitting compulsory licensing may be the only viable solution to address the inefficiencies associated with a patent thicket.

10 *See e.g.* Grindley and Teece, "Managing intellectual capital: licensing and cross-licensing in semiconductors and electronics", 39:2 *Cal. Mgmt. Rev.* 1997, 8. Cross-licensing is typical of industries characterized by cumulative innovation, where one innovation builds on another and products may draw on several related technologies. Rapid innovation, short-product life-cycle and ubiquity of patents make cross-licensing particularly important in these sectors, since it gives private firms freedom to operate. *See also* Somaya and Teece, "Patents, Licensing and Entrepreneurship: Effectuating Innovation in Multi-Invention Contexts" in D.J. Teece, *Technological Know-how, Organizational Capabilities, and Strategic Management: Business Strategy and Enterprise Development in Competitive Environments*, 1th edition (World Scientific, 2008), p. 287. In electronics and semiconductors, it is too cumbersome and costly to license only single patents for a specific product. Firms often conclude cross-licensing agreements, which cover all their patents in a certain field of use, in order to avoid the risk of patent disputes.

agreements whereby different parties license their patents to a central entity, which would provide contributors as well as and third parties with a standardized licensing agreement covering all the patents pooled.[11] They represent a "one stop shop": gathering all the necessary patents to practice a technology in one place, they allow potential licensees to negotiate with a single party, rather than obtaining licenses from each patent owner individually. The resulting reduction of transaction costs favors the diffusion of the technology and incentivizes licensees to invest therein.

Patent pools produce other beneficial effects. In the first place, they mitigate the problem of stacking royalties; when a thicket arises, each patent holder essentially controls one of several complementary inputs of a product. As the economic theory posits, independent pricing of complementary goods leads to a final price of the product higher than the one resulting if all inputs were controlled by a single agent.[12] The pool allows patent holders to coordinate their royalties, thereby lowering the price of the technology.[13] In addition, pooling patents may act as an incentive to innovation by creating a mechanism for patent holders to share the risks and benefits of technology ventures: the distribution of royalties among those who have invested in the innovation increases the likelihood that all pool members recoup their investment in research and development (R&D).[14] Furthermore, a pool favors the exchange of technical information related to the patented technology among its members and its licensees.[15]

Given their considerable efficiencies, patent pools have long been used to drive the diffusion of new technologies. One of the first pools was formed in 1865 to license sewing machine patents. In 1917, after years of ruinous litigation, an aircraft patent pool was created among almost all U.S. aircraft manufacturers.[16] More recently, pools have been formed in the field of consumer electronics and telecommunications in order to aggregate patents that cover industry standards.[17] In these sectors, the need to ensure compatibility among

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11 *See e.g.* Andewelt, "Analysis of Patent Pools Under the Antitrust Laws", 53 *Antitrust L.J.* 611 (1984); Merges, "Institutions For Intellectual Property Transactions: The Case for Patent Pools" in Dreyfuss, Zimmerman and First, *Expanding the Boundaries of Intellectual Property*, 1th edition (Oxford University Press, 2001) p. 123; Gilbert, "Antitrust for Patent Pools: A Century of Policy Evolution", 3 *Stan. Tech. L. Rev.* (2004), <http://stlr.stanford.edu/STLR/Articles/04_STLR_3> (last visited 23 Nov. 2012); Goldestein and Kearsey, *Technology Patent Licensing: An International Reference on 21st Century Patent Licensing, Patent Pools and Patent Platforms*, 1th edition (Aspatore Books, 2004) p. 1; Gallini, "Private Agreements for Coordinating Patent Rights: The Case of Patent Pools" (2011), <http://faculty.arts.ubc.ca/ngallini/revista.pdf> (last visited 4 Dec. 2012).

12 Cournot used the example of copper and zinc suppliers selling to manufacturers of brass to explain the complements problem. When input suppliers with market power sell complementary products, each input owner charges more than marginal cost for its input, thereby raising the price of the downstream product and reducing sales of that product. See e.g. Shapiro, "Theories of Oligopoly Behavior", in Schmalensee and Willig, *Handbook of Industrial Organization*, 1th edition (North Holland, 1989) p. 339.

13 *See e.g.* Gilbert, *supra* note 11, at par. 27. The pooling of blocking patents overcomes the double monopoly problem encountered when private firms hold mutually blocking patents. "Acting independently, each patentee ignores the effect of its royalty on the licensing revenues of other patentees. However, the demand for licenses depends on the total royalties charged by all the licensees. Thus, the failure to coordinate royalty rates for essential patents can result in total royalties that exceed the royalty that a pool would charge to maximize its licensing revenue."

14 Carlson, "Patent Pools and the Antitrust Dilemma", 16 *Yale J. on Reg.* 359, 364 (1999). On the effects of patent pools on innovation *see e.g.* Dequiedt and Varsaevel, "Patent Pools and the Dynamic Incentives to R&D" (2007), <http://hal.archives-ouvertes.fr/docs/00/14/24/97/PDF/0703.pdf> (last visited 4 Dec. 2012). *See also* Lampe and Moser, "Do Patent Pools Encourage Innovation? Evidence from the 19th-Century Sewing Machine Industry", Stanford Univ. Working Paper (2009), <http://economics.stanford.edu/files/LampeOct15.pdf> (last visited 4 Dec. 2012). The perspective of pool formation increases investments in R&D. Since firms value more being among the initial contributors to the pool, they increase innovative efforts before the creation of the pool and attempt to patent in the corresponding technological areas. After the pool is formed, there is a decline in innovation activity both by pool members and outside firms. During the life of the pool, increased litigation risk for outside firms discourage innovative activity and direct R&D towards competing technologies. Investments in R&D grow again after the dissolution of the pool and the expiration of pool patents. *But see* Baron and Pohlmann, "Patent Pools and Patent Inflation: The effects of patent pools on the number of essential patents in standards" (2011), <http://ftp.zew.de/pub/zew-docs/veranstaltungen/innovationpatenting2011/papers/Baron.pdf> (last visited 4 Dec. 2012). After the launch of the pool, the number of patents filed remains positive and significant. *See also* Gilbert and Katz, "Should Good Patents Come in Small Packages? A Welfare Analysis of Intellectual Property Bundling", 4 *Int. J. Ind. Organ*. 24, 931 (2006). Package licensing may decrease invent-around incentives. However, this reduction can bring private incentives closer to their socially optimal level. If R&D is directed only to avoid paying royalties for competitors' intellectual property rights, innovation do not necessarily increase total surplus. *See also* Lampe and Moser, "Do Patent Pools Encourage Innovation? Evidence from 20 U.S. Industries under the New Deal" (2012), <http://www.law.northwestern.edu/searlecenter/papers/Lampe_Patent_Pools_Licensing_Strategies.pdf> (last visited 4 Dec. 2012). Estimates with citations-weighted patents shows that the formation of a pool slightly decreases patenting activities, suggesting that the pool reduces the need for strategic patenting. Moreover, statistics indicate that the decline in patenting is strongest in subclasses where pools combine patents for substitute technologies by competing firms. Conversely, subclasses in which only one pool member was an active inventor before the creation of the pool experience a much weaker decline. Therefore, pools predominantly composed of complementary technologies do not stifle innovation.

15 *See* Merges, *supra* note 11, at 123.

16 In 1909, the Wright brothers sued for infringement Glenn Curtiss, the inventor of an alternative method of airplane control. After the entry of the United States into World War I, the government pressured the two patent holders to settle their disputes and to form a patent pool. Aircraft patent holders and manufacturers created the Manufacturers Aircraft Association, which collected and licensed all the patents essential to produce aircrafts. In 1972, the Department of Justice found the agreement anti-competitive, due to its negative effects on innovation and the pool was dissolved. *See e.g.* Dykman, Patent Licensing within the Manufacturer's Aircraft Association (MAA), 46 *J. Pat. Off. Soc'y*, 646 (1964). *See also* Bittlingmayer, "Property Rights Progress and the Aircraft Patent Agreement", 31 *J.L. and Econ.*, 227, 232-233 (1988).

17 *See e.g.* Merges, *supra* note 15, at 151.

products of different firms leads to the adoption of standards, that are often based on patents owned by several patent holders.[18] In order to favor the market adoption of such standards, patent holders centralize the licensing process through a patent pool, thus facilitating access to all patents required to comply with the standards. In this way, the pool helps patent holders to profit from the network externalities of maximally diffusing the standards.
The formation of patent pools has been proposed also as a solution to patent thickets outside the standardization context.[19] In 2000, the U.S. Patent and Trademark Office argued for the creation of patent pools to guarantee ready access to basic patents on genetic information and research tools in biotechnology.[20] Ebersole et al. suggested the use of patent pools in the diagnostic genetic industry.[21] Lately, the Expert Group on IPR Valorization, convened by the European Commission to implement the Innovation Union, identified patent pools as a possible option to foster the commercialization of intellectual property rights in Europe, particularly in those fields where key enabling technologies are covered by a large number of patents.[22]
Despite their beneficial role in today's economy, patent pools may also produce competitive harm; for instance, patent holders may use the pool to fix the price of their competing technologies or to extend their market power into adjacent technological sectors. EU competition law provides a detailed legal framework to ensure the pro-competitiveness of patent pools and identify several safe-harbors, which examines whether the pool represents an efficient combination of technologies or, instead, reduce inter-technology competition. EU authorities essentially transposed the traditional paradigms of merger law to intellectual property rights and scrutinize the pooling agreement on the basis of the competitive relationship among the patents combined. In this regard, the EU Commission requires that the pool includes only essential patents, i.e. patents which covers an essential component of the standard technology and for which there are no alternatives inside or outside the pool. In Part II, the article illustrate the current EU approach towards patent pools and explores the implications of the essentiality criterion. The analysis reveals the main short-comings of the artificial classification of patents adopted by EU authorities and shows the thin lines of demarcation between essentiality and complementarity. In Part III, the investigation shifts to US antitrust law, in order to indicate recent departures from traditional models: in particular, the Federal Circuit delineated a flexible interpretation of the essentiality criterion, aimed at allowing the patent pool to promote the diffusion of new technologies in an increasingly complex patent arena. In Part IV, the article uses the US case as a starting point for proposing alternative antitrust criteria, which would allow the pool to include "important" improvements of the technology.

PATENT POOLS AND EU COMPETITION LAW

EU competition law recognizes the potential efficiencies stemming from patent pooling agreements. Under the individual exemption regime,[23] the European Commission approved the creation of four patent pools, formed to simplify the adoption of standards in the consumer electronic and telecommunication industries. In clearing these agreements, the Commission underscored that they "would help to promote technical and economic progress, by allowing quick and efficient introduction of the […] technology" and would "have beneficial effects for

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18 Recent studies demonstrate that the telecommunication and information technology sectors show the higher number of patents essential for implementing a single standard. *See e.g.* European Commission, "Study on the Interplay between Standards and Intellectual Property Rights (IPRs)" 2009 OJ (S. 136) 33.

19 *See e.g.* Clarkson and Dekorte, "The Problem of Patent Thickets in Convergent Technologies", 181 *Ann. N.Y. Acad. Sci.* 1093 (2006). The emergence of "nanothickets" requires specific organizational responses to commercialize new technologies and to foster cumulative innovation. In this regard, the formation of patent pools represents a valuable mechanism for licensing future standard technologies.

20 Clark et al., U.S. Patent and Trademark Office, "Patent Pools: a Solution to the Problem of Access in Biotechnology Patents?" (2000), <http://www.uspto.gov/web/offices/pac/dapp/opla/patentpool.pdf> (last visited 4 Dec. 2012); *see also* Resnik, "A Biotechnology Patent Pool: An Idea Whose Time Has Come?", 3 *J. Phil., Sci. and L.* 1 (2003). Several factors hinder the formation of a patent pool for biological research tools. In the biotechnological sector, patent holders are highly heterogeneous and have different goals and interests, innovation is rapid and evolutionary and there is no ex ante mechanism to determine the value of a particular research tool. The industry structure makes impractical the creation of patent pools for single research endeavors, while the formation of pools encompassing all existing research tool patents would hamper competition and adversely affect incentives to innovate. *See also* Iyama, "The USPTO's Proposal of a Biological Research Tool Patent Pool Doesn't Hold Water", 57 *Stan. L. Rev.* 1223 (2005); Levang, "Evaluating the Use of Patent Pools for Biotecnology: A Refutation to the USPTO White Paper Concerning Biotechnology Patent Pools", 19 *Santa Clara Computer and High Tech. L.J.* 229 (2003); Gaulé, "Towards Patent Pools in Biotechnology?" (2006), <http://cemi.epfl.ch/webdav/site/cemi/shared/misc_files/IST-vol-2-No-2-2006-Patrick-Gaule.pdf> (last visited 4 Dec. 2012).

21 Ebersole, Guthrie and Goldstein, "Patent Pools and Standard Setting in Diagnostic Genetics", 23 *Nature Biotechnology* 937 (2005); see also Verbeure et al., "Patent Pools and Diagnostic Testing", 24 *Trends in Biotechnology* 115 (2006); Scala, "Making the Jump From Gene Pools to Patent Pools: How Patent Pools Can Facilitate the Development of Pharmacogenomics", 41 *Conn. L. Rev.* 1631 (2008-2009).

22 European Commission, Expert Group on IPR Valorisation, "Options for an EU instrument for patent valorization" (2012) <http://ec.europa.eu/enterprise/policies/innovation/files/options-eu-instrument-patent-valorisation_en.pdf> (last visited 4 Dec. 2012).

23 Under Regulation 17/62, all agreements including restrictive provisions and falling outside the scope of group exemptions had to be notified to the European Commission in order to obtain antitrust clearance. Due to the amount of work, notifications were not dealt in the way prescribed by Regulation 17/62. Instead, the Commission adopted the practice of issuing "comfort letters", which certified either that the agreement does not fall within Article 85 (1) or that it merited an individual exemption.

consumers".[24] The first pool approved has been the MPEG-2 programme, which originally aggregated 27 patents, concerning the international standard MPEG-2, a video compression technology.[25] The DVD 6C pool combines patents necessary to comply with the standards for the production of DVD and DVD players and was proposed by Toshiba, Time Warner, Hitachi, JVC, Matsushita and Mitsubishi.[26] The 3G patent platform involved technology relating to the five radio interface standards for use in third-generation wireless communications systems; for each interface standard, a Platform company was designated to offer standardized licensing agreements of essential patents.[27] Lastly, Philips and Sony concluded a set of bilateral agreements establishing a joint licensing program of their patents, which are essential to the manufacturing of several types of pre-recorded CD discs. [28] After the approval of Regulation 1/2003, individual exemption can no longer be provided. [29] Therefore, the Commission issued guidelines to provide guidance on the application of competition law to technology transfer agreements, including patent pools. The Guidelines on the application of Article 81 to technology transfer agreements (hereinafter TT Guidelines) recognize that patent pools can produce competitive benefits, "in particular by reducing transaction costs and by setting a limit on cumulative royalties to avoid double marginalization" […]. The pro-competitive role of patent pools is particularly important in sectors "where in order to operate on the market licenses need to be obtained from a significant number of licensors", i.e. those industries where patent thickets frequently arise. [30] The comfort letters issued under the previous regime and the TT Guidelines clarify the antitrust policy towards patent pools and identify certain safe-harbors to ensure that pools do not produce any competitive harm. The antitrust analysis tends to focus on two main aspects: the nature of the patents combined in the patent portfolio and the operation of the pool. While the former aspect aims at investigating whether the pool allows a more efficient use of the resources combined, the latter focuses on the terms under which third parties may take licenses from the pool and on the institutional framework governing the pool.[31]

A. The Nature of the Patents Pooled

The decisive factor in the antitrust review of patent pools is the nature of the patents pooled, i.e. the relationship between the patents included in the pool and their relationship with those outside the pool.[32] The antitrust investigation aims at clarifying whether the pool limits competition among technologies or allows an efficient combination thereof.[33] In this regard, the TT Guidelines identify the effects of pools on competition depending on whether they are mainly composed of substitute, complementary or essential patents.[34] Two patents are said to be *substitutes*, when they cover products or processes that compete with each other in the market (internal substitutability). In this case, the acquisition of a license of one patent by an individual decreases any demand by that individual for the other patent. A pool comprised of substitute patents decreases competition in the technology market: in the absence of the pool, licensees would have benefited from the rivalry between the

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24 *See e.g.* European Commission, Press Release of October 9, 2000 (IP/00/1135): *Commission authorizes agreement on the grant of DVD patent licenses*.

25 *See* European Commission, Press Release of December 18, 1998 (IP/98/1155): *Commission approves a patent licensing programme to implement the MPEG-2 standard*. *See also* the notification in OJ C 98/C 229/06 of July 22, 1998. For further details of the agreement see U.S. Department of Justice, Antitrust Division, Business Review Letter, June 26, 1997, <http://www.justice.gov/atr/public/busreview/215742.htm> (last visited 24 Nov. 2012) [hereinafter Business Review Letter MPEG-2]

26 *See* European Commission, *supra* note 24. *See also* the notification in OJ C 242 of August 27, 1999. For further details of the agreement see U.S. Department of Justice, Antitrust Division, Business Review Letter, June 10, 1999, <http://www.justice.gov/atr/public/busreview/2485.htm> (last visited 25 Nov. 2012) [hereinafter Business Review Letter DVD 6C]

27 *See* European Commission, Press Release of November 12, 2002 (IP/02/1651): *Antitrust clearance for licensing of patents for third generation mobile services*. For further details of the agreement see U.S Department of Justice, Business Review Letter, November 12, 2002, <http://www.justice.gov/atr/public/busreview/200455.htm> (last visited 25 Nov. 2012) [hereinafter Business Review Letter 3G]

28 *See* European Commission, Press Release of 7 August 2003 (IP/03/1152): *Commission clears Philips/Sony CD Licensing Program*. The agreement was modified after several complaints by CD disc manufacturers alleging that Philips and Sony joint licensing programme ran counter to Articles 81 and 82. For the details on the original configuration of the pool see U.S International Trade Commission, *In the Matter of Certain Recordable Compact Discs and Rewritable Compact Discs*, 2003 WL 22988476 (October 24, 2003) (ALJ's initial determination); 2004 WL 1435791 (U.S.I.T.C. 2004) (commission determination).

29 *See* Council Regulation 1/2003 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty, (2003) OJ L 1.

30 European Commission, *Guidelines on the application of Article 81 of the Treaty to technology transfer agreements*, 2004 OJ (C 101), par. 214 (hereinafter TT Guidelines).

31 European Commission, TT Guidelines, par. 212.

32 *Id.* at par. 215

33 *See generally* Bowman, *Patent and antitrust law: a legal and economic appraisal*, 1th edition (University of Chicago Press, 1973) p. 200. "The central question concerning the propriety of combining patents is not different from that involved in combining other proprieties. Merging of patents, like merging of other assets, may be horizontal, vertical or conglomerate. […] A central issue in any pooling of assets is whether competition among the merged resources is eliminated or whether more efficient use of the merged resources results."

34 European Commission, TT Guidelines, par. 216. *See also* Goller, "Competing, Complementary and Blocking Patents: Their Role in Determining Antitrust Violations in the Areas of Cross-Licensing, PatentPooling and Package Licensing", 50 *J. Pat. Off. Soc'Y* 723 (1968); Andewelt, *supra* note 11, at 611; Carlson, *supra* note 14, at 381.

patents in question. Given that patents are competing, the pool amounts to price-fixing between direct competitors.[35] Two patents are considered *complementary* if they "cover technologies that complement each other in that the use of one makes use of the other more valuable".[36] Complementary patents typically cover different components of a larger invention (external substitutability). The inclusion of non-essential but complementary patents raises two competitive concerns. First, since patents are not essential for downstream exploitation of the technology, the pool may amount to collective bundling. Second, the pool may lead to foreclosure of third-party technologies. There may be patents covering competing technologies outside the pool: as licensees are not likely to pay twice for a solution to the same technical problem, the inclusion of the non-essential patents may determine the removal from the market of a genuine technological alternative. A patent is *essential* if it covers a necessary part of the technology and there are no substitutes for that patent inside or outside the pool. According to the TT Guidelines, pools substantially composed of essential patents do not pose any competitive risk.

The categorization of patents based on their internal or external substitutability reveals the different anti-competitive harms that patent pools may produce. However, the demarcation lines among these categories are not always clear. The relationships among patents may have both complementary and competitive aspects, depending on the definition of the characteristics of the technology. [37] The intrinsic uncertainty of the patent system further complicates the classification: infringement litigation may change patent scope and enforceability. If certain patent claims are invalidated by the court, patents that have been considered as blocking prior to litigation may become competing.[38] In addition, except for the cases of perfect substitutes and perfect complements, the nature of the patents is influenced by the level of their price. Low prices lead consumers to demand both technologies, so that the patents are regarded as complementary, while high prices turn the two patents into competing products or processes. [39] The TT Guidelines recognize the difficulty of applying any orderly categorization to patents and affirm that in dubious cases the nature of patents will be defined according to the economic efficiencies stemming from their integration. If licensees are likely to demand both patents, due to the additional economic benefit of exploiting both of them, they are considered as complements, even if they are partly substitutable. Indeed, in the absence of the pool, licensees would have licensed both intellectual property rights in any case.[40]

B. The Essentiality Criterion

Pools predominantly composed of essential patents do not generally trigger antitrust liability, since they comprise necessary components of the technology and there are no patents covering alternative components inside or outside the pool. In order to ensure the implementation of the essentiality criterion, the TT Guidelines require the involvement of an independent expert in the selection of the patents for the pool. Technical expertise is needed to assess patent claims and the independence of the expert from pool members increases the credibility of the essentiality evaluation.[41] According to the TT Guidelines, the independent expert review mechanism should not be limited to the selection stage, but should represent an on-going process. Since substitute and complementary patents may emerge after the creation of the pool, the expert should be able to exclude from the portfolio those patents that have become non-essential.[42] Moreover, the pool may provide grant-back obligations

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35 When the patents pooled are competing, patent holders should be considered horizontal competitors. They license patents which can be used to accomplish similar functions and therefore are suppliers of competitive products. *See e.g.* Andewelt, *supra* note 11, at 611. Even royalty-free licensing of substitute patents can produce competitive harm by lowering incentives for research and development or by facilitating collusion. *See* Gilbert, *supra* note 11, at 3.

36 Andewelt, *supra* note 11, 611. The TT Guidelines affirms that two patents are complementary "when they are both required to produce the product or carry out the process". This definition of complementary patents cannot be reconciled with the fact that pooling complementary patents may amount to collective bundling. If patents are "required" to produce a product, they cannot be considered a separate product for the purpose of tying analysis.

37 *See* Goller, *supra* note 32, at 726; *see also* Bowman, *supra* note 31, at 202; Andewelt, *supra* note 11, at 611.

38 *See e.g.* Carlson, *supra* note 14, at 381; *see also* Newberg, "Antitrust, Patent Pools and the Management of Uncertainty", 3 *Atlantic L.J.* 1, 6-21 (2000).

39 Lerner and Tirole, "Efficient Patent Pools", 94(3*) American Economic Review* 691 (2004); *see also* Lerner and Tirole, "Public Policy towards Patent Pools", in Jaffe , Lerner and Stern, *Innovation Policy and the Economy*, 1th edition (Mit Press, 2008) 157.

40 European Commission, TT Guidelines, par. 218.

41 European Commission, TT Guidelines, par. 232-233. The presence of a patent expert would limit strategic behavior by pool members. A patent holder would find it difficult to argue that its technology is key to the pool and thus deserves a greater share of pool revenue, if the independent expert finds otherwise. An independent evaluation of essentiality may also help to overcome parties' cognitive biases. The opinion of a disinterested agent represents a powerful corrective to an intransigent pool member inflexible about the importance of its contribution to the pool. *See* Merges, *supra* note 11, at 123.

42 European Commission, TT Guidelines, par. 222. The need for an on-going review mechanism depends also on the definition of essentiality adopted by the pool. If the pool includes only technically essential patents, the emergence of alternative technologies may occur only when standard specifications are redefined. Indeed, technical essentiality identifies those patents necessary to produce the technology as a consequence of the correspondence between the specifications of the standard and the scope of patents. *See* Plompen, "The New Technology Transfer Guidelines as Applied to Patent Pools and Patent Pool Licensing: Some Observations Regarding the

in order to constantly update its patent portfolio. Such provisions aims at including subsequent improvements in the pool portfolio and at preventing licensees that obtain essential patents from holding up the exploitation of the standard technology. In this regard, the TT Guidelines explicitly require that grant-back obligations are limited to developments that are essential or important to the use of the pooled technology.[43] Thus, the independent expert is called to evaluate the essentiality (or the importance) of the technologies developed by licensees.

Following the TT Guidelines requirements, the pools approved by the European Commission limit their portfolio to essential patents and provide an independent expert review mechanism to identify which patents are needed to manufacture the technology and which are not. In addition, all pooling agreements oblige licensees to "license back" their essential patents to the pool.[44] Only in the MPEG-2 agreement, the grant-back clause is extended to mere improvement of the standard technology, i.e. patents useful, albeit not essential, to the implementation of the standard.[45] However, in this case, improvement patents do not become part of the pool portfolio, nor they are licensed to the other licensees, but are only granted to pool members.

In sum, the essentiality criterion plays a key role in governing the aggregation issues raised by pooling agreements. From the exploration of the agreements' provisions, however, different definitions of essentiality emerge, which in turn correspond to different methods of assessment in the patent selection process. In the MPEG-2 pool, patents included in the portfolio are "essential to compliance with the MPEG-2 standard" in the sense that "there is no technical alternative to any of the Portfolio patents within the standard […] each patent is useful for MPEG-2 products only in conjunction with the others". [46] In this case, the pool is limited to *technically essential* patents and does not include any patent that is merely one of several alternatives of implementation of the standard. Differently, the DVD 6C pool contemplates two senses of essentiality. A patent is essential if it is "necessarily infringed" in implementing the standard or if "there is no realistic alternative to it".[47] While the former definition is equivalent to technical essentiality, the latter covers patents for which economically feasible alternatives do not exist, i.e. *commercially essential* patents. This formulation of essentiality includes those patents not reading on the standard itself but nonetheless necessary because inventing around them is not economically practicable or will not produce a commercially viable product.[48] In this case, substitute technologies may exist, but they are not able to produce a standard-compliant product with bearable costs.

The difference between technical and commercial essentiality can be further clarified by exemplifying the practical methods used to qualify the patents for inclusion in the pool. An example of methods to assess technical essentiality can be found in the MPEG-2 pool.[49] Initially, the independent expert conducted a search of the potentially relevant patents throughout the world.[50] After patent owners agreed to submit their patents for evaluation, the expert compared the set of patents against the standard specifications. Every independent claim of a given set of patents was examined in order to determine if the claim covered one of the MPEG-2 specifications. A patent was essential only if the specification of the normative part of the standard could not be done without that independent claim; whereas, patents reading on specifications which allowed for various alternatives in the implementation were not deemed essential. Unlike technical essentiality, commercial

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Concept of Essential Technologies", in Ehlermann and Atanasiu, European *Competition Law Annual 2005: The Interaction between Competition Law and Intellectual Property Law*, 1th edition (Hart Publishing, 2007) p. 295.

43 European Commission, TT Guidelines, par. 228. Such obligations are frequently reinforced by the pool members' right to terminate the license of any licensee that, after having refused to grant a pool member a license on an essential patent, sues that pool member for infringement of that patent.

44 *See e.g.* Business Review Letter DVD 6C.

45 *See* Business Review Letter MPEG-2.The MPEG-2 pooling agreement allows each pool member to withdraw its patents from the license of that licensee, who has brought a lawsuit against a pool member for infringement of an improvement technology and refused to grant that pool member a license of the technology in question on fair and reasonable terms. Such provision has been approved by antitrust authorities on both sides of the Atlantic. In particular, the Department of Justice explained that the partial termination right imposes licensees to license their improvements only to pool members and not to the other licensees. Considering that patent owners are interested in encouraging the improvement of the standard technology, they are likely to be restrained in exercising their partial termination rights. Moreover, the partial termination right may have pro-competitive effects, by allowing licensors and licensees to share the risk and rewards of supporting and improving the MPEG-2 standard.

46 Business Review Letter MPEG-2. For a similar definition see Business Review Letter DVD 3G. In the 3G Patent Platform, a patent was considered essential if it claimed "an apparatus, a method or a process necessary for compliance for the 3G Standards." For a patent to be included, at least one claim under the patent must be found to be essential to a particular 3G standard.

47 Business Review Letter DVD 6C. For a similar definition see U.S. Department of Justice, Antitrust Division, Business Review Letter, December 16, 1998, <http://www.justice.gov/atr/public/busreview/2121.htm> (last visited 21 Nov. 2012) [hereinafter Business Review Letter DVD 3C]. The DVD 3C agreement describes essential patents as "necessary (as a practical matter) for compliance with the DVD Standard Specifications." This definition implies that "the expert will include in the pool only those patents for which there are no economically viable substitutes." *See also* U.S. Department of Justice, Antitrust Division, Business Review, October 21, 2008, <http://www.justice.gov/atr/public/busreview/238429.htm> (last visited 20 Nov. 2012) [hereinafter Business Review Letter UHF RFID].

48 Simmons, Lynch and Frank, ""I know it when I see it": Defining and Demonstrating 'Blocking Patents", 16 *Antitrust* 48 (Summer 2002).

49 Clarkson, "Objective Identification of Patent Thickets: A Network Analytic Approach for Measuring the Density of Patent Space", (2004), <http://www.immagic.com/eLibrary/ARCHIVES/GENERAL/HARVARD/H041206C.pdf> (last visited 4 Dec. 2012).

50 The search focused on the participants in the standard setting process and on those parties who had agreed to the RAND commitments required to participate in the standard setting organization. The expert also analyzed the topics in the patents owned by the initial members to identify relevant keywords and then searched for patents with the same keywords. *See* Clarkson, *supra* note 44, at 39-40.

essentiality adds an economic dimension to the selection process and goes well beyond a patent law analysis. The original configuration of the CD pool offers an example of methods for selecting commercially essential patents.[51] In this case, after having determined that the submitted patent was not technically essential, the evaluator considered if the patent was economically essential, i.e. if it comprised at least one claim having no viable alternative for implementing a portion of the standard. When a patent was submitted for inclusion in the pool on the basis of commercial essentiality, the evaluator asked the patent holder for specific evidence on (1) the technical and commercial reasons why the invention was the only practical way to implement part of the standard, (2) any known alternatives to the invention and (3) the reasons why these alternatives were not used. The patent holder might also submit studies to demonstrate the pervasive use in the marketplace of the patent. After that, the evaluator analyzed market preferences to see whether most of the relevant producers infringed one or more claims of the patent. If 90 % or more manufacturers practiced the patent, the expert found the patent to be commercially essential. The selection method used in the original CD pool is not the only way to qualify a patent as commercially essential,[52] nevertheless it sheds light on the degree of flexibility that the commercial essentiality criterion introduces in the selection process.[53] Commercial essentiality necessarily implies a market assessment in order to investigate the existence of economically feasible alternatives; thus, the patent expert should have sufficient and accurate information about all the patents that could have been included in the pool, the benefit of each patent and its contribution to the standard. Moreover, the patent expert's evaluation is not limited to the comparison between the patent claims and the specifications of the technology, but also considers the feasibility of costs of integrating the patented component with the standard technology.[54] Although this kind of analysis does not necessarily presuppose an assessment of market preferences, it may lead to quite discretional evaluations, even if based only on patent claims.[55] One may wonder whether the commercial essentiality criterion leads to including in the pool complementary patents. After all, commercial essentiality leads to excluding from the pool those patents covering substitute technologies, whose costs of integration with the standard-compliant product are not feasible, while complementarity covers those technologies whose integration with the standard-compliant product leads to high economic efficiencies.[56]

C. The Inclusion of Complementary Patents

In order to prevent the inclusion of non-essential but complementary patents, the TT Guidelines set out that the pooling agreement should provide a continuous role of the independent evaluator. The pool evaluator should re-examine the essentiality of the patents periodically and exclude from the portfolio those patents that have become non-essential, due to the emergence of alternative technologies. [57] For instance, the DVD 6C pool provides that the expert conducts quadrennial reviews and re-examines individual patents upon the request of pool members.[58] According to the TT Guidelines, the independent assessment of essentiality acts practically as a safeguard mechanism against possible breaches of competition law. It is, however, questionable whether or not the review process is realistically effective in preventing foreclosure effects. Apart from the fact that pool

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[51] *See* U.S International Trade Commission, *In the Matter of Certain Recordable Compact Discs and Rewritable Compact Discs*, 2003 WL 22988476 (October 24, 2003), at 186 et seq.

[52] The method used in the original CD pool has never been expressly approved by European authorities, however the definition of commercial essentiality is equivalent to that of the DVD 6C pool. In order to reduce flexibility in the selection process, the TT Guidelines require that the role of the patent expert in evaluating essentiality should continue even after the creation of the pool. This should guarantee that if alternative technologies emerge, the patent expert would exclude from the pool the patent that have become non essential. Unlike the original CD pool, the DVD 6C pool provides reviews mechanisms to exclude non-essential patents from the pool, since commercially essential patent might become non-essential as a consequence of changes in the marketplace. *But see* Janis, "Aggregation and Dissemination Issues in Patent Pools" (2005), <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=715045> (last visited 25 Nov. 2012). "The Toshiba DVD pool *attempted* to account for the time-dependence of essentiality by providing for both comprehensive and individual review mechanisms."

[53] For another example of the discretion underlying the commercial essentiality criterion see Business Review Letter UHF RFID. In the UHF RFID pool, the definition of essentiality encompasses not only technically essential patents, but also patents "not reading on the standard but nonetheless required to manufacture a competitive product compliant with the standard, due to production or design costs, consumer preferences, or other reasons."

[54] See U.S International Trade Commission, *In the Matter of Certain Recordable Compact Discs and Rewritable Compact Discs*, 2003 WL 22988476 (October 24, 2003), at 203-204. According to the opponents' expert, the existence of a patent covering an alternative technology, which integrates effectively with the standard-compliant product, demonstrates that the patent included in the pool is not essential.

[55] "This determination calls for evidence of actual marketplace preferences in addition to patent law analysis. Such evidence might not exist as of the time when the evaluator is making the threshold determination. It seems likely that the evaluation will be done largely on the basis of what is revealed from the face of the patent at issue, perhaps coupled with the evaluator's general technical expertise". See Janis, *supra* note 52, at 23.

[56] European Commission, TT Guidelines, par. 218.

[57] *Id.* at par. 222.

[58] *See* European Commission, Press Release of October 9, 2000 (IP/00/1135): *Commission authorizes agreement on the grant of DVD patent licenses.*; *see also* European Commission, Press Release of December 18, 1998 (IP/98/1155): *Commission approves a patent licensing programme to implement the MPEG-2 standard*; European Commission, Press Release of 7 August 2003 (IP/03/1152): *Commission clears Philips/Sony CD Licensing Program*.

members are unlikely to accept the exclusion of their patents,[59] an accurate review process requires information about all the patents existing in the relevant technology area.[60] The reliability of the expert's evaluations is further complicated by the commercial essentiality criterion, as the assessment of the economic efficiencies arising from the integration of technologies is intrinsically disputable.

A deeper insight is therefore required into the antitrust treatment of pools containing non-essential but complementary patents. In this regard, the TT Guidelines simply state that a pool encompassing non-essential but complementary technologies "is likely to be caught by Article 81(1) where the pool has a significant position on any relevant market." [61] According to the TT Guidelines, the presence of non-essential but complementary patents in the pool raises competitive concerns similar to those of tying and bundling arrangements. After all, a pool is an agreement whereby multiple patents are offered as a package to third parties and, by including complementary patents, it poses two competitive risks: it may foreclose alternative technologies and force licensees to pay for technologies that they do not need or want. [62] Similarly, the main restrictive effects of tying arrangements are foreclosure of competing suppliers of the tied product and limitation of customer choice.[63] Thus, EU case law on tying arrangements may clarify the circumstances under which the inclusion of complementary patents in the pool produces antitrust liability. [64] Under the current framework, both the Commission and the General Court adopt a five-part test to establish whether or not a tying arrangement deserves antitrust condemnation: (1) the existence of two separate products; (2) significant market power in the tying product market; (3) refusal to supply the tying product without the tied product; (4) foreclosure effects of the tying arrangement; (5) absence of any objective justification for the practice.[65]

Analogously, the presence of complementary patents in the pool portfolio should allow the pool to leverage its market power in the standard technology so as to foreclose competition in areas that go beyond the rights attributable to the essential patents. This requires the possibility of identifying two distinct markets: the complementary patent should define a market distinguishable from that of essential patents. In other words, the complementary patent should cover a distinct or separate technology.[66] In high-technology markets, separateness between technologies requires a careful assessment of the factual and technical situation. As affirmed in *Microsoft I*, separateness between technologies may evolve over time: applications initially appearing as separate may subsequently be regarded as forming a single application.[67] However, EU case law generally relies on market definition when assessing the existence of distinct products. Indeed, the Commission and EU Courts have mainly applied the consumer demand test as a benchmark for whether there are two products. Separateness between products is demonstrated by the presence of independent suppliers of alternative technologies, i.e. technologies that provide the same functionality covered by the complementary patent; [68] or by the fact that licensees choose to obtain the patents covering the complementary functionality separately from the standard technology.[69] Little consideration, conversely, has been given to the nature and technical features of the technologies concerned.[70]

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59 *See e.g.* Plompen, *supra* note 41, at 302.

60 Several commentators question the effectiveness of the on-going process of evaluation. *See e.g.* Janis, *supra* note 47, at 28. *See also* Nagaoka, "Policy Issues in Efficient Collaboration through a Patent Pool", in Tzong-Leh and Chen, *The Future Development of Competition Framework*, 147 (2004). The continuing role of the patent expert in assessing essentiality is likely to lead to the inclusion of newly developed technologies in the pool portfolio, but not necessarily to the exclusion of the original contributions. Several studies show that pool portfolios tend to grow over time; more than half of the patents are added to pools after their formation. And, this tendency to over-inclusion favors original contributors: the on-going selection process favors pool members' technologies, instead of non-members' ones. See Baron and Delcamp, "Strategic inputs into patent pools" (2010), CERNA Mines ParisTech Working Paper No. 2010:05, <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1641265> (last visited 25 Nov. 2012). Moreover, pooling agreements may provide that pool members are not always forced to consult the expert: if they agree unanimously that a patent is essential, that patent may be included in the pool portfolio, even without the approval of the expert. *See e.g.* Business Review Letter MPEG-2.

61 European Commission, TT Guidelines, par. 221.

62 *Id.* at par. 221.

63 Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, 839 et seq.; Case COMP/C-3/37.792, *Microsoft I* [2005] 4 C.M.L.R. 965,794 et seq.; Case COMP/C-3/39.530, *Microsoft II* [2009], OJ C242/20, 33 et seq.; European Commission, TT Guidelines, par. 191 et seq.; Commission Communication, *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, (2009) OJ C 45, par. 47 et seq.

64 *See e.g.* Janis, *supra* note 47, at 9-10. "A pool may be viewed as a package licensing arrangement in which multiple patent owners – who might otherwise be competitors – contribute patents to the package."

65 *See e.g.* General Court, *Microsoft Corp. v. Commission*, *supra* note 63, at par. 814 et seq.

66 *Id*, at par. 912 et seq. Two technologies are separate where they are dissociable in economic and commercial terms, although they are linked by nature or according to commercial usage.

67 *Id.* at par. 913.

68 *Id*. at par. 917; Case COMP/C-3/37.792, *Microsoft I* [2005] 4 C.M.L.R. 965, at par. 802.

69 Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 918. "Only in the absence of independent demand for the allegedly tied product, there can be no question of separate products and no abusive tying". See also Case T-30/89, *Hilti AG v. European Commission* [1991] E.C.R. II-1439, at par. 67. "Since the 1960s there have been independent producers, […] [who were] specialized and produce[d] only nails [i.e. the tied product], and indeed *some* make only nails specifically designed for Hilti tools [i.e. the tying product]. That fact in itself is sound evidence that there is a specific market for Hilti-compatible nails." Recently, the Commission adopted a more flexible standard to assess separateness between technologies. See Commission Communication, *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, (2009) OJ C

Once two separate markets are identified, the pool should be found to hold significant market power in the tying market, so as to restrict competition in the tied technology.[71] The assessment of market power generally requires the identification of the competitive constraints that the pool faces. If the standard has not yet gained broad acceptance or competitors offer functionally interchangeable technologies, the pool might not be in the position to exercise market power. However, in markets characterized by network effects and where the technological standard constitutes a barrier to entry, a pool comprising essential patents is likely to be found dominant.[72]
In that case, the question of abuse centers on the coercion exerted on licensees and the consequent anti-competitive effects. To mitigate any limitation of licensees' choice, the TT Guidelines suggest that the pool allows pool members to license their patents independently and/or offers partial licenses,[73] thereby giving licensees the option to purchase only the patents they desire or need. Accordingly, pools generally allow independent licensing and permit licensees to develop and use alternative technologies.[74] Under EU case law, where the tie-in does not fully restrict licensees from purchasing the tied product separately, a finding of abuse requires a detailed assessment of the current and potential foreclosure effects of the practice. As affirmed in *Microsoft*, for a tying arrangement to violate competition law, antitrust authorities should prove that the practice has the potential to foreclose competition.[75] In other terms, the presence of complementary patents in the pool portfolio should be liable to marginalize or exclude alternative technologies from the market. Where a pool licenses patents essential for implementing a standard, it would likewise achieve a high degree of market penetration, that would consequently benefit the complementary technology.[76] Thus, unless alternative technologies can reach the market as efficiently as pooled patents do,[77] the pool is likely to be held anti-competitive.
Although potential foreclosure effects are liable to materialize, an objective justification can in principle save the tying arrangement. The combination of complementary technologies may, indeed, be justified by technical and/or economic efficiencies. In this respect, the TT Guidelines affirm that in assessing pools comprising non-essential technologies, the Commission considers "whether there are any pro-competitive reasons for including the non-essential technologies".[78] In the context of tying arrangements, EU case law permits the efficiency defense under specific conditions: the incumbent should demonstrate that the tying is indispensable to achieve the alleged efficiencies. More specifically, the Commission and EU Courts require the dominant company to prove that the integration creates "superior technical product performance" in comparison to the use of products together when purchased separately.[79] Accordingly, the inclusion of complementary patents in the pool portfolio may be justified where the tied functionality and the standard technology are so interdependent, that the removal of the former entails a malfunction of the latter and no technological alternative integrates as efficiently as the pooled technology does. [80] Such a standard of proof is considerably high and significantly limits the likelihood that an efficient integration would be approved.
Recent developments, however, partially signal a less rigid attitude towards the integration of complementary technologies. In the Guidance on abusive exclusionary conduct, the Commission has indicated that it will also examine whether or not the tie-in simply enhances the ability to bring the product to the market to the benefit of consumers.[81] The Commission will also give greater consideration to the reduction of transaction costs produced by the tie-in.[82] In the context of standard technologies, this factor may contribute to justifying the integration of complementary technologies, as licensees need several non-essential patents to produce a commercially

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45, at par. 51. "Two products are distinct if, in the absence of tying or bundling, a substantial number of customers would purchase or would have purchased the tying product without also buying the tied product from the same supplier".

70 *See* Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 926.

71 *Id*. at par. 859

72 *See e.g.* Commission Communication, *Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements*, [2011] OJ C 11, par. 269.

73 European Commission, TT Guidelines, par. 222. It should be noted that independent licensing may not be a meaningful solution in the majority of pool situations. Besides incurring considerable transaction costs, licensees may not be able to identify the patents needed to realize a marketable product. Moreover, the pool's pricing policy may make purchase of the tying and tied products together the only viable economic option. Differently, partial licenses allows licensees to obtain a license for only part of the package with a corresponding reduction of royalties. *But see* Skitol, *supra* note 54, at 103. In order to structure and implement partial licenses, pool members should agree on tiered fees and on the allocation of partial license payments. The associated negotiation and administrative costs may explain why modern pools tend to exclude partial licenses.

74 *See e.g.* Business Review Letter MPEG-2.

75 *See* Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 1031 et seq.

76 *Id*. at par. 1038.

77 *Id.* at par. 1050.

78 European Commission, TT Guidelines, par. 222.

79 *See* Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 1159. *But see* Case COMP/C-3/37.792, *Microsoft I* [2005] 4 C.M.L.R. 965, at par. 962 et seq. "Tying […] is indispensable for the alleged pro-competitive effects to come into effect."

80 *See e.g.* Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 1161-1165.

81 Commission Communication, *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, (2009) OJ C 45, at par. 62. Such formulation might allow pool members to include non-essential patents, that are nevertheless necessary to make a commercial appealing product.

82 *Id.* at par. 62.

successful product. If these patents were not included in the pool portfolio, licensees would have to identify relevant patent holders, to obtain information on their patents' scope and value and to negotiate the details of the licensing agreements, thereby incurring significant costs.[83] Recognizing the role of tying in reducing transaction costs may therefore lead to a greater leeway towards the integration of complementary technologies in the pool context.

PATENT POOLS AND US COMPETITION LAW

Patent pools have a long history in US case law. The first Supreme Court case to apply competition law to a patent pool took place in 1902, and several following patent pooling arrangements have attracted antitrust attention. Historically, case law on patent pools followed the legal approach towards intellectual property rights. While in the early years after the passage of the Sherman Act, US courts tended to accord absolute freedom to the exercise of intellectual property rights,[84] judicial opinions later showed increasing hostility towards patent monopolies. Such tension between competition law and intellectual property manifested itself in a stricter evaluation of the licensing practices in the pool context. [85] As regards the aggregation issues, the nature of the combined patents has been first recognized as a key determinant in the legality of patent pools in Standard Oil Co. v. United States.[86] Here, the Supreme Court emphasized that pooling blocking patents promotes rather than restrains competition. Blocking positions typically arise where one patent covers an improvement of the technology covered by another patent. Since the improvement technology cannot be practiced without infringing the basic patent, the Court held that the interchange of patent rights is "necessary if technical advancement is not to be blocked by threatened litigation."[87] However, the Court did not undertake a detailed evaluation of whether all the patents combined were actually blocking or substitutes. In concluding that the pool did not harm competition, the Court based its decision on two factors: the limited market power of the parties and the absence of price-fixing and non-compete provisions.[88] Similarly, in subsequent cases, courts have generally accorded little weight to the competitive relationship between the combined patents, instead focusing on the vertical restraints imposed on licensees.[89]

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83 *See e.g.* European Commission, *Options for an EU instrument for patent valorization*, *supra* note 22, at 16 et seq.

84 *E. Bement and Sons v. National Harrow Co.*, 186 U.S. 70, 91 (1902). The pooling agreement fixed prices for licensed products, required licensees to make or sell only the licensed products and obligated licensees not to challenge licensed patents. The Supreme Court upheld the agreement, stating that "the general rule is absolute freedom in the use or sale of rights under the patent laws of the United States. […]The fact that the conditions in the contracts keep up the monopoly or fix prices does not render them illegal." *See also Standard Sanitary Manufacturing v. United States*, 226 U.S. 20 (1912). The Standard Sanitary pooling arrangement fixed downstream prices, obligated licensees not to market competing technologies and established exclusive market territories. In contrast with the National Harrow decision, the Court condemned the pool, as the restrictive provisions "transcended what was necessary to protect the use of the patent or the monopoly which the law conferred upon it."

85 *See e.g. Hartford Empire Co. v. United States*, 323 U.S. 386 (1945). Through a network of cross-licensing agreement, Hartford-Empire and other firms merged together most of the patents related to the manufacture of glassware. The resulting pool issued field-of-use restricted licenses, which in some cases fixed the quantities that could be produced with the licensed technologies. Although the pool did not fix prices for downstream products, "the companies were able to apply moral sanctions […] which amounted to the same thing." The Supreme Court affirmed the district court's finding that, over the years, the members of the Hartford-Empire pool had "regulated and suppressed competition in the use of glassmaking machinery and employed their joint patent position to allocate fields of manufacture and to maintain prices of unpatented glassware." However, the Court did not impose the dissolution of the pool, but simply forced pool members to license their patents to all comers at a reasonable royalty rate and without any restriction on the use of the technology. *See also United States v. Line Material Co.*, 333 U.S. 287 (1948). A cross-licensing agreement was concluded between Southern and Line Material to resolve the blocking relationship between their patents on a particular circuit protection device. The agreement provided that Line Material became the exclusive licensor of Southern's patent and had the power to fix prices for devices that embodied both patents. Although precedent cases had established that, under certain conditions, a patentee may control the price the licensees charge for the patented device, in Line Material the Supreme Court held that the power to fix prices was anticompetitive. According to the Court, when separate patentees cross-licenses their patents to fix downstream prices, "competition is impeded to a greater degree than where a single patentee fixes prices for his licensees". And this principle applies "even when […] the devices are not commercially competitive because the subservient patent cannot be practiced without consent of the dominant". *See also United States v. National Lead Co.*, 333 U.S. 364 (1948). National Lead and foreign producers of titanium-dioxide decided to cross-license all their existing and future patents, with each retaining exclusive rights to manufacture and sell the technology in its relevant territory. Moreover, National Lead agreed with Dupont to cross-license all their conflicting U.S. patents and to exchange all future patents and know-how related to titanium dioxide processes and products. The Supreme Court upheld the lower court's ruling, affirming that the allocation of exclusive territories violated the antitrust laws. As regards the agreement between Dupont and National Lead, the Court confirmed that the cross-licensing agreement contributed to the proliferation of patents in the industry, thereby allowing the two companies to create a barrier to new entry in the U.S. market. Consequently, the Court required the companies to remove the vertical restrictions and to license their patents at reasonable and non-discriminatory rates. *See also United States v. Singer Manufacturing*, 374 U.S. 174 (1963). Feared of the emerging Japanese competitors, Singer, Vigorelli and Gegauf concluded a series of cross-licensing agreements to exchange their conflicting patents on a specific type of sewing machine. The companies agreed to defend their patents rights in their respective territories and not to contest each other's patents. According to the Supreme Court, the agreements deserved antitrust condemnation, since they were concluded for an illegal purpose, i.e. to rid the three companies of infringement by their Japanese competitors and therefore to suppress the Japanese machine competition.

86 *Standard Oil Co. (Indiana) v. United States*, 283 U.S. 163 (1931)

87 *Id.* at 171.

88 *Id.* at 176.

89 *See e.g.* Gilbert, *supra* note 11, at par. 88 et seq.

The modern approach towards patent pools has been inaugurated by the Antitrust Guidelines for the Licensing of Intellectual Property, which adopted a rule of reason framework to evaluate patent pools by comparing their pro- and anti-competitive effects. The US Guidelines explicitly recognize that patent pools promote the dissemination of technology and provide important benefits "by integrating complementary technologies, reducing transaction costs, clearing blocking positions, and avoiding costly infringement litigation".[90] The antitrust analysis of patent pools is further clarified by five US Department of Justice (DoJ) Business review Letters.[91] In the Letters, the DoJ pays particular attention to the nature of the patents pooled and highlights that "a starting point for an antitrust analysis of any patent pool is an inquiry into the validity of the patents and their relationship to each other."[92] In particular, the DoJ emphasizes that the essentiality criterion provides a reliable safe harbor from antitrust challenges: the limitation of the pool portfolio to essential patents guarantees that "the pool does not foreclose competition neither among patents within the pool nor between patents in the pool and patents outside it."[93] In the DoJ's view, two different formulations of essentiality deserve antitrust approval: technical and commercial essentiality. Consequently, patents not reading on the standard may be included in the pool portfolio, if they are necessary to "manufacture a competitive product compliant with the standard, due to production or design costs, consumer preferences, or other reasons."[94] In order to ensure the essentiality of the patents, the DoJ recommends the involvement of a third party evaluator in the selection process and suggests that the evaluator reviews periodically the essentiality of the patents pooled.[95] In the same spirit, any grant-back provision should be limited to essential patents and cannot oblige licensees to "license back" mere improvement of the standard technology.[96] Moreover, the DoJ recognizes that any risk of foreclosure effects may be reduced where pool members can license their patents independently or where the pool allows licensees to obtain fewer than all the pooled patents.[97]

A. The Inclusion of Complementary Patents: the Philips Case

In order to prevent foreclosure of third party technologies, the Business review Letters require that patent pools do not include complementary but non-essential patents and suggest that pool members retain an independent expert to periodically review the essentiality of the patents pooled. The combination of complementary technologies in the pool may indeed give rise to an illegal tying arrangement.[98]

Under US case law, tying practices are traditionally treated as per se unlawful and therefore condemned without proof of actual anti-competitive effects.[99] Over the time, however, the Supreme Court clarified that per se condemnation applies only under specific conditions, which indicate that the arrangement is likely to have anticompetitive consequences.[100] First, no unlawful tie-in can exist unless the arrangement involves two separate products. In this regard, the Court explained that "the answer to the question whether one or two products are involved turns not on the functional relation between them, but rather on the character of demand for the two items".[101] In other terms, for two products to be considered distinct, the plaintiff should demonstrate that there is

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90 U.S. Department of Justice and Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* (1995), <http://www.justice.gov/atr/public/guidelines/0558.htm> (last visited 26 Nov. 2012).

91 Business Review Letter MPEG-2; Business Review Letter DVD 6C; Business Review Letter 3G; Business Review Letter DVD 3C; Business Review Letter UHF RFID.

92 *See e.g.* Business Review Letter MPEG-2.

93 *Id.*

94 *See* Business Review Letter UHF RFID.

95 *See e.g.* Business Review Letter MPEG-2; Business Review Letter DVD 6C. *See also* Business Review Letter 3G. The DoJ recognizes that even the royalty allocation formula may contribute to prevent the inclusion of non essential patents. Where the pool adopt numeric proportional sharing rules, pool members are financially incentivized to object to the inclusion of non-essential patents, as such inclusion could lower each member's compensation.

96 *See e.g.* Business Review Letter MPEG-2.

97 *Id.*

98 U.S. Department of Justice – Federal Trade Commission, *Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition*, Washington, DC (2007), <http:// www.usdoj.gov/atr/public/hearings/ip/222655.pdf> (last visited 4 Dec. 2012). "Including only one of several substitute patents in a pool risks foreclosing markets to competing patents outside the pool because a licensee would not purchase both a pool license and a license for a substitute patent, even if that substitute were a superior technology."

99 *See e.g. International Salt Co. v. United States*, 332 U.S. 392, at 396 (1947). *Contra United States v. Microsoft Corp*, 253 F.3d 34, at 89-94 (D.C. Cir. 2001) (en banc). In technologically dynamic markets, tying may indeed produce efficiencies, that courts have not previously encountered; the "pervasively innovative" character of the computer platform market requires a departure from the per se rule.

100 *Jefferson Parish Hospital District No. 2 v. Hyde*, 466 U.S. 2, at 12-16 (1984).

101 *Id.* at 19-22. See also *Eastman Kodak Co. v. Image Technical Services*, 504 U.S. 451, at 462 (1992). *Contra United States v. Microsoft Corp.*, 147 F.3d 935, at 940-950 (D.C. Cir. 1998). The Court investigated whether Internet Explorer and Microsoft's operating system should have been considered two distinct products or, rather, were so integrated to form a single product. The Court applied a much different separate-product test than that required by Jefferson Parish and established the standard for proving that two complementary technologies do not constitute separate products for the purpose of tying law. According to the Court, the undertaking should demonstrate that the integration "offers advantages unavailable if the functionalities are bought separately and combined by the purchaser." *See also United States v. Microsoft Corp*, 253 F.3d 34, at 89-94 (D.C. Cir. 2001) (en banc). The Court stressed that, in the software industry, the consumer demand test is an inappropriate proxy for assessing tying arrangements. Indeed, condemning tying because there is a separate consumer demand or there are independent suppliers for the tied product may hinder innovation and product

sufficient consumer demand so that it is efficient for a company to provide the two products separately. Second, an essential characteristic of tying lies in customer coercion, i.e. conditioning the availability of one product on the purchase of another. The tie-in should force buyers to purchase a product that they did not want or might have preferred to purchase elsewhere on different terms.[102] Conversely, if products are separately available, the arrangement does not violate antitrust law. Third, the seller must have sufficient economic power in the tying product to enable it to restrain trade in the market for the tied product.[103] In this respect, the Court recently rejected the long-standing assumption that a patent confers market power. Indeed, even a per se tying claim involving a patented product "must be supported by proof of power in the relevant market."[104] Lastly, the per se rule against tying arrangements requires that the defendant tied up a not-insubstantial amount of tied product commerce.[105]

While standing the application of the per se approach to tying arrangements, the Supreme Court recognized that tie-ins may have pro-competitive justifications that make it inappropriate to condemn without considerable market analysis.[106] In Illinois Tool Works Inc. v. Independent Ink, Inc., the Court reaffirmed that many tying arrangements can be pro-competitive and "are fully consistent with a free competitive market."[107] Over the years, judicial "disapproval of tying arrangements has substantially diminished",[108] insomuch as the test currently used under the per se standard increasingly coincides with a rule of reason inquiry.[109] Indeed, courts increasingly allow consideration of the efficiencies that such arrangements may generate and frequently require proof of anti-competitive effects in the tied market before a tying claim can succeed.[110] In the patent pool context, these evolutions are echoed in the case U.S. Philips Corp. v. International Trade Commission (ITC).[111] Here, the Court of Appeals for the Federal Circuit reversed an opinion by the ITC, which held a package license to constitute an illegal tying arrangement under the patent misuse doctrine.[112] The licenses at issue were granted by Philips, which bundled all the patents necessary for the production of recordable and rewritable CDs. As Princo, GigaStorage and Lindberg stopped paying the licensing fees, Philips filed suit in the ITC, alleging that the three licensees were importing CDs that infringed Philips's patents. In response, the licensees raised the affirmative defense of patent misuse, arguing that Philips bundled essential and non-essential patents in the package licenses, thereby leveraging the monopoly power conferred by essential patents beyond their limited scope. The ITC upheld the licensees' argument and ruled that Philips's package licenses foreclosed alternative technologies, as commercially viable alternatives to the allegedly non-essential patents existing in the market. The ITC concluded that the package license constituted an illegal tying arrangement under both the per se rule and the rule of reason standard.[113] Conversely, the Federal District held that package licensing arrangements are not so clearly anti-competitive to warrant being condemned as per se illegal and conducted a deep analysis of the pro- and anti-competitive effects stemming from Philips's package licensing.

In rejecting the application of the per se standard, the Federal District affirmed that the ITC's holding was unsupported by precedent,[114] as well as contrary to sound economic reasoning. In particular, the Court highlighted that Philips did not compel licensees to use all licensed patents, nor did it force them to take anything they did not want. According to the Court, package licensing arrangements can be assimilated to non-assertion covenants: patent holders simply promises that, for a fixed licensing fee, they would not sue any licensee for engaging in any conduct covered by the entire group of patents in the package. [115] In other terms, package

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development. Under this test, the first company to integrate two previously distinct functionalities will always be condemned, as, at the moment of integration, the tied product will inevitably have a distinct demand. Thus, new and innovative integrations requires a more thorough assessment, which goes beyond consumer and suppliers historic behaviors.

102 *Jefferson Parish Hospital District No. 2 v. Hyde*, 466 U.S. 2, at 12 (1984).

103 *Id.* at 14-15.

104 See *Illinois Tool Works Inc. v. Independent Ink, Inc.*, 547 U.S. 28, at 43 (2006).

105 *Jefferson Parish Hospital District No. 2 v. Hyde*, 466 U.S. 2, at 16 (1984).

106 *Id.* at 11-12 as reported in *National Collegiate Athletic Association v. Board of Regents of the University of Oklahoma*, 468 U.S. at 104 n.26 (1984).

107 *See Illinois Tool Works Inc. v. Independent Ink, Inc.*, 547 U.S. 28, at 45 (2006).

108 *Id.* at 35.

109 *See e.g.* American Bar Association Section of Antitrust Law, *Antitrust Law Developments*, 6th edition (ABA Publishing, 2007) p. 176.

110 *See e.g. Brantley v. NBC Universal, Inc.*, 675 F.3d 1192 (2012). The 9th Circuit affirmed that plaintiffs should demonstrate the competitive harm produced by the tying arrangement. It does not suffice to prove that consumers were being forced to buy the tied product; specific evidence of actual foreclosure or horizontal collusion are necessary to succeed on a tying claim.

111 *U.S. Philips Corp. v. International Trade Commission*, 424 F.3d 1179 (Fed. Cir. 2005).

112 The analysis of tying arrangements in the context of patent misuse closely tracks antitrust law principles. The Court explained that, because of the importance of anticompetitive effects in shaping the defense of patent misuse, the analysis of tying arrangements in the context of patent misuse is closely related to the analysis of tying arrangements in antitrust law. *Id.* at 1185.

113 U.S International Trade Commission, *In the Matter of Certain Recordable Compact Discs and Rewritable Compact Discs*, 2003 WL 22988476 (October 24, 2003) (ALJ's initial determination); 2004 WL 1435791 (U.S.I.T.C. 2004) (commission determination).

114 *U.S. Philips Corp. v. International Trade Commission*, 424 F.3d 1179 at 1187-1189 (Fed. Cir. 2005). In contrast with the ITC's holdings, the Federal District affirmed that the case was not governed by the Paramount and Lowe's precedents. Philips's package licensing could have been distinguished from Paramount, as licensees were not required to use all the patents bundled in the package. Differently from the Lowe's case, a substantial portion of the licensing fees could have not been attributed to the cost of the tied products.

115 *Id.* at 1190.

licensing merely allows licensees to produce freely the patented technology without worrying about infringement suits. Therefore, Philips's licensees were not restricted from obtaining the tied technologies from other sources. In addition, the Court argued that the inclusion of non-essential patents did not lead to higher licensing fees, as the royalty rate did not depend on the number of patents used.[116] Importantly, the Court reasoned that the inclusion of non-essential patents have generally little influence on licensing fees. The price of a package license generally depends on the value of essential patents. [117] More specifically, patent holders set royalty rates depending on the willingness of licensees to practice the technology in question, not on the marginal value of each patent. Consequently, the royalty rate would not have been lower if patents had been offered in smaller packages or on an individual basis.

In examining the pro- and anti-competitive effects of the package licensing, the Federal District further rejected the ITC's holding, concluding that the efficiencies produced by Philips's package licensing outweighed any alleged competitive harm. According to the Court, package licensing produces unique advantages. Grouping licenses in a package reduces transaction costs and protects licensees against future litigation. Package licensing also diminishes licensors' administrative and monitoring costs and simplifies pricing decisions, as licensors estimate their patents according to the overall technology value, instead of calculating the marginal benefit provided by each patent. Where technologies evolve rapidly, package licensing provides additional efficiencies, by resolving in advance all potential patent disputes and reducing the degree of uncertainty associated with investment decisions.[118] While the agreement produced well-established pro-competitive benefits, the existence of any anti-competitive effects was doubtful. The Court pointed out that licensees did not demonstrate that Philips's package licensing produced any competitive harm.[119] Even though licensees showed that a competitor offered an alternative technology to the allegedly non-essential patents, they did not demonstrate that there was a demand for this technology and that this demand "went unmet because of the coercive effect of Philips's inclusion of the non-essential patents in the pool".[120] According to the Court, the mere existence of an alternative technology does not suffice to condemn package licensing. Licensees should have proved that Philips's package licenses had an actual anticompetitive effect. Finally, the Court questioned the ITC's understanding of non-essential patents with regards to timing and ruled that the emergence of alternative technologies after the execution of the agreement cannot invalidate an originally lawful agreement.[121] In fast-developing industries, changes in the technology could render some patents essential at the time of licensing arguably non-essential at some later point. If a package license could be challenged due to developments in the technology of which the patentees are unaware, or which have just become commercially viable, licensees would have a strong incentive to litigation. In order to avoid substantial uncertainty in the market, the Court established that the correct timeframe to determine the essentiality of patents is the time of the execution, not that of the litigation.[122] On the same grounds, the Federal District concluded that Philips's package licensing did not deserve antitrust condemnation even under the rule of reason.[123]

In reversing the ITC's decision, the Court remanded the case for further proceedings, as the ITC did not address all of the issues presented by licensees.[124] In particular, the licensees further claimed that one particular pooled patent (the Lagadec patent) not only was non-essential to the production of standard compliant CDs, but also covered a technology, which could potentially compete to another pooled patent (the Raaymakers patent). The Federal District ruled on these issues in two following judgments: the 2009 Princo Corp. v. ITC decision[125] and the subsequent 2010 en banc ruling.[126] In 2009, the Court rejected the claim that the Lagadec patent was not essential to produce standard compliant CDs and, therefore, unlawfully tied to essential patents. In particular, the Court outlined that "perfect certainty [on the essentiality of a patent] is not required to avoid a charge of misuse through unlawful tying." [127] Even though a patent is found to be non-essential after the execution of the license, its original inclusion in the package contributes to avoid uncertainty and costly patent disputes. [128] Indeed, where the scope of patent claims is uncertain, making doubtful the essentiality of the patent, excluding that patent from the pool would leave licensees with the risk of facing future infringement actions. Accordingly, a showing of misuse through unlawful tying requires the plaintiff to demonstrate that "at the time of the license an objective

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116 *Id.* at 1191.
117 *Id.*
118 *Id.* at 1192-1193.
119 *Id.* at 1195.
120 *Id.* at 1196.
121 *Id.* at 1196-1197.
122 *Id.* at 1197.
123 *Id.* at 1197-1198.
124 *Id.* at 1198-1199.
125 *Princo Corp. v. International Trade Commission*, 563 F.3d 1301 (Fed. Cir. 2009).
126 *Princo Corp. v. International Trade Commission*, 616 F. 3d 1318 (Fed. Cir. 2010) (en banc).
127 *Princo Corp. v. International Trade Commission*, 563 F.3d 1301, at 1309 (Fed. Cir. 2009).
128 *Id.*; *see also Nero AG v. Mpeg LA, L.L.C. et al.*, 2010 WL 4366448 (C.D. Cal. 2010) "[i]t is not anticompetitive for a patent pool to include numerous potentially blocking patents, patents which may or may not be essential but which are more efficient to license as part of the pool than to risk the expense of future litigation."

manufacturer would believe reasonably [that the patent] might be necessary to practice the technology".[129] Having refused the misuse claim based on tying, the Court ruled on the second issue raised by licensees: the Lagadec patent covered a technology alternative to the Rayamakers patent or could have been developed as part of a competing standard. In this regard, the Court noted that the inclusion of competing patents in the pool raises different concerns than tying arrangements. Unlike tying, the combination of substitute patents suppresses competition among technologies and does not produce any efficiency.[130] This implies the application of the theory of elimination of competition and consequently a lower standard of proof. While under the law of tying it should be demonstrated that an alternative technology is already commercially viable, in this case the plaintiff should prove that, absent the agreement, "a suppressed technology would have been viable".[131] The Court added that this lower threshold is further justified by the intrinsic nature of intellectual property. Technology disclosed in a patent generally needs further development to be commercialized; pool members have nevertheless little incentive to develop technologies that may reduce their market power. [132] In these circumstances, the plaintiff might find it particularly difficult to prove that one of the pooled patents covers a technology, which is already commercially viable to compete with another pooled patent. In the en banc ruling, the Federal District further clarified that, under the theory of elimination of competition, a patent is found to be competing where there is "a reasonable probability that the […] technology, if available licensing, would have matured into a competitive force in the […] technology market."[133] The Court finally dismissed the licensees' claims, finding that the alleged conduct did not fall within the rationale of the patent misuse doctrine, nor did it produce any anti-competitive effects. The purported agreement to suppress the Lagadec technology had none of the features, that have characterized patent misuse cases. In particular, it did "not leverage the power of a patent to exact concessions from a licensee that are not fairly within the ambit of the patent right."[134] Moreover, the Court ruled that the conduct did not produce any competitive harm. The facts of the case suggested that the Lagadec technology lacked the technical and commercial prospects necessary to be integrated in the CD standard or to constitute a possible basis for an alternative technological platform.[135]

OVERCOMING THE ESSENTIALITY CRITERION

US and EU legislations show a convergent framework in the antitrust analysis of patent pools.[136] On both sides of the Atlantic, the aggregation issues raised by patent pools are governed by the essentiality criterion.[137] In order to ensure pool's compliance with essentiality, competition authorities support a continuing role of the independent evaluator.[138] Moreover, aware that licensees need technologies additional to those mentioned in the standard specifications, antitrust authorities embrace a broad interpretation of the essentiality criterion and allow the pool to include commercially essential technologies in its portfolio.[139] The adoption of the commercial essentiality criterion aims at balancing two different interests: preventing foreclosure effects in the market of complementary technologies and guaranteeing a certain degree of effectiveness of the pool. Such definition of essentiality, however, obfuscates even more the boundaries between essentiality and complementarity. Whether or not a patent should be part of the pool depends not only on the correspondence between standard specifications and patent claims, but also on the comparison among the technical efficiencies stemming from the integration of different technologies within the standard. Accordingly, the pool expert must extrapolate from patent documents the costs of integration of a particular technology within the standard and confront them with those of the other existing technologies. In other terms, the expert should examine all existing patents in a certain field, compare them with each other and pick the most efficient one. Yet, how can demarcation lines be drawn between patents essential to manufacture a commercially viable products due to consumer preferences[140] and merely complementary patents?

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129 *Id.* at 1309.
130 *Id.* at 1313.
131 *Id.* at 1315.
132 *Id.*
133 *Princo Corp. v. International Trade Commission*, 616 F. 3d 1318, at 1338 (Fed. Cir. 2010) (en banc).
134 *Id.* at 1333.
135 *Id.* at 1338-1339.
136 For instance, both the DoJ and the Commission require that the pool allows its members to engage in independent licensing and/or offers partial licenses, thereby reducing the risk that licensees will be obliged to pay for non-essential patents. *See e.g.* Ullrich, Patent Pools: Approaching a Patent Law Problem via Competition Policy, in Ehlermann and Atanasiu, *European Competition Law Annual 2005: The Interaction between Competition Law and Intellectual Property Law*, 1th edition (Hart Publishing, 2007) 305. Describing the process underlying the adoption of the regulation on patent pools, the Author affirms that "the Commission followed the – implicit – invitation to adopt the standards established by the US Department of Justice by way of what an intellectual property lawyer might be tempted to call slavish imitation".
137 *See* European Commission, TT Guidelines, par. 220. *See e.g.* Business Review Letter MPEG-2.
138 *See* European Commission, TT Guidelines, par. 222. *See e.g.* Business Review Letter MPEG-2.
139 *See* European Commission, Press Release of October 9, 2000 (IP/00/1135): *Commission authorizes agreement on the grant of DVD patent licenses*. *See e.g.* Business Review Letter DVD 6C.
140 *See e.g.* Business Review Letter UHF RFID.

Instead of promoting the creation of efficient pools, such adaptation of the law of tying arrangements creates serious risks of antitrust liability. As shown above, if a technology alternative to a pooled patent is offered by a competitor, the pool is likely to be challenged by competition authorities. Under the current EU legal framework, direct or indirect evidence of separate consumer demand for the complementary technology attracts antitrust attention almost automatically. Although the European Commission has affirmed that the separate customer demand should be substantial, [141] the presence on the market of single undertakings specialized in the sale of the tied product still indicates the presence of an illegal tying arrangement.[142] In addition, the possibility of defending the agreement only occurs after the finding of abuse; this makes it difficult to justify the integration once two separate products are found and dominance is established. In sum, even if the commercial essentiality criterion aims at favoring efficient combinations of technologies, the current framework accords still greater consideration to potential foreclosure effects. In this context, the application of the commercial essentiality criterion implies significant risks of antitrust liability, and requires the patent expert to monitor the entire technology area and to undertake disputable technical evaluations.

The inadequacy of such transposition of tying law has been implicitly recognized by the Federal District in Philips.[143] Here, the Court established a high threshold for proving foreclosure effects, adopting a protective approach towards patent pools. According to the Court, for the inclusion of complementary patents to trigger antitrust liability, the plaintiff must prove that: (1) commercially viable alternatives to the disputed patents exist in the market, (2) there is a demand for these alternative technologies and (3) this demand went unmet because of the coercive effect of including the complementary patents in the pool.[144] In practice, licensees should demonstrate that independent manufacturers of the tying product have already been marginalized due to the inclusion of complementary patents in the pool. Conversely, under EU law, a tying arrangement is generally condemned when it has the potential to foreclose competition.[145] Moreover, the Federal District put particular emphasis on the role of pools in reducing uncertainty in "thicketed" markets. Although both EU and US systems recognize the pro-competitive benefits of patent pools, the US Court underscored that patent pools reduce "the degree of uncertainty associated with investment decisions" and implicitly recognized that patent thickets may discourage investments in new technology.[146] In 2009, the Court went one step further and held that the avoidance of uncertainty and costly litigation may justify the inclusion of non-essential patents in the pool.[147] The Court found that including patents whose essentiality is ambiguous produces pro-competitive effects, by preventing "continuing disputes over whether the licensee's technology infringes certain ancillary patents owned by the licensor".[148] Consequently, any party seeking to challenge a patent pool under the law of tying arrangement faces a high standard of proof: the plaintiff should be able to show that an objective manufacturer would have been certain about the non-essentiality of the patents in question. Along the same line, the Federal District held that a patent pool cannot be invalidated due to the emergence of alternative technologies after the execution of the agreement.[149] Conditioning the lawfulness of the pool on the later emergence of improved technologies would indeed incentivize litigation and introduce unjustified uncertainty in the market. According to the Court, the need for legal certainty in "thicketed" markets legitimizes a flexible application of the essentiality criterion and justifies a heavy burden of proof for qualifying a patent as non-essential. On the other side of the Atlantic, EU authorities neglect the role of pools as reference points in fragmented technology markets and put greater emphasis on potential exclusionary effects. The TT Guidelines express considerable concern about the risk that later technology developments may be marginalized as a consequence of the existence of the pool;[150] accordingly, establish that essentiality should be evaluated at the time of litigation.[151]

The Federal District's departure from the traditional perspective aims at redefining the balance between antitrust concerns and emerging industry needs, by ensuring that blocking patent positions do not hinder the development of the downstream market. To this end, the Court ruled that, in cases of dubious essentiality, the pool is not caught by the law of tying arrangements. Such transposition of the *in dubio pro reo* paradigm justifies the over-inclusion of patents in the pool and aims at preventing the detrimental consequences of potential patent hold-ups. In the same vein, the new report commissioned by European authorities for the revision of the TT Guidelines recognizes that pools supporting standard technology "might need to include some non-essential patents in order

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141 Commission Communication, *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, (2009) OJ C 45, par. 51

142 *See e.g.* Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 918. *See also* Case T-30/89, *Hilti AG v. European Commission* [1991] E.C.R. II-1439, at par. 67.

143 *U.S. Philips Corp. v. International Trade Commission*, 424 F.3d 1179 (Fed. Cir. 2005).

144 *Id.* at 1195-1996.

145 See e.g. Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 1031 et seq.

146 *U.S. Philips Corp. v. International Trade Commission*, 424 F.3d at par. 1192-1193 (Fed. Cir. 2005).

147 *Princo Corp. v. International Trade Commission*, 563 F.3d at 1309 (Fed. Cir. 2009).

148 *Id.*

149 *U.S. Philips Corp. v. International Trade Commission*, 424 F.3d at par. 1197 (Fed. Cir. 2005).

150 European Commission, TT Guidelines, par. 221.

151 *Id.* at par. 222.

to achieve a degree of legal certainty".[152] The report underscores how the proliferation of patent rights and the ubiquity of patent boundaries require greater leniency in the antitrust evaluation of cooperative agreements among patent holders.[153] In this respect, a less stringent approach towards the combination of non-essential patents would preserve the pool's role in reducing uncertainty in thicketed markets.

In conclusion, recent developments highlight how the emergence of patent thickets entails the redefinition of the traditional approach towards patent pools. In particular, greater consideration should be accorded to the role of pools in guaranteeing the development of the downstream industry. Patent pools should be condemned only when they impair competition in absolute terms, i.e. lower consumer welfare independently of the effects on competitors.[154] A more cautious approach would therefore deny antitrust condemnation when actual exclusionary effects are not fully demonstrated and would advise against impossible standards for proving antitrust exemptability. Besides rejecting unrealistic analytical perspectives, an informed antitrust attitude should start from some preliminary considerations.

First, as an ordinary licensing agreement, a pool opens up new market segments, previously reserved to patent holders. In other words, the pool exercises a centralized control over the standard technology and favors the access of downstream operators to the proprietary standard.

Second, where uncertainty surrounds the identification of the intellectual property rights needed to manufacture a particular technology, the pool provides freedom to operate to all market agents. It represents an access platform in markets characterized by several unidentifiable entry barriers.[155]

Third - and more importantly - the pool perpetrates the benefits stemming from standardization. Where innovation is pervasive and cumulative, the standard setting organization and the pool reduce the time necessary to diffuse a new technology to the market and promote innovation by allowing companies to build on top of agreed solutions.[156]

Such planning role also influences subsequent innovative processes. As explained above, patent pooling agreements frequently oblige licensees to grant non-exclusive licenses of their improvement technologies to pool members and to the other licensees.[157] In other words, the pool forces licensees to make their improvement solutions available to all downstream developers. In markets with sequential innovation, access to the standard technology normally leads to many second-generation innovations. Nonetheless, subsequent developers are not likely to freely release their enhancements. In this context, economic studies showed that orchestrated control over the standard and over the subsequent innovative process not only reduces transaction costs, but also increase total surplus compared to decentralized and unmanaged processes of standard evolution.[158] Indeed, in the absence of centralized governance, developers individually refuse to "open" their inventions, although they prefer that all the other downstream operator open their own. Where the standard holder forces improvers to license their inventions, subsequent cycles of innovation can build from a larger pool of initial input and this maximizes both users and developers' welfare.[159] Patent pools can be therefore assimilated to "social planners": they bundle subsequent enhancements into the joint portfolio and make them available to all downstream agents, thereby favoring long-term innovation. Besides favoring cumulative processes, such continuous updating of the pool portfolio also avoids prolonging the artificial monopoly of the basic technology in markets characterized by high rates of technological obsolence.

In this perspective, limiting the pool portfolio to strictly essential technologies would excessively reduce the beneficial effects of pools on downstream markets. For this purpose, the TT Guidelines mitigate the rigidity of the essentiality criterion and establish that grant-back obligations can also comprehend "developments that are […] *important* to the use of the standard technology."[160] The concept of importance differs from essentiality, as it refers to technological components that are not inevitably necessary to manufacture the standard technology. In patent law, an important improvement is generally defined as "an important technical advance of considerable

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[152] European Commission, "Assessment of Potential Anticompetitive Conduct in the Field of Intellectual Property Rights and Assessment of the Interplay Between Competition Policy and IPR Protection", COMP/2010/16, (2011), 32, <http://ec.europa.eu/competition/consultations/2012_technology_transfer/study_ipr_en.pdf> (last visited 4 Dec. 2012).

[153] *Id.* at 33 et seq.

[154] *See e.g.* Commission Communication, *Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, (2009) OJ C 45, at par. 6. "[…]the Commission is mindful that what really matters is protecting an effective competitive process and not simply protecting competitors."

[155] On the difficulties to identify all the intellectual property rights necessary to practice a particular technologies *see e.g.* European Commission, Expert Group on IPR Valorisation, "Options for an EU instrument for patent valorization", *supra* note 22, at 16.

[156] *See e.g.* Commission Communication, *Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements*, [2011] OJ C 11, at par. 308.

[157] *See e.g.* Business Review Letter MPEG-2.

[158] *See* Parker and Van Alstyine, "Innovation, Openness and Platform Control" (2012), <http://ssrn.com/abstract=1079712> (last visited 23 Nov. 2012).

[159] "Given a sufficiently large developer pool, however, all developers are better off submitting to a contract forcing them to open their applications. The reason is that subsequent output can build from a larger pool of initial input, leading to higher total surplus. The platform sponsor must enforce such contracts not only for benefit of the platform but of the developers themselves, a role not unlike that of a social planner." *Id.* at 30.

[160] European Commission, TT Guidelines, par. 228.

economic significance in relation to the [basic] invention".[161] Such formulation comprehends all those dependent inventions representing notable progress on the standard technology.[162] By extending the grant-back obligations to important improvements, the TT Guidelines seems to valorize the pool's pro-competitive role in processes of cumulative innovation. Such provisions introduce a possible exception to the essentiality criterion and legitimize the incorporation in the pool portfolio of technologically significant improvements. The limited use of such leeway among modern pools, however, justifies a certain degree of skepticism. Among the six pools approved by antitrust authorities, only the MPEG-2 pool provides a mechanism to push licensees to "license back" all their improvements patents.[163] The scarce diffusion of such extended version of the grant-back clause suggests that, as a matter of fact, the essentiality criterion admits few exceptions. Although the pool may oblige licensees to license their improvements, these technologies could hardly be incorporated in the pool portfolio. Besides reducing licensees' incentives to invest in innovation, bundling subsequent non-essential improvements would most probably present foreclosure risks, i.e. they would have the potential to foreclose alternative improvement technologies.[164] Substantially, the EU legal framework does not leave much room for any departure from the essentiality criterion. The current legislation is shaped on EU case law on tying arrangements, which accords greater attention to foreclosure risks and limited consideration to efficiency gains. Nevertheless, the pro-competitive role of patent pools would suggest overcoming such a rigid approach and reserving greater leniency to efficient combinations of complementary technologies.

CONCLUSION

Too many overlapping intellectual property rights hinder the smooth functioning of high-technology markets. Patent pooling arrangements represent the modern instrument for untangling patent thickets, as they dissolve the barriers preventing the commercialization of new technology and obstructing further innovation, while still yielding revenue for the patent holders. In order to preserve such pro-competitive role, antitrust law establishes a detailed discipline on the structure and operation of pooling arrangements. Under the current legal framework, the decisive factor in antitrust analysis is the competitive relationship of the patents pooled. In this regard, the aggregation issues raised by patent pools are governed by the essentiality criterion, which aims at preventing that the pool reduces competition among technologies inside and outside the joint portfolio. The concrete application of the current framework, however, reveals several points of criticality. Under EU case law, foreclosure risks determine automatically antitrust condemnation, while technical and economic efficiencies obtain marginal consideration. In the pool context, such approach entails a rigid application of the essentiality criterion and creates significant risks of antitrust liability for pro-competitive pools. Conversely, the current configuration of high-technology markets would require to overcome formalistic models and to carefully balance competitive hams with emerging industry needs. A genuine rule of reason analysis would indeed allow the development of socially efficient pools and reduce the regulatory uncertainty associated with artificial classifications of patents.

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[161] *See generally* Article 31 of the Trips Agreement.

[162] This concept refers to those improvements that exceed the minimal social value threshold for patentability. For a definition *see e.g.* Lemley, "Economics of Improvement in Intellectual Property Law", 75 *Tex. L. Rev.*, 989 (1996). The notion of importance recalls the value of the improvement in terms of technical progress and differs from the commercial essentiality criterion, that indicates the additional efficiencies conferred by the improvement technology to the basic invention.

[163] *See e.g.* Business Review Letter MPEG-2.

[164] *See e.g.* Case T-201/04, *Microsoft Corp v. Commission*, [2007] E.C.R. II-3601, at par. 1031 et seq.