Rigorous empirical research on intellectual property

STUDENT CONTRIBUTION

Mandatory Patent Pools

Authors: Luca Maggioni, Diana Marin, Laura Natalia Morales Charry, Paolo Orlando and Victoire Guegan

Master Students, Technical University Berlin

March 2020

Rigorous empirical research on intellectual property

4iP Council is a European research council dedicated to developing high quality academic insight and empirical evidence on topics related to intellectual property and innovation. Our research is multi-industry, cross sector and technology focused. We work with academia, policy makers and regulators to facilitate a deeper understanding of the invention process and of technology investment decision-making.

www.4ipcouncil.com

Suggested citation

Maggioni, Luca; Marin, Diana; Morales Charry, Laura Natalia; Orlando, Paolo; Guegan, Victoire. Mandatory Patent Pools (March 2020). 4iP Council.

Mandatory Patent Pools

Luca Maggioni, Diana Marin, Laura Natalia Morales Charry,
Paolo Orlando and Victoire Guegan[1]
Master Students, Technical University Berlin

Abstract

Patent pools are often perceived as a significant tool for widespread innovation. Yet, they can also lead to monopolistic behavior. In practice, patent pools are used by some stakeholders as a tool to organise the licensing of standard essential patents. Thus, pools are encouraged by the European Commission, especially for the information and communication technology (ICT) field with complex products incorporating multiple patents. Yet, to be efficient and pro-competitive, pools need to fulfill certain conditions. Even considering the benefits of voluntary patent pools, mandatory patent pools raise serious concerns. This paper explains the link between patent pools and standardisation in telecommunications and analyses the potential impact of mandatory for pools for innovation.

Key words

Mandatory patent pools, FRAND, ICT, SEPs.

[1] This paper has been inspired by the master thesis jointly written for the IP Management Master programme of the Technical University Berlin. The opinions expressed only reflect the views of the authors.

I. Introduction

In modern society, where consumers demand electronic devices to be continuously connected, the implementation of standards, that allows for such interoperability between devices, is a need. Standards also promote the increase and diffusion of technologies that work smoothly and reliably together, allowing for the digitalisation of the global economy,[2] and impacting almost each area of our day-to-day lives.

In the area of mobile telecommunication, the industry relies heavily on standardisation. Already in 2016, the European Commission proposed to focus standard-setting resources and communities on five priority areas: 5G, Internet of Things, cloud computing, cybersecurity, and data technologies to achieved a wider EU competitiveness.[3] Action in these fields can indeed speed up digitalisation and have an immediate impact on competitiveness in eHealth, intelligent transport systems, connected/automated vehicles, smart homes, and cities.[4]

In this context, patent pools can play a significant role. This paper will explain why patent pools have been suggested as the best way to achieve a successful standardisation in the Information and Communication Technology (ICT) field, as well as analyse the impact of mandatory patent pools in innovation.

II. Standardisation

Standards are a set of rules or guidelines that ensure that products made by different manufacturers are able to interoperate.[5] Beneficial effects can be appreciated in innovative markets when multiple stakeholders collaborate to the development of standards, usually in the

[2] In Europe, the three Standard Development Organizations officially recognized are the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunication Standards Institute (ETSI). See ECSIP Consortium (2014). Patents and Standards: a modern framework for IPR-based standardization, p. 279, available at https://doi.org/10.2769/90861 [hereinafter ECSIP Consortium (2014).

[3] See Brussels, 19.4.2016 COM(2016) 176 final, available at https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-176-EN-F1-1.PDF.

[4] See ECSIP Consortium (2014), p. 279.

[5] On the relevance of standardization see Tapia, C., "Securing a competitive future in Europe", *The Patent Lawyer*, Jan/Febr. 2016.

form of lower prices, more innovation and more consumer choice and convenience.[6] Standardisation may, however, create a barrier to entry to the relevant market as "switching from one standard to another is oftentimes not possible or only with unreasonable efforts".[7] However, the benefits of standardisation clearly overweigh the risks.[8]

Standardisation can secure efficiency gains, and benefit consumers by allowing manufacturers to increase the overall size of markets and thus achieve economies of scale. Standards also bring "better relations with suppliers and clients derived from the improved safety of consumers; an immense value for the competitiveness of enterprises working in transport, machinery, electro-technical products, or telecommunication; easier introduction of innovative products provided by interoperability between new and existing products, services, and processes - for example in the field of eco-design, smart grids, energy efficiency of buildings, nanotechnologies, security, and eMobility; and help to bridge the gap between research and marketable products or services".[9]

Standards ensure not only interoperability but also guarantee that such technologies work together appropriately. This will become increasingly important as in the future as many more devices will be connected to each other. According to statistical data, 75% of the population in high-income countries are already connected to mobile internet versus over 40% of the LMIC (low- and middle income) population (around 2.6 billion people).[10] And by 2025 more than 24.9 billion Internet of Things (IoT) connections are estimated, which, considering the forecasted 8.1 billion people (human population), is quite significant.[11]

[6] Tsilikas, H. 2016, "Collaborative Standardization and Disruptive Innovation: The Case of Wireless Telecommunication Standards." *SSRN* Scholarly Paper ID 2783372. Rochester, NY: Social Science Research Network. https://papers.ssrn.com/abstract=2783372.
[7] See Schellingerhout. R./Cavicchi, P, "Patent ambush in standard-setting: the Commission accepts commitments from Rambus to lower memory chip royalty rates", 9 December 2009, e-Competitions, N°42075, 33, at WIPO Secretariat, Patent Pools and Antitrust – A comparative Analysis (March 2014), p.6 [hereinafter WIPO, (2014)]
[8] See for instance European Commission. 2016. "Benefits of Standards". Internal Market, Industry, Entrepreneurship and SMEs. July 5, 2016. https://ec.europa.eu/growth/single-market/european-standards/policy/benefits_en.
[9] See European Commission, European Standards, available at https://ec.europa.eu/growth/single-market/european-standards/policy/benefits_en.
[10] See GSMA report (2019), Connected Society, The State of Mobile Internet Connectivity, available at https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/07/GSMA-State-of-Mobile-Internet-Connectivity-Report-2019.pdf.
[11] See Ericsson, Internet of Things, available at https://www.ericsson.com/en/internet-of-things.

III. Patent Pools: Benefits and Challenges

Standards are often the result of heavy research and development efforts, so that technologies incorporated in standardisation are often covered by patents. Standard essential patents (SEPs) are those patents infringed when incorporating a standard (e.g. 3G or 4G cellular standard) in a product or service. In order to provide access to patented technology included in a standard, allowing for a wide dissemination of the standard,[12] while obtaining a fair return on substantial investments,[13] innovators typically license their SEPs under fair, reasonable and non-discriminatory (FRAND) terms.

FRAND is agreed in bilateral negotiations by the SEP holder and the SEP user, in a sometimes long and costly process. As a result, some companies may choose to license all or part of their SEPs via patent pools.[14] Patent pools are "agreements between two or more patent owners to license one or more of their patents to one another, or to third parties".[15]

Patent pools can bring many benefits but also face certain challenges. On the other hand, pools have the potential to reduce transaction costs (thanks to the 'one-stop shopping' of the licenses

[12] The European Commission details the meaning of FRAND commitments as "commitments designed to ensure that essential IPR protected technology incorporated in a standard is accessible to the users of that standard on fair, reasonable and non-discriminatory terms and conditions. In particular, FRAND commitments can prevent IPR holders from making the implementation of a standard difficult by refusing to license or by requesting unfair or unreasonable fees (in other words, excessive fees), after the industry has been locked-in to the standard or by charging discriminatory royalty fees." WIPO (2014), p.8.

[13] If patent owners would receive lower returns than the real value of their patent in the market, this could discourage them to innovate and include their best technologies in a standard. See OECD, "Licensing of IP Rights and Competition Law", DAF/COMP(2019)3, 29. April 2019.

[14] Some examples of patent pools are MPEG technologies (for video codecs), and MP3 and AAC (for audio codecs).

[15] See the European Commission, Ensuring technology transfer agreements respect competition rules, last updated on 29.07.2015, available at https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=LEGISSUM:08010104_1&from=EN.

to implement the standard),[16] avoid the duplication of essentiality checks by each licensee,[17] distribute risks between the firms[18] and mitigate potential hold-up and hold-out problems.[19] On the other hand, patent pools typically distribute their revenues using a proportionality system (meaning that each SEP would be equally valuable) which may discourage those companies owning core patented technology of a standard. Also, potential members may be concerned on the high costs of the essentiality checks[20] (which would be cheaper if done internally) or just prefer to engage in cross-licenses negotiations. Finally, patent pools face the challenging task to align the different business interests of SEP holders. Thus, sometimes the market experiences different patent pools for the same standard.

Under some circumstances, pools can reduce litigation,[21] which seems particularly relevant for small and medium sized enterprises (SMEs), with limited human and financial resources.[22] But it has also been shown that patents in pools are more litigated than other patents with the same characteristics which are not included in a pool.[23]

In practice it is difficult to obtain comparative evidence of the efficiency of pools vs bilateral

[16] Licensees would have access to all SEPs at once, avoiding the multiple negotiations with the owner of each SEP portfolio needed for a certain standard. See Futa, B., "Statements for FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy, Patent Pools and Cross-Licensing: When Do They Promote or Harm Competition?", 17 April 2002, available at http://www.ftc.gov/opp/intellect/020417barynfuta.pdf; Merges and Mattioli estimate that many pools save hundreds of "millions of dollars" in transaction costs. See Merges, R.P./Mattioli, M., "Measuring the Costs and Benefits of Patent Pools", 4. April 2016. Ohio State Law Journal, Forthcoming; UC Berkeley Public Law Research Paper No. 2759027, available at https://ssrn.com/abstract=2759027 [hereinafter Merges/Mattioli (2017)].

[17] Essentiality would be proved by neutral evaluators. Phelps, M. (2019). "Is 5G Being Weaponized?", *Forbes*, available at https://www.forbes.com/sites/marshallphelps/2019/02/25/is-5g-being-weaponized/#28f91b0d3a61 [hereinafter Phelps (2019)]; See also Nagaoka S., "Policy Issues in Efficient Collaboration Through a Patent Pool" in: T.L Hwang/C. Chen, The Future Development of Competition Framework, volume 15, 147- 154, The Hague: Kluwer Law International, 2004; Currently parties typically argue on essentiality in so-called technical discussions in bilateral negotiations. See Herranz, L / Tapia, C.," Good and Bad Practices in FRAND Licence Negotiation", p. 69 et seqq. Resolving IP Disputes, (2018) Zeiler/Zojer (eds), NWV.

[18] See Van Etten, D. (2007), "Everyone in the Patent Pool: U.S. Philips Corp. v. International Trade Commission". *Berkeley Technology Law Journal,* 22(1), 241-258, available at www.jstor.org/stable/24118210.

[19] On hold-up and hold-out see Angwenyi, V., "Hold-up, Hold-out and F/Rand: The Quest for Balance", *GRUR Int* 66, 2 (2017), 105 – 114.

[20] Via Licensing charged (in 2017) 10,500 USD per patent analysis of the AAC standard patents, whereas the typical cost for essentiality evaluation in a pool per patent was in 2012 considered to be between USD 5,000 and 10,000. See European Commission, Transparency and Predictability of Licensing in ICT through Patent Pools?, 21. Febr. 2012, available at https://ec.europa.eu/growth/content/transparency-and-predictability-licensing-ict-through-patent-pools_en. See also Suppliet, M. "Patent Pools and Litigation", 14. January 2018, 3, available at https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=IIOC2019&paper_id=252.

[21] In their study Merges/Mattioli (2017) estimated up to $600 million savings thanks to patent pools.

[22] See WIPO (2014). Also Phelps (2019) argues that pools "can offer businesses immunity from the technology and trade battles now brewing over 5G around the globe".

[23] Delcamp, H. "Are Patent Pools a Way to Help Patent Owners Enforce Their Rights?" International Review of Law and Economics 41 (March 2015): 68–76, available at https://doi.org/10.1016/j.irle.2014.10.005.

negotiations,[24] especially within highly innovative fields, like the ICT, which offers complex cutting edge technology products including a large number of patents.[25] Pools incorporating large portfolios have been said to achieve in some occasions reasonable cumulative royalty rates for standardisation users and thus reduce the risk of royalty stacking.[26] However, others argue that bilateral negotiations create increased social welfare when compared to that generated by patent pools, because pools may create a bargaining power that leads to higher aggregate royalty rates.[27]

Taking into account all above mentioned aspects of patent pools, it can be concluded that patent pools can, in some circumstances, be an excellent tool for the licensing of essential patents, but not necessarily the best choice for all stakeholders, all kinds of standards and in all circumstances. Other licensing options are available, e.g. in highly dynamic markets such as in the ICT, successful independent licensing programs with a long history have been the preferred choice, and SEP holders are best placed to choose the licensing program that best meets their business interests and situation. Given the challenges explained, authorities and policy-makers should not rely solely on patent pools, much less make them mandatory.

IV. Mandatory patent pools

Considering the increasing number of new and unexperienced stakeholders joining the Internet of Things, one could argue that mandatory patent pools appear at first glance a possible

[24] Frequently, not all of the pooled patents are available to be independently licensed. Therefore, a comparison between the cumulative bilateral rates and the pool rate is not possible.
[25] Pepe et seq. explain that in the context of 5G technology, if the rates would be too high, consumers may continue using the previous technology (i.e. 4G/LTE). Having pools mandating a reasonable cumulative royalty rate could facilitate more innovative standards in the market. Pepe, S., Post, K. J., & Cross, A. S.,"Opportunities and IP Risks Surrounding 5G: The Next Dominant Cellular Technology", *Bloomberg*, October 2019, see https://www.ropesgray.com/-/media/Files/articles/2019/10/5G-IP-Opportunities--Risks-Bloomberg-Law-Article-10-30-19.pdf?la=en&hash=D93BB0862D8950B512DD19ED86A3F36435AE9DBB [hereinafter Pepe/Post/Cross (2019)].
[26] Royalty stacking occurs when where multiple patents read on a single product causing a downstream firm facing possible claims from multiple patent holders, leading to prohibitively high production costs. See Lemley M. / Shapiro, C., 85 Texas Law Rev. 1992 et seq. (2007). Royalty-stacking is considered by some authors and courts as a theoretical concern, See e.g. Angwenyi ,V./Barani, M., "Smokescreen Strategies: What Lies Behind the Hold-up Argument?", GRUR Int 204 (2018); Layne-Farrar, A., "Patent Holdup and Royalty Stacking Theory and Evidence: Where Do We Stand. After 15 Years of History?", OECD, available at http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DAF/COMP/WD(2014)128&doclanguage=en
[27] Spulber, Daniel F. 2019. "Licensing Standard Essential Patents: Bargaining and Incentives to Invent." *SSRN* Scholarly Paper ID 3338997. Rochester, NY: Social Science Research Network. https://papers.ssrn.com/abstract=3338997.

solution to face the 5G revolution challenges.[28] The ICT technologies are often assembled by integrating multiple components covered by many patents.[29] By making patent pools mandatory, the integration of multiple technical component products could, at least in theory, be facilitated.[30] There are however, several concerns and unresolved questions that speak against mandatory patent pools (for ICT SEPs):

Firstly, there is no conclusive opinion between academics on whether patent pools increase innovation.[31] For instance, some academics argue that by decreasing product differentiation pools could adversely affect welfare, as it may reduce the incentives towards product development and product market competition.[32]

Secondly, as explained above, the distribution of the revenues amongst the members is a particularly sensitive and debated topic. If the distribution is made using a numeric proportionality, then all patents would be considered equally relevant, which would encourage members to contribute to the standard low quality patents,[33] make patents thinner so that their patent portfolio increases,[34] or keep them as a trade secret, instead of contributing the best technologies resulting from their massive R&D investments, as it is nowadays typically the case with cellular standardisation thanks to the FRAND reward.[35] Numeric proportionality is

[28] According to Phelps (2019), the competition among 5G rights holders around the world is exorbitant increasing; See also Matthew N. et seqq, "Determining which companies are leading the 5G race", *IAM*, July/August 2019, available at https://www.twobirds.com/~/media/pdfs/news/articles/2019/determining-which-companies-are-leading-the-5g-race.pdf?la=en&hash=8ABA5A7173EEE8FFA612E070C0EA4B4F53CC50DE

[29] 5G will incorporate a large number of SEPs. Moreover, "the success of these [5G] anticipated use cases will depend upon other technical standards covering network, software, and hardware implementations to ensure critical systems are interconnected and interoperable". See Pepe/Post/Cross (2019), p. 3.

[30] Merges/Mattioli (2017).

[31] Academics making the link between increase innovation and patent pools are e.g., Baron, J./Pohlmann, T. (2015), "The Effect of Patent Pools on Patenting and Innovation -- Evidence from Contemporary Technology Standards" (Northwestern Univ. Working paper, 2015), available at http://www.law.northwestern.edu/research-faculty/searlecenter/innovationeconomics/documents/Baron_Pohlmann_effect_of_patents.pdf, and "Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting," in A. Jaffe, J. Lerner, and S. Stern eds., Innovation Policy and the Economy, vol. 1, Cambridge: MIT Press Shapiro, 2001. Opposite views can be seen in e.g., Lampe, R./ Moser. P (2016), "Patent Pools, Competition, and Innovation -- Evidence from 20 United States Industries under the New Deal", 32 J. L. Econ. & Organ, available at https://academic.oup.com/jleo/article/32/1/1/2579509.

[32] This would happen even with perfectly complementary patents. See Jeitschko, T. D./Zhang, N., "Adverse Effects of Patent Pooling on Product Development and Commercialization" (December 2013), available at http://dx.doi.org/10.2139/ssrn.1917393

[33] The quality of the patents introduced by pool members "significantly decreases over time". Baron, J./ Delcamp, H., "Strategic Inputs into Patent Pools", 16, July 2010. *CERNA* Mines ParisTech Working Paper No. 2010:05, p.27, available at http://dx.doi.org/10.2139/ssrn.1641265

[34] Baron, J./ Delcamp, H., "The Strategies of Patent Introduction into Patent Pools" (Northwestern Univ. Working Paper, 2015), available at https://www.tandfonline.com/doi/full/10.1080/10438599.2015.1004245?scroll=top&needAccess=true

[35] See the negative impacts on innovation of counting patents at Hovenkamp, E., & Hovenkamp, H. (2017),

the reason to the failure of some patent pools in the past.[36] On the other hand, some pools have established more complex rules where the division of earnings depends on certain indicators of the quality of the patents contributed. Yet these rules cannot fully explain differences in the value across different patents and its evaluation may lead to a very long process. And thus, pools will always continue to have some inherent limitations.

In addition, a mandatory patent pool would obliterate a fundamental premise that underpins patents: that the inventor has a monopoly on its invention for a fixed period of time in exchange for contributing that invention to society when the patent expires. Importantly this monopoly includes the right to exclude others from making, using or selling the invention so that the inventor itself can exploit the invention in order to obtain a return on its invention. In the pharmaceutical industry for example, billions are invested to obtain a single successful drug. Patent rights allow the inventor of the drug to exclude others such that the inventor can recover its enormous investment. Were mandatory pools imposed on patent owners, it is unlikely that the investments can be recovered and incentives to innovate would vanish. It is evident that it is best left to the researchers and developers to determine how investments in innovation should be obtained in order to reward and incentivise future innovations.

Another aspect to consider is the fact that a mandatory pool would imply changes in regulation and relative patent laws, as mandating a pool would be an obligation that would be far broader than what the Court of Justice of the European Union has ever considered for SEPs.[37] Even if this regulation would take place in Europe, it is highly doubtful that other countries would follow, so that an inconsistency would take place. Moreover, even if the members of a Standard Development Organisation would agree to a mandatory pool for 5G, this would only involve those SEPs contributed after the new IPR Policy takes place, which would make it unfeasible in practice. And even if the mandatory pool would start with the 6G standard, they could not force the SEP holders to incorporate in the pool the rest also necessary, standardised technology (users of e.g. smartphones need also the previous standards, i.e. 2G to 5G, for the communication to work properly everywhere).

"Patent pools and related technology sharing". *Faculty Scholarship*, 358–376, p. 14, available at https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=2768&context=faculty_scholarship

[36] Layne-Farrar, A. and Lerner, J., "To join or not to join: Examining patent pool participation and rent sharing rules." International Journal of Industrial Organization 29.2 (2011): 294-303.

[37] In *Huawei v. ZTE* (Case C-170/13 Huawei Technologies Co. Ltd v. ZTE Corp, judgment dated 16 July 2015), the CJEU explained under which circumstances the SEP holder can seek an injunction against a SEP user without acting in breach of competition law. See Jacob, R./Milner, A., "Lessons from Huawei v. ZTE", October 2016, 4iPCouncil, available at https://www.4ipcouncil.com/download_file/view_inline/182

It is also unclear who would make the essentiality assessment, or which would be the criteria (expertise and know-how of the examiner, time spent per patent, process, when and how often essentiality checks need to be made, etc.[38]) to analyse 5G highly complex patented technology, as well as who would bare the high costs of essentiality checks, which can easily cost thousands of euros per patent[39] (would the costs be passed to consumers?).

Finally, it is open whether the pool would be liable if it wrongly denies the inclusion of certain patents to the pool.

Conclusions

Patent pools have been proposed as a tool to allow unexperienced implementers an easy introduction to standardisation in the ICT field. The impact of voluntary patent pools in innovation has been mixed, as shown in this work. At the end, the SEP holder is the one who is best placed to choose how to license their patents: via a patent pool, another kind of licensing platform or bilateral (cross-license) negotiations.

5G standards are expected to be 10 times faster and offer around 100 times of traffic capacity than 4G/LTE standard. This will strongly impact our day-to-day lives. Thanks to 5G we will experience virtual and augmented reality, machine-to-machine communications, and edge computing, to name but a few examples.[40]

5G is the result of companies sharing the result of massive R&D investments under the assumption that they will obtain FRAND terms in a timely manner. Even though voluntary patent pools have showed to have positive effects on innovation in certain occasions, mandatory pools seem to be too complex and risky (with a long list of unresolved questions), eventually leading to a drastic decrease in innovation.

[38] See e.g. Tapia, C/Mohsler G., "The current cost of transparency in IoT patent licensing", April 2019, IAM Magazine, available at https://www.iam-media.com/frandseps/transparency-iot-licensing
[39] See footnote 20.
[40] See Pepe/Post/Cross (2019), p. 2.

Until those concerns and questions are satisfactory clarified, voluntary market solutions for 5G, such as the licensing platform AVANCI, that licenses in a one stop-shopping large portfolios of SEPs to automotive,[41] appear to be the best approach.

[41] More on Avanci at www.avanci.com