THE POSSIBLE BENEFITS OF POOL LICENSING FOR THE INTERNET OF THINGS, AND THE PERILS OF PROPOSED REGULATORY INTERVENTIONS

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During the LeadershIP EU Roundtable on November 18, 2019, experts from industry, academia and the European Commission gathered in Brussels to discuss current issues and policy evolutions regarding the licensing of Standard Essential Patents ("SEP"). The discussions focused on topics of particular interest to emerging technologies such as the Internet of Things ("IoT"). The roundtable thus inscribed itself in an ongoing debate in Europe, partly initiated by the European Commission with its November 2017 communication[2], and carried forward in the ongoing work of the Commission's expert group on SEPs as well as a number of recently published or forthcoming studies.[3] The Commission in its communication refocused the longstanding debate about various issues with SEP licensing on recent technological trends, in particular IoT, and the situation of European small and medium enterprises ("SMEs"). The discussions at the IP Leadership Roundtable largely reflected this recent focus.

It is generally expected that the IoT will have applications in a wide array of different environments, including in industries with limited experience with wireless communication technology and the concomitant need for SEP licensing. Some of the actors in these industries fear that securing licenses to all the required SEPs will be overly cumbersome for them, and that licensing terms may disadvantage recent participants in the SEP technology market, in particular SMEs. Some commentators therefore believe that ongoing technological changes will require significant adjustments to current SEP licensing practices, which may entail regulatory measures and/or initiatives from a variety of private actors.

Within this context, there is a renewed interest in multilateral licensing instruments; including traditional patent pools, but also more novel propositions, such as licensee collectives or multilateral deliberations on aggregate royalty caps. I was therefore thrilled that Kirti Gupta and the roundtable organizers invited me to chair a session on patent pools, which was a welcome and timely opportunity to explore these important ideas. The session featured three panelists with complementary backgrounds: Lapo Fillistruchi, Associate Professor of Economics at Tilburg School of Economics and Management, as an academic expert on Intellectual Property Rights ("IPR") and innovation; Patrick McCutcheon, Senior Expert for IP and competition law at the European Commission, providing a perspective from a public authority; as well as Matthias Schneider, Chief Licensing Officer at Audi, participating in the panel as a practitioner and industry voice. As the roundtable was held under Chatham House Rule, I will reflect on the topics of the discussion in general terms and from my personal perspective.

2 "Communication from the Commission to the Institutions on Setting out the EU approach to Standard Essential Patents," November 29, 2017. https://ec.europa.eu/docsroom/documents/26583.

3 In particular, the European Commission's Joint Research Center has commissioned a series of studies: Baron, Justus; Conterras, Jorge; Husovec, Martin; & Pierre Larouche. "Making the Rules – The Governance of Standard Development Organizations and their Policies on Intellectual Property Rights," *JRC Science for Policy Report*, 2019. https://ec.europa.eu/jrc/sites/jrcsh/files/sdo_governance_final_electronic_version.pdf Blind, Knut; Boehm, Mirko. "The Relationship Between Open Source Software and Standard Setting," *JRC Science for Policy Report*, 2019. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117836/jrc_the_relationship_between_open_source_software_final_online_compressed_logo.pdf. Another study on the feasibility of essentiality evaluations of declared SEPs is forthcoming.

In order to better situate the panel discussion within recent trends and possible future evolutions, it is useful to briefly review the experience with existing pools. Patent pools have attracted significant academic and regulatory interest for some time, and a number of studies have analyzed existing pools for SEPs. Well before the modern debate on patent pools for SEPs, earlier patent pools – e.g. on sewing machines and aircrafts – functioned similarly to cartels. Owners of different, often competing technologies, would bundle their technologies and only license these through a pool. Unsurprisingly, such pools increased prices for downstream users, while reducing innovation incentives.[4] In response to these adverse effects, antitrust enforcement agencies developed a tough stance on pooling of patents.

In the field of Information and Communication Technologies, however, implementers of complex technology standards, e.g. the manufacturers of mobile phones, often need licenses for a large number of complementary SEPs held by different owners. Patent pools are often seen as offering an attractive licensing solution for such standards, promising to cut transaction costs, promote transparency, and reduce the scope for opportunistic conduct among both SEP owners and standard implementers.[5] In view of these potential benefits, competition authorities reconsidered their stance, and favorably reviewed patent pools for video coding and digital disc formats.[6] Cognizant of the anticompetitive effects of earlier pools, these new pools featured a number of institutional safeguards: modern pools are limited to patents that are all essential to the same standard (as determined by an independent expert), thus significantly reducing the risk that the pool may be used to eliminate potential competition between patented technologies. Furthermore, participation in the pools is entirely voluntary for SEP owners, and pool members are free to negotiate bilateral licenses with implementers who do not wish to take a license from the pool. Competition authorities found that pools with these characteristics are unlikely to create anticompetitive effects. This created a successful "template" for a number of other pools.[7]

Since the late 1990s, at least 60 pools were formed or at least launched.[8] Nevertheless, while a number of these pools were very successful, several of these pools failed to attract interest among potential licensors and/or licensees. In other cases, pools only attracted marginal SEP owners, falling well short of creating a one-stop licensing solution for a standard. Overall, in the past, pooling has remained a marginal practice in many technological fields characterized by large numbers of SEPs (most notably telecommunications).

A number of important lessons can however be learned from the experience with existing pools. Many contemporary pools inherited several features from the trailblazing MPEG-2 and DVD pools, which often reduced their viability: for one, most pools redistribute their royalty revenue among participating SEP owners proportionally to the number of SEPs included from each firm. While this feature was explicitly recognized and welcomed in the Business Review Letters setting the template for contemporary pools (viewed as incentivizing pool members to fight the inclusion of non-essential patents), it reduces the attractiveness of pool participation for the owners of higher-quality portfolios,[9] and contributes to fueling opportunistic and wasteful patenting strategies.[10]

Second, most pools are tied to a single standard. Essentiality of patents can thus be objectively assessed with respect to a stable set of technical specifications, virtually eliminating the risk that pools may be used to soften competition between rival technologies. Such a tight technical focus of a pool however reduces its attractiveness for potential licensees, who often seek broader licenses and freedom to operate a certain production activity with respect to the licensor's entire portfolio of existing and future patents.

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4 Lampe, Ryan & Petra Moser, "Do patent pools encourage innovation? Evidence from the nineteenth-century sewing machine industry," *The Journal of Economic History* 70.4 (2010): 898-920. Lampe, Ryan & Petra Moser, "Patent pools, competition, and innovation—evidence from 20 US industries under the new deal," *The Journal of Law, Economics, and Organization* 32.1 (2016): 1-36.

5 An influential analysis that is particularly sanguine about the dangers of bilateral licensing and the benefits of patent pools is Shapiro, Carl, "Navigating the patent thicket: Cross licenses, patent pools, and standard setting," *Innovation policy and the economy* 1 (2000): 119-150. There is significant controversy about the empirical relevance of the hypothesized adverse consequences of bilateral licensing.

6 See in particular U.S. Department of Justice, "Response to Trustees of Columbia University, Fujitsu Limited, General Instrument Corp., Lucent Technologies Inc., Matsushita Electric Industrial Co. Ltd., Mitsubishi Electric Corp., Philips Electronics N.V., Scientific-Atlanta, Inc., and Sony Corp.," June 26, 1997 https://www.justice.gov/atr/response-trustees-columbia-university-fujitsu-limited-general-instrument-corp-lucent and U.S. Department of Justice, "Response to Hitachi, Ltd.'s, Matsushita Electric Industrial Co., Ltd's, Mitsubishi Electric Corporation's, Time Warner Inc.'s, Toshiba Corporation's, and Victor Company of Japan, Ltd.'s Request for Business Review Letter," June 10, 1999. https://www.justice.gov/atr/response-hitachi-ltds-matsushita-electric-industrial-co-ltds-mitsubishi-electric-corporations [hereafter "Business Review Letters"].

7 Gilbert, Richard J., "Antitrust for patent pools: A century of policy evolution," *Stan. Tech. L. Rev.* (2004): 3.

8 Bekkers, Rudi, et al., "Selected quantitative studies of patents in standards," available at SSRN 2457064 (2014).

9 Layne-Farrar, Anne, and Josh Lerner. "To join or not to join: Examining patent pool participation and rent sharing rules," *International Journal of Industrial Organization* 29.2 (2011): 294-303.

10 Baron, Justus & Henry Delcamp, "The strategies of patent introduction into patent pools," *Economics of Innovation and New Technology* 24.8 (2015): 776-800.

Third, most pool licensors limit their role to the negotiation and administration of licensing agreements, and do not participate in the assertion of pool members' SEPs against unwilling licensees. The pro-competitive intent behind this separation is intuitive, as the collective enforcement of large bundles of alleged SEPs may make it difficult for standard implementers to critically assess the asserted patents' validity and essentiality, and shield weak patents from scrutiny.[11] On the flip side, collective licensing through a pool in the absence of collective action on patent assertion is bound to yield insufficient enforcement efforts, as each pool member hopes for the threat of other pool members' enforcement activities to motivate standard implementers to seek a license from the pool. Such assertion free-riding not only diminishes the licensing revenue of the pool, but also conflicts with the pool's mission to level the playing field among standard implementers.

Finally, most patent pools post standard licensing terms at which licenses are available to all implementers. While individual SEP owners may also publish standard licensing contracts, it is generally understood that such general terms are subject to possible amendments in bilateral negotiations. Pool licensing administrators however are more often bound by the standard licensing terms jointly agreed upon by pool members, and large numbers of licensees of pools have indeed signed on to identical terms.[12] Such price posting is certainly helpful for demonstrating that participation in the pool satisfies the pool members' obligation to offer licenses to their SEPs on non-discriminatory terms. Nevertheless, price posting may deprive the pool of valuable flexibility to accommodate licensees' individual situations. Implementers with the strongest bargaining position are most likely to negotiate better terms with individual SEP owners; which may deprive the pool of the most significant potential licensees. Posting of standard licensing terms may also reduce the contribution of pools to the efficiency of SEP licensing, as bargaining over licensing terms is generally a welfare-enhancing feature that helps eliminate royalty stacking and the deadweight loss of patent protection.[13]

It is easy to see why institutional features such as numerically proportional royalty-sharing schemes, review of individual patents' essentiality to a specific standard, separation of pool licensing and individual patent assertion, and posting of standard licensing terms were initially perceived to be strong guarantees against anticompetitive conduct. The empirical evidence however suggests that these features undermined the success and often the very viability of pools. This is all the more remarkable as economic theory has established that such institutional features are not vital to the pro-competitive character of pools. The one characteristic that effectively screens between pro-competitive and anti-competitive pools is a pool's voluntariness on both sides of the market: pools form part of a competitive licensing market, as individual SEP owners are free to decide whether they wish to participate in the pool, and individual implementers are free to decide whether they wish to seek a license from the pool or rather approach each SEP owner individually for a bilateral license.[14] Contemporary pools can thus generally be regarded as pro-competitive, as only those pools that create value for both SEP owners and implementers are able to thrive.

Against this background, more recent years have seen cautious experimentation with limited departures from the institutional features incorporated in the initial "template," and some of the more successful pools have provided incremental innovations in these regards. OneBlue e.g. offers modest departures from strict numerical proportionality, and provides for some mechanisms to reward members' assertion efforts.[15] More recently, Avanci presents a larger number of innovations; including the fact that its licensing terms were not posted ex ante, but first negotiated with significant licensees. Another significant characteristic is the pool's limited scope, allowing SEP owners to restrict the pool's mandate to some of the technological fields in which the standards and appurtenant SEPs are used. Finally, the pool is not limited to a specific set of SEPs, but offers a license for using a certain technology with respect to all of the pool members' patents. While it is too early for an overall assessment, these innovations have persuaded several significant SEP owners to join, several of which were traditionally reluctant to participate in pools.

Beyond the individual innovations that these pools present, they exemplify a beneficial approach to institutional change in SEP licensing: different licensing administrators experiment with different models, often in explicit competition with one another, and thus need to persuade stakeholders on both sides of the market of the benefits of their specific approach. Licensing models that add value over existing practice survive and spread, whereas other models that may seem appealing on paper reveal their shortcomings in practice. Entrepreneurship has thus delivered incremental but significant progress, whereas many attempts at mandating change from above have faltered.

11 Pooling of SEPs generally creates a risk of softening implementers' incentives to challenge patent validity, see in particular Choi, Jay Pil, "Patent pools and cross-licensing in the shadow of patent litigation," *International Economic Review* 51.2 (2010): 441-460. Choi, Jay Pil &Heiko Gerlach. "Patent pools, litigation, and innovation," *The RAND Journal of Economics* 46.3 (2015): 499-523.

12 The District Court of Duesseldorf e.g. heard a case in which pool licensing administrator MPEGLA demonstrated that more than 2,000 different licensees had subscribed to identical standard licensing terms; and found that the opposing parties failed to support allegations that actual licensing terms offered to individual licensees differed from the publicly available general terms. Landgericht Düsseldorf, 4a O 17/17 of November 9, 2018; ECLI:DE:LGD:2018:1109.4A.O17.17.00; at 455

13 Spulber, Daniel F., "Patent licensing and bargaining with innovative complements and substitutes," *Research in Economics* 70.4 (2016): 693-713.

14 Lerner, Josh & Jean Tirole. "Efficient patent pools," *American Economic Review* 94.3 (2004): 691-711.

15 Peters, Ruud. "One-Blue: a blueprint for patent pools in high-tech," *Intellectual Asset Management* 9 (2011): 38-41.

In some instances, regulators nevertheless may support the (still cautious) experimentation with innovative pool models. Some institutional arrangements that may overcome problems with existing pools are still held back by the restrictive template set by the regulatory review of earlier pools. One example is involvement of pool licensing administrators in enforcement litigation, which – depending on the jurisdiction within Europe – may require legislative change. More generally, as European competition authorities offer no equivalent to the Business Review Letters of the U.S. Department of Justice, they may seek alternative routes to offer regulatory clarity and encourage experimentation with alternative pool models. In this regard, the failure to include an analysis of patent pools in the European Commission's 2011 Horizontal Guidelines is still felt as a missed opportunity (which may be corrected in a future revision).

These recent developments featured prominently in the panel discussion during the IP Leadership Roundtable. In particular, participants highlighted the promise of Avanci's new approach, with its direct relevance for IoT. The panelists and audience nevertheless also discussed the merits and perils of a very different approach, which would seek to achieve higher rates of SEP pooling through a mandate or other regulatory interventions. Some voices in Europe currently turn to copyright collection agencies as a model for mandating Intellectual Property Rights owners' participation in collective licensing. While such radical ideas seem unlikely to become a reality, and were flatly rejected by many roundtable participants, they may set the floor for other policies that sound moderate by comparison, even though they may produce similar effects. One such idea that was discussed during the roundtable would require individual SEP owners that decline to participate in a pool to offer licensing terms that are consistent with the share that they would collect from the pool, if they had chosen to join. Such a proposal formally falls short of mandating participation in a pool, but nevertheless makes it impossible for SEP owners to escape the terms set by the pool.

The experience with existing pools however sheds light on why making participation in pools mandatory (or quasi-mandatory) would be a bad idea. First, even after almost 30 years of experience with contemporary pools, there is no empirical evidence that licensing SEPs through a pool is *generally* more efficient or more beneficial for standard implementers than bilateral licensing. Indeed, bilateral bargaining has many virtues. Bargaining over royalty rates may effectively address concerns over royalty stacking;[16] and be more protective of implementers wary of having to pay for patents that are either invalid or that they don't need.[17]

There is actually surprisingly little systematic empirical evidence on the effects of contemporary patent pools. A number of empirical studies have examined the effect of pool formation on a number of measures of innovative activity, and yielded inconsistent results.[18] One study proposes to measure the economic costs and benefits of pool formation more generally, and concludes that the benefits of existing pools (e.g. savings on transaction costs) outweigh potential social costs.[19] Such results however do not support the more general proposition that SEPs must always be licensed through pools. Individual examples alone may suffice to cast doubt on the simplistic view that a successful pool formation always helps the underlying standard succeed.[20] While the jury is still out on the aggregate effects of pools, the most likely answer is that patent pools create value for some standards, for some licensors, and for some licensees; and that the standards that most stand to benefit from a pool are those for which a pool already exists. It is difficult to evaluate just how big the residual margin of possible improvement is, i.e. how many additional implementers and SEP owners would actually benefit if regulatory intervention resulted in a larger number of pools. These uncertain benefits have to be weighed against the risk of disrupting existing effective bilateral licensing practices.

Second, making pools mandatory (or quasi-mandatory) risks undermining the existing pools and their benefits. As I have argued above, the voluntary character of pools is the most effective guarantee of their pro-competitive effects. Making pool participation mandatory would destroy that guarantee; and strong institutional protections would be required to ensure that the regulator does not create pools of the anti-compet-

16 Spulber, *supra* note 13.

17 Choi, *supra* note 11.

18 One study e.g. finds negative effects of pools on follow-on innovation: Joshi, Amol M. & Atul Nerkar, "When do strategic alliances inhibit innovation by firms? Evidence from patent pools in the global optical disc industry," *Strategic Management Journal* 32.11 (2011): 1139-1160. Another study however concludes that the same set of contemporary pools had positive effects on innovation: Vakili, Keyvan. "Collaborative promotion of technology standards and the impact on innovation, industry structure, and organizational capabilities: Evidence from modern patent pools," *Organization Science* 27.6 (2016): 1504-1524. In my own research, I found evidence that the prospect of future pool creation may induce additional patent filings, but I found little evidence for significant effects on innovation. Baron, Justus & Tim Pohlmann. "The effect of patent pools on patenting and innovation-evidence from contemporary technology standards," Unpublished Manuscript (2015).

19 Mattioli, Michael & Robert P. Merges. "Measuring the Costs and Benefits of Patent Pools," 78 *Ohio State Law Journal* 281 (2017) (2017).

20 IEEE's 1394 "FireWire" is an example of a standard for which licenses to a large share of the relevant SEPs were available through a pool, but nevertheless failed to gain as much traction as other, rival technologies. IEEE's 802.11 "WiFi" and 3GPP's fourth generation LTE standards on the other hand are among the standards with the largest number of declared SEPs; and in both cases pools have never attracted more than a small group of relatively marginal SEP owners. Notwithstanding the relative failures of efforts to provide pool licenses for WiFI and LTE SEPs, the underlying standards are widely deployed around the world in many different industries, and subject to vital technological innovation.

itive type. In the existing pools, individual SEP owners are protected from seeing their share in the pie being eaten up by a coalition of other SEP owners ganging up against them. Voluntary pools are immune against this type of abuse, because they need to offer each SEP owner a fair deal, or it will simply not join. If participation in pools became mandatory (or staying out was made sufficiently unattractive); coalitions of pool members would have both the incentives and a wide range of opportunities to rig the rules in their favor, e.g. by placing the thumb on the balance in the pool's experts' assessment of essentiality, by biasing the royalty sharing formula, or by imposing that the pool offers licensing conditions that uniquely favor their own downstream business interests in the standard. In many cases, a sufficient number of vertically integrated SEP owners may impose that the pool offers low royalty rates that fail to adequately compensate R&D specialists for their contributions.

In a scenario where pool participation is mandatory for SEP owners, avoiding each of these anti-competitive outcomes requires strict institutional guarantees and regulatory oversight. Experience with existing pools has shown the cost of such institutional guarantees. Mandatory pool participation would thus be a bad idea not only because there are situations in which pools are less efficient than bilateral licensing; it is a bad idea also because mandatory pools would likely be less efficient than the voluntary pools that we know. Even if regulatory oversight may be effective in averting drastically anticompetitive outcomes, it is still difficult to imagine that forcing unwilling SEP owners to participate in the formation of a pool would be a positive contribution to the attempts of willing members to create the high level of trust and common understanding that is required to set up a complex joint licensing operation.

Third and finally, heavy-handed regulatory intervention imposing pool licensing would run counter the successful model of institutional entrepreneurship that has delivered significant progress within existing pools. The institutional innovations of more recent pools (which were generally applauded by the industry experts speaking at the roundtable) are a response to the competitive pressures that pools face in the current licensing environment: licensing administrators must prove the added value of their business model not only with respect to other ways of creating a pool, but also and more importantly with respect to bilateral licensing. Therefore, further experimentation seems to be a more promising avenue towards creating more successful pools than a mandate or another, similarly intrusive regulatory intervention.

While the session mostly focused on patent pools, other models for multilateral negotiations of SEP licensing terms were also discussed. In particular, some experts advocated a model in which industry associations or other representative organizations negotiate SEP licensing terms with a SEP owner (or a pool) on behalf of a group of standard implementers seeking a license. This proposal has recently featured in a number of initiatives, such as a study commissioned and published by the European Parliament's JURI committee.[21] Given the hypothetical nature of the proposal, roundtable participants cautiously weighed its potential implications. Unlike the situation with patent pools, there is limited precedent or practical experience on which the analysis could draw.

Nevertheless, I find it reasonable to expect that the lessons learned from the experience with pools carry over to other collective instruments for SEP licensing. There is an intuitive potential for transaction cost savings if a number of similarly situated willing licensees pool their negotiation efforts. Willing licensees may legitimately bundle their efforts in analyzing the individual value contribution of different SEP portfolios, critically assessing asserted patents' validity and essentiality, and communicating with a large number of different SEP owners to raise awareness for their industry's specific needs and requirements. Such bundling of resources may produce economies of scale that would benefit both implementers and SEP owners alike.

Also similar to licensor pools, joint negotiation by organizations representing a group of licensees may reduce the scope for individual opportunism. Many implementers may be generally willing to pay a fair price for the technology they use, but are wary of finding themselves competing with other implementers that either eschew their licensing obligations or were able to secure a better deal. An industry association negotiating licensing terms on behalf of a larger group of implementers may attenuate these concerns, and reduce potential licensees' resistance to accepting an appropriate level of royalties.

These benefits have to be weighed against the risk of anticompetitive outcomes. Legitimate coordination and transaction cost savings should not pave the way for buyer cartels depriving IPR owners of their fair return on investment. The experience with pools indicates that the primary safeguard against such outcomes is voluntariness on both sides. No standard implementer should ever be forced to participate in a joint negotiation group. Similarly, no SEP owner should ever be forced to accept negotiating with such a group instead of directly approaching individual implementers. Therefore, individual implementers participating in a licensee negotiation group must nevertheless be willing to engage in bilateral negotiations with SEP owners, or be considered an unwilling licensee. Provided that an agreement among implementers to jointly negotiate licensing terms with SEP owners complies with these necessary conditions, it seems unlikely to present a risk of anticompetitive effects.

21 Luke McDonagh & Enrico Bonadio: "Standard Essential Patents and the Internet of Things," In-Depth Analysis for the JURI Committee of the European Parliament; January 2019; available at http://www.europarl.europa.eu/RegData/etudes/IDAN/2019/608854/IPOL_IDA(2019)608854_EN.pdf.

Voluntary participation in the group should not, however, be confused with the absence of a commitment to accept the outcome of the joint negotiation. SEP owners negotiating with an organization representing a group of implementers would legitimately expect that the individual implementers represented by the organization accept the licensing terms agreed upon in these negotiations. In the absence of such a commitment, negotiations with representative organizations become mere 'cheap talk', and create yet another opportunity for hold-out on the side of implementers. This is similar to a situation in which an individual pool member would suddenly withdraw its SEPs from the pool and aggressively assert its SEPs against pool licensees. Allowing for such opportunism would deprive either collective licensing mechanism of any value.

The discussions of the panel on patent pools at the LeadershIP EU Roundtable thus covered a lot of fertile ground. Overall, the debate was characterized by substantial agreement on the merits of the current European regulatory approach to patent pools and collective licensing models for SEPs more generally; which stands in stark contrast to proposed regulatory mandates or other binding regulations. The discussions at the conference however also highlighted potential for incremental improvements, which may provide food for thought for the ongoing debates within the European Commission's expert group and beyond.

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