

‘Open’ Models for Patents: Giving Patents a New Lease On Life?

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‘A country without a patent office and good patent laws [is] just a crab and [can’t] travel any way but sideways and backways’.¹ This is a modern 19th century view, expressed vividly by author Mark Twain, of the relationship between intellectual property and innovation. Contemplating the current trends in patent law, most countries have evidently made the choice not to be odd-walking crustaceans only moving sideways and backways, by adopting strong patent regimes. In line with the traditional incentive theory of intellectual property (IP), this on-going tendency suggests that patents are understood as the most viable option to foster innovation: a patent is an exclusive right granted to innovators incentivising them to innovate. With the transformation of our economies into information-based ones driven by innovation, the task of expanding, strengthening and harmonising patent law both at a procedural and substantial level is deemed crucial. The rationale is invariably the same: patents promote innovation.

Yet, the classical understanding of patents as providing the necessity of having strong exclusive rights to encourage innovation is slightly tempered and disrupted by the recent development of peculiar models. ‘Open patent’ licenses, patent pledges, defensive patent strategies and the like are challenging the traditional way patents are used, hence chipping away at the exclusive—rights based approach. These models are manifold and grew out of different contexts. Some have already been implemented, some are still a work in progress. Nevertheless, they collectively have in common to show that patents can be used in unconventional ways and that the patent system can allow for a certain flexibility. These models do not

1. Mark Twain in ‘*A Connecticut Yankee in King Arthur’s Court*’, Charles L. Webster & Company, 1889, p.107.

question patents *per se* (i.e., a right to prohibit anyone from making and using the patented invention), but rather the way patents are being used as exclusionary tools. These models demonstrate that there are other ways and other approaches to what patents are for and how they should or could be used to spur innovation.

I - Walking forward

This how the story goes. We understand knowledge and informational assets such as research and development, patents, and trademarks, etc, as tantamount for driving innovation in an information-based economy.² However, knowledge presents particular characteristics: it is non rival and non-excludable, and it is therefore difficult for the innovator to prevent free-riders from using its knowledge.³ We then must make it possible for the innovator to exclude others from using this knowledge and prevent them from appropriating it. Consequently, the innovator is thus willing to innovate. Because knowledge is intangible it is difficult to protect it using physical barriers, therefore we erect a legal barrier: patents.

A patent gives its holder an exclusive right that allows him or her to exclude others from making, using, offering for sale, or selling his or her patented invention. A patent is a legal instrument that helps protect the exclusive right of the patentee, allowing infringement actions against free-riders. Hence, the patentee can control the use of his or her invention and draw revenue, etc. This exclusive right would be the only way to ensure the promotion of innovation. Patents are commonly thought to be strong tools for encouraging innovation. Hence, expanding and strengthening the patents appears to be a reasonable thing to do in response to the rise of the digital knowledge-based economy. Over the past two decades, patent regimes have therefore gone through changes aimed at reinforcing the exclusive rights granted to the patentees. Patents have gone ‘global’ via the international harmonisation; their coverage has been extended and their enforcement has been eased.⁴ This

2. OECD Report, ‘Actifs Immatériels et Création de Valeur’, Réunion du Conseil OCDE au Niveau Ministériel, 2006, available at <http://www.oecd.org/fr/sti/inno/actifsintellectuelsetcreationde valeur.htm>.

3. K.J. Arrow, ‘Economic Welfare and the Allocation of Resources for Invention’, in National Bureau of Economic Research, 1962; R. A. Posner, ‘Intellectual Property: The Law and Economics Approach’, *Journal of Economic Perspectives*, Vol. 19, No. 2, 2005, pp 57—73.

4. B. Remiche, ‘Révolution Technologique, Mondialisation et Droit des Brevets’, *Revue Internationale de Droit Economique* (t. XVI, 1), pp. 83-124, 2002, p.95; C. Martinez, D. Guellec, ‘Overview of Recent Changes and Comparisons of Patent Regimes in the United States, Japan and Europe’, in *Patent, Innovation and Economic Performance*, OECD

process of extension started during the 19th century and has shown few signs of slowing.⁵ Progressively, *crab-countries* that did not have patent laws were required to adopt patent regimes and those who had inadequate regimes were compelled to align with newly emerging global standards.⁶

There is unlikely to be any escape for the remaining crabs,⁷ the background music is unfailingly the same: patents foster innovation.⁸ The process of strengthening and harmonising patent regimes is not only witnessed at a substantial level (standards required by international agreements) but also at a procedural level. The patent package set up by the EU is a good example in which the EU seeks to create uniform patent protection, cost-saving procedures and measures to enhance patent exploitation.⁹ Patents have not just expanded geographically, they have also been extended to new fields (computer programs, biotechnology and business methods in some countries).¹⁰ Some fields that were not previously covered by patents now are.¹¹

Conference Proceeding, Chapter 7, 2004, p.128; C. Geiger, ‘The Social Function of Intellectual Property Rights, or How Ethics can Influence the Shape and Use of IP Law’ in *Intellectual Property Law: Methods and Perspectives*, Cheltenham, UK/Northampton, MA, Edward Elgar, Graeme B. Dinwoodie (eds.), pp. 153—176, 2013, Max Planck Institute for Intellectual Property & Competition Law Research Paper No. 13-06, 2013.

5. For a brief history of universalisation of IP see P. Drahos, ‘The Universality of Intellectual Property Rights: Origins and Development in Intellectual Property and Human Rights’, World Intellectual Property Organization, Geneva, pp. 13—41, 1999.

6. For the phenomenon of ‘Planeterization’ see M. Vivant, ‘Savoir et Avoir’, *Arch. phil. droit* 47, pp. 333—353, 2003, p. 341; ‘un brevet qui reigne en tout lieux’ in M. Vivant, ‘Le Systeme des Brevets en Question’, in *Brevet, Innovation et Interet General. Le Brevet : pourquoi et pour faire quoi?* Larcier, 2006, pp. 20—24.

7. B. Remiche, ‘Revolution Technologique, Mondialisation et Droit des Brevets’, *Revue Internationale de Droit Economique* (t. XVI, 1), p. 83—124, 2002, p.92; Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) Article 1 (Nature and Scope), Article 27 (Standards) and Article 41 (Enforcement).

8. TRIPS Article 7: ‘*The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations*’. See also Recitals 1&2 of Directive 2004/48/EC of 29 April 2004 on the enforcement of intellectual property rights ‘*The protection of intellectual property is important not only for promoting innovation and creativity, but also for developing employment and improving competitiveness [...] The protection of intellectual property should allow the inventor or creator to derive a legitimate profit from his or her invention or creation*’.

9. See EU Commission ‘*In 2012, EU countries and the European Parliament agreed on the patent package, a legislative initiative consisting of two regulations and an international agreement that lay the ground for the creation of unitary patent protection in the EU. [...] Unitary patent protection will make the existing European system simpler and less expensive for inventors. It will end complex validation requirements and drastically limit expensive translation requirements in participating countries. Consequently, it is expected to stimulate research, development and investment in innovation, helping to boost growth in the EU*’, 2016, http://ec.europa.eu/growth/industry/intellectual-property/patents/unitary-patent/index_en.htm (accessed 15 November 2016).

10. ‘A patent that applies to all objects’ see M. Vivant, ‘Le Systeme des Brevets en Question’, in *Brevet, Innovation et Interet General. Le Brevet : pourquoi et pour faire quoi?* Larcier, 2006, p.24.

11. ‘IPRs appear to be spreading like a rash, particularly across new technologies and threatening to leave few patches of unblemished skin’ see W. Cornish, *Intellectual Property. Omnipresent, Distracting, Irrelevant?* Clarendon Law

Behind this trend of strengthening and expanding patents is the idea that exclusive rights are the sole way to protect and encourage innovation. The stronger the better! Yet, one can now hear a different tune arising from the development of new models that, alongside the traditional patents, challenge the strong exclusive right based approach.

II - Walking sideways

‘All our patents are belong to you’.¹² Tesla Motors, surprised many by announcing that it ‘will not initiate patent lawsuits against anyone who... wants to use... [its] technology’. This pledge is only but one of many recent attempts to subvert existing legal models of intellectual property rights (IPRs) to challenge and resist the dominating discourse on innovation. The purpose of the pledge is to clear the path to the creation of compelling electric vehicles.¹³ In this case patents are considered as ‘land mines’ inhibiting others. Patent might have been a good thing in the past but they now impede innovation, only profiting big corporations and lawyers and amount to ‘lottery tickets to a lawsuit’.¹⁴ Tesla is not the only company who has made such a promise, now termed ‘patent pledges’¹⁵. Patent pledges are promises made by patent holders not to assert their rights or limit the enforcement of their rights. As Contreras explains, it creates ‘a little-understood middle ground between the public domain and exclusive property rights.’¹⁶ Habitually, these types of promises or pledges were made in the context of FRAND (Fair, Reasonable and Non-Discriminatory) commitments and Standard Setting Organisations (SDOs). Indeed, patent holder members of SDO are sometimes required to commit to license their patents under a FRAND license to manufacturers

Lectures, 2004, p. 1.

12. The Tesla Pledge (2014) on Tesla’s Blog, at <https://www.teslamotors.com/blog/all-our-patent-are-belong-you> (accessed 15 November 2016).

13. *idem.* Elon Musk (Tesla CEO) explains that electric cars represent only 1% total car sales. Tesla found itself unable to answer the demand of electric vehicles due to the carbon crisis. Renouncing asserting patent right will enable a rapidly evolving technology platform and the production of electric vehicles.

14. See the Tesla pledge.

15. J. L Contreras, ‘Patent Pledges’, 47(3) *Arizona State Law Journal* 543; University of Utah College of Law Research Paper No. 93, 2015. Contreras classifies pledges into unilateral and coordinated pledges: Generally speaking, coordinated pledges are made by members of a defined group, according to some predetermined form or formula, with respect to a defined technology or set of patents. Unilateral pledges, on the other hand, are one-off commitments made independently and voluntarily by patent holders’. For a list of pledges see <http://www.pijip.org/non-sdo-patent-commitments/> (accessed 15 November 2016).

16. J. L Contreras, ‘Patent Pledges’, 2015, p 543.

of standardized products.¹⁷ The purpose of the FRAND commitments is to avoid patent ‘hold up’ phenomena and enable manufacturers to implement the essential patent covered by a FRAND license. These types of commitments or pledges have multiplied outside of this traditional framework.¹⁸

The Tesla pledge caused a big stir and raised many questions with respect to its very informal character and lack of legal certainty. Some have been concerned with the enforceability of such a promise (i.e., what happens if the pledgor goes back on his word).¹⁹ Initially, the condition of ‘use in good faith’²⁰ imposed by Tesla did not participate in clarifying how this promise would be articulated, which generated various interpretations. What if Tesla suddenly decided to sue another company because the use was not ‘in good faith’ as understood by Tesla? Can companies legally rely on the pledge?²¹

Although Tesla’s pledge is the most known, other companies, in the same vein, have made similar commitments justifying their choice with reference to the promotion of the Open Source Movement. Indeed, in its patent pledge, Google²² explains that it is committed to promoting innovation and the advancement of information technology. Google considers that Free and Open Source Software are crucial tools for fostering innovation. Google decided that it would allow the free use of certain of its patents in connection with Free or Open Source Software. It encompasses patents related to encryption technology, middleware, and distribu-

17. For instance see the IPR policy of ETSI (European Telecommunications Standards Institute) ETSI Rules of Procedure, Annex 6, Article 6, April 2016. Available at <http://www.etsi.org/about/how-we-work/intellectual-property-rights-iprs> (accessed 15 November 2016).

18. see J. L., ‘A Market Reliance Theory for FRAND Commitments and Other Patent Pledges’, Utah L.Rev. 2, 2015.

19. Parties using the pledged patents could rely for instance on the estoppel doctrine or implied licenses. See for instance, J. M. Rice, ‘The Defensive Patent Playbook’, Berkeley Technology Law Journal, Vol. 30 (4), Annual Review 2015, p 748.

20. The good faith condition has since then been specified: ‘A party is ‘acting in good faith’ for so long as such party and its related or affiliated companies have not: asserted, helped others assert or had a financial stake in any assertion of (i) any patent or other intellectual property right against Tesla or (ii) any patent right against a third party for its use of technologies relating to electric vehicles or related equipment ; challenged, helped others challenge, or had a financial stake in any challenge to any Tesla patent, or marketed or sold any knock-off product (e.g., a product created by imitating or copying the design or appearance of a Tesla product or which suggests an association with or endorsement by Tesla) or provided any material assistance to another party doing so’. See https://www.teslamotors.com/en_GB/about/legal/#patent-pledge, (accessed 15 November 2016).

21. In an interview published in 2015 Musk’s insisted on the informal aspect of the pledge. Musk: ‘We actually don’t require any formal discussions. So they can just go ahead and use them’. Reporter: ‘Is there a licensing process ? ’Musk: ‘No. You just use them. Which I think is better because then we don’t need to get into any kind of discussions or whatever. So we don’t know. I think you’ll see it in the cars that come out, should they choose to use them’. See the interview at <https://www.techdirt.com/articles/20150217/06182930052/elon-musk-clarifies-that-teslas-patents-really-are-free-investor-absolutely-freaks-out.shtml>, (accessed 15 November 2016).

22. The Google patent pledge is available at <http://www.google.com/patents/opnpledge/pledge/> (accessed 15 November 2016).

tive storage management, etc.²³The promise is addressed to each person or entity developing, distributing or using Free or Open Source Software (pledge recipients): Google commits not to bring any lawsuit or legal proceedings against them.²⁴

As opposed to Tesla’s pledge, Google has specified the legal nature of its commitment: the pledge is legally binding, irrevocable and enforceable against Google and entities controlled by Google, as well as their successors and assignees. Google requires any person or entity to whom it sells or transfers any of the Pledged Patents to agree, in writing, to abide by the Pledge and to place a similar requirement on any subsequent transferees to do the same.²⁵

IBM made a comparable commitment targeted at the Open Source Community.²⁶ The justifications are analogous to Google’s: promoting innovation and advancement of information technology. Indeed, IBM considers the Open Source community as the ‘forefront of innovation’. IBM pledges the free use of 500 of its U.S patents as well as all counterparts of these patents issued in other countries. Like Google, the pledge recipients are developers, users and distributors of Open Source software.²⁷

Alongside these pledges, other models have emerged. The Defensive Patent License (DPL)²⁸ for instance, is a sort ‘patent-non-aggression-pact’²⁹ protecting

23. For a list of pledged patents see <http://www.google.com/patents/opnpledge/patents/> (accessed 15 November 2016).

24. The Google patent pledge is available at <http://www.google.com/patents/opnpledge/pledge/> (accessed 15 November 2016), ‘Google promises to each person or entity that develops, distributes or uses Free or Open Source Software that Google will not bring a lawsuit or other legal proceeding against a Pledge Recipient for patent infringement under any Pledged Patents based on the Pledge Recipients (i) development, manufacture, use, sale, offer for sale, lease, license, exportation, importation or distribution of any Free or Open Source Software, or (ii) internal-only use of Free or Open Source Software, either as obtained by Pledge Recipient or as modified by Pledge Recipient, in standalone form or combined with hardware or with any other software (‘Internal-Only Use’).

25. *idem*. ‘However, the pledge is made under a condition: the pledge recipients and its affiliates must not assert or profit from the assertion of patents against Google, its affiliates, or its products or services. Google reserves itself the right to terminate the pledge if it deems necessary to protect itself (Defensive Termination). This will concern any Pledge Recipient (or affiliate) who files a lawsuit or other legal proceeding for patent infringement or who has a direct financial interest in such lawsuit or other legal proceeding against Google’.

26. ‘IBM hereby commits not to assert any of the 500 U.S. patents listed above, as well as all counterparts of these patents issued in other countries against the development, use or distribution of Open Source Software’, 2005. The IBM Pledge is available at <http://www.ibm.com/ibm/licensing/patents/pledgedpatents.pdf> (accessed 15 November 2016).

27. IBM defines OSS as ‘any computer software program whose source code is published and available for inspection and use by anyone, and is made available under a license agreement that permits recipients to copy, modify and distribute the program’ s source code without payment of fees or royalties. All licenses certified by opensource.org and listed on their website as of 01/11/2005 are Open Source Software licenses for the purpose of this pledge’.

28. The Defensive Patent license is available at <http://www.defensivepatentlicense.com> (accessed 15 November 2016).

29. The DPL is presented as ‘a new legal mechanism to protect innovators by networking patents into powerful, mutually-beneficial legal shields that are 100% committed to defending innovation, no bullies, trolls. The DPL is ‘a standardised open patent license designed to encourage the creation of a broad, decentralised network of open innovation communities that both patent their innovation with a commitment to defensive purposes and license them on a royalty free basis to any others who will do the same’. See J. Schultz, J. Urban, ‘Protecting Open Innovation: The Defensive

innovators against patent bullying.³⁰ The DPL is meant to create a set of viral,³¹ bilateral obligations preventing offensive patent litigation and promoting freedom to operate and innovate.

The DPL provides every DPL user a perpetual, worldwide, royalty-free license to every other DPL user’s entire current and future patent portfolio.³² In the event of a DPL user wanting to stop offering his or her patent, he or she has to provide a six month notice to other DPL users and future parties. The DPL user³³ who wishes to leave must continue to grant and cannot revoke any licenses before the end of the notice period. Once this period has passed, other DPL users are free to revoke their licenses, but the DPL granted before remains in effect.

According to its creators,³⁴ the DPL would make patent available neutrally and openly to anyone who agrees to use the DPL. Anyone part of the DPL network can make, use or sell any technology licensed under DPL. Every user can rely on the ‘defensiveness’³⁵ of the patents covered by the DPL (since the licenses are irrevocable). As the network will grow, this benefit of defensiveness will be distributed across the network.³⁶ Members of the DPL retain the possibility to

Patent License as a New Approach to Patent Threats, Transaction Costs, and Tactical Disarmament’, *Harvard Journal of Law and Technology*, vol. 26, No1, 2012, p.38.

30. For a case study and a definition of patent bullying see T. Sichelman, ‘The Vonage Trilogy : A Case Study in Patent Bullying’, *Notre Dame Law Review*, Vol. 90(2), 2014. Patent bullying differs from the so-called patent trolls which sell no product or services and do not engage in any R&D process. Patent bullies are well-established operating companies.

31. Traditionally the term ‘viral’ is used for Free Software and Open Source licenses. A viral clause guarantees that any derivative work will be licensed under the same conditions. The user has to grant the same freedom he initially received to any subsequent users.

32. Article 2 DPL 1.0 Grant: ‘Licensor hereby grants and agrees to grant to such DPL User a worldwide, royalty-free, no-charge, non-exclusive, irrevocable [...] license, perpetual for the term of the relevant Licensed Patents, to make, have made, use, sell, offer for sale, import, and distribute Licensed Products and Services that would otherwise infringe any claim of Licensed Patents. A Licensee’s sale of Licensed Products and Services pursuant to this agreement exhausts the Licensor’s ability to assert infringement by a downstream purchaser or user of the Licensed Products or Services’, Article 1.16 DPL 1.0 [...] ‘the Licensor’s commitment to offer a license to its Patents under the DPL, or, if such Licensor has no Patents, the commitment to offer a license to any Patents it may obtain in the future under the DPL. DPL users, licensees and licensors refrain from any offensive patent infringement action against one another. In case of an offensive claim by a DPL user against its licensor or any other DPL user, the licensor can revoke its license and other DPL users may suspend their license as well to the DPL user asserting its patents offensively’, Article 3 DPL 1.0 [...] ‘Licensor reserves the right to revoke and/or terminate this License with respect to a particular Licensee if: Licensee makes any Infringement Claim, not including Defensive Patent Claims, against a DPL User; or Licensee grants an exclusive license, with the right to sue, or assigns or transfers a Patent to an entity or individual other than a DPL User without conditioning the transfer on the transferee continuing to abide by the terms of this License.’

33. The DPL user is to be understood as the individual or entity that announced on the DPL website his or her wish to grant a DPL license. See <http://defensivepatentlicense.org/content/known-dpl-users-and-patents>. (accessed on 15 November 2016).

34. J. Schultz, J. Urban, ‘Protecting Open Innovation: The Defensive Patent license as a New Approach to Patent Threats, Transaction Costs, and Tactical Disarmament’, *Harvard Journal of Law and Technology*, vol. 26, No1, 2012

35. In a defensive strategy, patents are used by a company with the intention of defending itself against patent infringement lawsuit, allowing the company to countersue. See J. M. Rice, ‘The Defensive Patent Playbook’, 2015.

36. As of now there are only three users of the DPL. See <http://defensivepatentlicense.org/content/known-dpl-users->

assert their patents against non DPL members (non DPL members are not covered by the defensive mechanism).³⁷ The main objective of the DPL is to limit patent threat and litigation, and this aspect can also be found in other models. For instance, the Open Innovation Network (OIN)³⁸ is also conceived around the idea of using patents for defensive purposes. The OIN defines itself as a defensive patent pool, aiming at protecting Open Source developers.³⁹

The OIN is a shared defensive patent pool that acquires patents and licenses them royalty-free to entities that in exchange agree not to assert their own patents against Linux⁴⁰ and Linux-related systems and applications. The beneficiaries (licensees) are any company or organisation that agrees to refrain from using its patent portfolio against the Linux System. OIN provides participants with licenses to all patents owned by other OIN licensees related to the Linux system. The whole purpose is to protect the GNU/Linux ecosystem, creating a safe environment and limiting negative effects on patent challenges brought by companies who are not involved in open source.⁴¹ The larger the safe environment is, the better the protection. A strong and large patent portfolio would prevent attacks; thus, in order to protect the safe area, the OIN also acquires patents.⁴² The purpose of acquiring valuable patents (Linux-related or not) is to incentivise companies to join OIN (since they will receive the patents under a royalty-free license)⁴³ and also to deter companies from threatening either OIN members and licensees or the

and-patents (accessed 15 November 2016).

37. J. Schultz, J. Urban, ‘Protecting Open Innovation: The Defensive Patent license as a New Approach to Patent Threats, Transaction Costs, and Tactical Disarmament’, *Harvard Journal of Law and Technology*, Vol. 26, No1, 2012.

38. See <http://www.openinventionnetwork.com> (accessed on 15 November 2016).

39. Launched in 2005, the OIN has strong industry support with backing from Google, IBM, NEC, Philips, Red Hat, Sony and SUSE (a business unit of Novell). ‘Any company, project or developer that is working on Linux, GNU, Android or any other Linux-related software is welcome to join OIN, free of charge or royalties. Open Invention Network was created to ensure a level playing field for Linux, safeguarding developers, distributors and users from organizations that would leverage intellectual property to hinder its growth and innovation. We do this by acquiring and sharing intellectual property to promote a collaborative Linux ecosystem. We do this by providing a royalty-free license to OINs strategic intellectual property portfolio and cross licensing Linux System patents between OIN community members.’

40. Linux is an operating system released under the General Public License (GPL), a free software license. See <https://www.gnu.org/licenses/license-list.html>. (accessed on 15 November 2016).

41. See <http://www.openinventionnetwork.com/about-us/>

42. These acquired patents are not necessarily Linux related. OIN has acquired various U.S. Patents. For a list of the OIN patents, see at <https://www.openinventionnetwork.com/about-us/us-patents-owned-by-oin/> (accessed 15 November 2016).

43. OIN license article 1.1 : ‘OIN, grants to You and Your Subsidiaries a royalty-free, worldwide, nonexclusive, non-transferable license under OIN Patents to make, have made, use, import, and Distribute any products or services. In addition to the foregoing and without limitation thereof, with respect only to the Linux System, the license granted herein includes the right to engage in activities that in the absence of this Agreement would constitute inducement to infringe or contributory infringement (or infringement under any other analogous legal doctrine in the applicable jurisdiction)’.

Linux Community at large. If someone wants to bring a patent infringement claim against the OIN-enumerated Linux-related applications, OIN will act as a shield threatening to assert its patent portfolio.

In a similar vein, the License-On-Transfer Agreement (LOT Agreement)⁴⁴ proposes a protection mechanism against Patent Assertion Entities (PAEs). The LOT Agreement is defined as a standardised, networked, royalty-free License-On-Transfer (LOT) patent license agreement.⁴⁵ Under the LOT Agreement, participants agree that when a patent is transferred (to a non-participant) it is automatically licensed to the other participants in the LOT network. The transfer of the patent to another entity than a LOT user is called ‘triggering event’ which causes the license to be effective (i.e., the licensee can use, make, etc, the patented invention covered by the license). Hence, participants in the LOT network are protected from potential future attacks if the patent is later transferred to a PAE or Troll. According to the authors of this proposal⁴⁶ the LOT is aimed at reducing the availability of patents to PAE, so they cannot extract patent rent from LOT users, since users benefit from a license. The LOT mechanism would increase the freedom to operate since its members obtain a royalty-free license to the transferred patents and are protected against PAE. The DPL, LOT Agreement and OIN mainly aim at creating a safe environment for innovators relying on defensive mechanisms. Other models rely less on defensive aspects to create a safe environment for innovators.

CAMBIA, for instance, aims at creating ‘new technologies, tools and paradigms to promote change and enable innovation.’⁴⁷ The BIOS licenses⁴⁸ of CAMBIA aim at ‘ensuring common access to the tools of innovation, to promote the development and improvement of these tools, and to make such developments and improvements freely accessible to both academic and commercial parties under substantially

44. See <http://lotnet.com> (accessed on 15 November 2016).

45. David L. Hayes, Eric C. Schulman, *An Updated Proposal for a License on Transfer (LOT) Agreement*, 2014, available at <http://ssrn.com/abstract=2463660> (accessed 15 November 2016).

46. *ibid.*

47. CAMBIA is a non-profit research Institute based in Canberra, Australia, established in 1991 by Richard Jefferson. See at <http://www.cambia.org/daisy/cambia/home.html> (accessed 15 November 2016). It is to be noted that the initiative of CAMBIA has not been completely successful. See S. Finegold, ‘The Hard Path to Open Source Bio-innovation’, available at <https://scienceprogress.org/2012/08/the-hard-path-to-open-source-bioinnovation/> (accessed 15 November 2016). However, CAMBIA offers a good example of using patents in a different way as we will see further in this essay.

48. BIOS means Biological Innovation for Open Society. See <http://www.bios.net/daisy/bios/home.html>.

similar conditions’.⁴⁹ The BiOS patent portfolio is available for any entity that will agree to maintain the technology in open access. Contrary to traditional patent licenses, BiOS licenses do not require the payment of royalties from the licensees. In order to access what CAMBIA calls the ‘protected commons’, where patent owners and licensees share their technologies,⁵⁰ BiOS licensees have to agree to the BiOS-compliant agreement (i.e., sharing the improvements made on the initial technologies licensed by CAMBIA).⁵¹ The licensees agree not to prevent other licensees from using the technologies licensed by CAMBIA and the improvements made in developing different products, they may not assert IP rights over the technologies or improvements against any other entity that agreed to the terms of a BiOS-compliant agreement. All licensees agree to share improvements, making them available for use, although they may be patented, to all other licensees.⁵²

The models described above are diverse and do not display the same characteristics or goals., (i.e., building a commons, defending against trolls, and protecting a particular category, etc.). Yet, they each build upon the idea of inclusivity to provide a safe environment for innovators by giving them the freedom to operate within that environment. Another term other than patent pledges has been used to describe some of these models : ‘Open Patenting’.⁵³ Open patenting requires two elements: a patented invention and the will of the patentee to license it outside of a traditional license schemes.⁵⁴ Licenses are essential in this process, since IP rights are exclusive and inclusive, a licensing mechanism allows for opening up use of the patented inventions. Open patenting is not be confused with the Open Innovation Systems which focus on aggregating and sharing scientific knowledge,

49. See recitals of the The CAMBIA ‘Biological Open Source’ (BiOS) License for Plant Enabling Technologies Version 1.5 available at <http://www.bios.net/daisy/bios/mta/agreement-patented.html> (accessed 15 November 2016).

50. ‘The protected commons includes both patent owners and licensee users of the technology in the rights to share improvements and the capability to use them, whether these improvements are patented or not’. See at <http://www.bios.net/daisy/bios/404.html> (accessed 15 November 2016).

51. CAMBIA offers BiOS licenses for Plant Molecular Enabling Technology. See <http://www.bios.net/daisy/bios/mta/agreement-patented.html>.

52. See The CAMBIA ‘Biological Open Source’ (BiOS) License for Plant Enabling Technologies Version 1.5, Article 2 ‘License Grant’, available at : <http://www.bios.net/daisy/bios/mta/agreement-patented.html>.

53. M. Maggiolino, M. L. Montagnani, ‘Standardized Terms and Conditions for Open Patenting’, 14 *Minnesota Journal of Law, Science & Technology*, pp. 785—816, 2013. See also from the same authors ‘Open Source Software to Open Patenting: What New in the Realm of Openness?’, in *International Review of Intellectual Property and Competition Law*, pp. 804—832, 2011.

54. M. Maggiolino, M. L. Montagnani, ‘Open Source Software to Open Patenting: What New in the Realm of Openness?’, 2011, p 71.

but do not rely on contractual systems and do not license patented inventions.⁵⁵

These models usually have in common an online structure where patentee and licensees interact with one another. However, they display differences in how they achieve the construction of safe environments. Some of these models aim at 'spreading patent knowledge', others aim at 'pooling patent knowledge'.⁵⁶ The Yahoo! DomainKeys Patent License Agreement is an example of the first. The Yahoo!-patented software and hardware are available to anyone, the license is royalty-free, perpetual, worldwide, sub-licensable and non-exclusive and allows the licensee to make, use, sell, offer for sale Yahoo!-designated patents. In exchange, the user agrees not to assert any patent infringement claim against Yahoo! and other DomainKey developers.⁵⁷ As for the pooling feature one has to refer to the CAMBIA licenses. The pooling character requires the licensees of CAMBIA to 'grant back'⁵⁸ improvements made on the licensed patent.⁵⁹

Some of these models aim at protecting the innovators (such as the DPL and its modified version),⁶⁰ others at spreading and sometimes both (these features are not necessarily exclusive from one another). In practice, models such as the DPL function on the basis of reciprocity. For instance, in the case of the DPL, patentees agree to cross license their patents under the same conditions as long as these conditions are complied with. On the other hand, models such as CAMBIA or the Yahoo! DomainKeys Patent License Agreement, function on a viral basis, establishing a safe environment that is expected to grow as its viral character operates (under such systems the user is obliged to maintain the same licensing

55. Maggiolino and Montagnani exclude from open patenting initiatives such as Public Patent Foundation, Tropical Disease Initiative, Patent commons, Eco Patents, and the HapMap project.

56. M. Maggiolino, M. L. Montagnani, 'Standardized Terms and Conditions for Open Patenting', 2013, p 794.

57. Yahoo! DomainKeys Patent License Agreement v.1.2, available at <http://domainkeys.sourceforge.net/license/patentlicense1-2.html> (accessed 15 November 2016).

58. A grant-back mechanism included in a license requires the licensee to grant the licensor the right to use the improvements made when using the licensed technology.

59. M. Maggiolino, M. L. Montagnani, 'Standardized Terms and Conditions for Open Patenting', 2013, p 799

60. D.L. Hayes, E.C. Schulman, 'A Response to a Proposal for a Defensive Patent License (DPL)' (unpublished manuscript), 2013, available at <http://ssrn.com/abstract=2054314> (accessed 15 November 2016). Hayes and Schulman have proposed a Modified DPL (MDPL) where they address issues with regard to certain provisions of the original DPL such as the withdrawal/revocation provisions. They refer to the revocation scheme in the original DPL as a 'one-way tunnel' that prevents the removal of patents that have been licensed under the DPL. To solve this issue, which might concern companies which consider using the DPL but want to keep a 'way out', they propose that when a member withdraws from the DPL, that member's license is automatically revoked inbound and outbound. The previously issued license does not remain in effect (non-sticky mechanism). Thus, a company with a big patent portfolio would have an incentive to join without fearing leaving their patents 'behind'.

conditions).⁶¹ Thus, some models create a ‘fenced environment’ (reciprocity mechanisms - inside vs outside world) whereas others create an ‘unfenced environment’ (viral clause mechanism spreading as it goes with subsequent users).⁶²

One could observe that these mechanisms are strongly inspired by the Open Source and Free Software Movement. Tesla, for instance is rather explicit about it : ‘[patents] have been removed, in the spirit of the open source movement’.⁶³ Scholars have then asked the question ‘Could open source be applied to patented inventions?’⁶⁴ Transposing ‘open source’ mechanisms to patented invention is not exactly a walk in a park. This question raises many issues starting with the terminology, since one could ask what ‘open’ means in the context of patents. ‘Open’ when used in the context of software, refers to the source code not being secret, however, a patent, by principle, is no secret since the deal is ‘you get an exclusive right but the patent is published so the public can benefit from it’. ‘Open’ must therefore have a different meaning and different implications when applied to patented technologies. Applying open source-like licenses to technologies other than software requires adaptations to the complexities of certain technologies such as biotechnological inventions, while following the underlying logic of open source, namely favouring the rights of the users rather those of the IP holders.⁶⁵

The core principles and objectives of open source must therefore be identified. Hope⁶⁶ lists three objectives of open source licensing: credible commitment,

61. M. Maggolino, M. L. Montagnani, ‘Standardized Terms and Conditions for Open Patenting’, 2013, p.809: ‘This diversity of purposes is evidence that while theoretical models apply to current or prospective patent portfolio holders that, on the basis of reciprocity, explicitly agree to enter into the safe environment, empirical experiences tend to involve any innovator who is interested in the project and shares its purpose. An innovator who, by the mere use of the patent conferred into the safe environment, becomes an implicit licensee. This innovator is then obliged, on a viral basis, to maintain the same licensing conditions for the products developed by using that license’.

62. *idem.* pp 811-814. In their article Maggolino and Montagnani propose to eliminate the distinction between ‘fenced’ and ‘unfenced’ scheme established by the theoretical and empirical models. They propose a license that combines a high degree of standardisation, targeted at any inventor without any regard to his/her capacities to contribute patents, and the possibility of tailoring some licenses conditions. Thus, such a license would feature mandatory (core) provisions guaranteeing the spread of knowledge and optional provisions taking into account the specificities of certain sectors, individuals needs and commercial use.

63. See the Tesla pledge at <https://www.tesla.com/blog/all-our-patent-are-belong-you>.

64. Particularly in the field of biotechnologies. See S. Boettinger, D. L. Burk, ‘Open Patenting’, *Journal of International Biotechnology Law*, Vol. 1, pp. 221-231, 2004. And also S. Boettinger and B.D. Wright, ‘Open Source in Biotechnology : Open Questions Innovations Case Discussion : CAMBIA-BiOS’, *Innovations :Technology, Governance, Globalization* 1, no. 4 (2006), pp. 43—55.

65. See S. Weber, *The Success of Open Source*, Harvard University Press, 2004, p.1. Weber notes that ‘property in open source is configured fundamentally around the right to distribute, not the right to exclude’.

66. J. Hope, ‘Open Source Genetics, Conceptual Framework’, in *Gene Patents and Collaborative Licensing Models, Patent Pools, clearinghouses, open source models, and liability regimes*, Van Overwalle, Geertrui (eds.) Cambridge Univ. Press, pp. 171—193, 2009. See also J.Hope, *Biobazaar. The Open Source Revolution and Biotechnology*, Harvard

competition, and optionally, copyleft.

Credible commitment requires the technology to be protected by IPRs, so when distributed the license is legally enforceable. The technology must be ‘owned’ by the licensor and not be placed in the public domain, or else there is nothing to license. Competition encompasses the freedom to use and commercialise the technology itself as well as any downstream innovations. Hence, a license that is given only for research purposes and excludes commercial uses would not be an open source license. In the case where the licensor imposes requirements on the licensee, then the license is not open source. Finally, Hope explains that in life science, copyleft is akin to grant-back and reach-through mechanisms⁶⁷ also known as ‘passing it forward’.⁶⁸ In order for a license to be qualified as reciprocal or copyleft, the licensor must not retain rights to improvements to the original technology. Thus, it creates a club ‘atmosphere’ in which licensors and licensees can share improvements enabling the initial licensed technology to provide commercial advantages to both licensor and licensees.⁶⁹

Similarly to Open Source and Free Software, these models leverage exclusive rights to include others (although with various degrees) instead of excluding them.⁷⁰ Compared to the ‘*no-crabs-strong-exclusive-rights*’ approach these models do walk sideways. But do they actually walk backwards?

III- Walking sideways, walking forward?

Traditionally, one would seek to expand one’s exclusive rights, following the idea that more rights are better. These models however propose more inclusive mechanisms: patents can be used to include instead of exclude.⁷¹ These models

University Press, (2008), pp.142—188.

67. A reach through royalty provision allows the licensor to receive payments on the use or the sale of follow-on innovations. For instance, in the case of research tools, it allows the research tool developer to gain royalties on the sale of products developed using their research tool (even if the patented invention is not incorporated in the final product)

68. J. Hope, ‘Open Source Genetics, Conceptual Framework’, 2009, p 183.

69. *ibid.*

70. S. Dusollier, ‘Sharing Access to Intellectual Property through Private Ordering’, 82 Chi.-Kent. L. Rev. 1391, 2007. See also M. Xifaras, ‘Copyleft and the theory of property’, *Multitudes*, Vol. 2, No. 41, pp. 50-64, 2010.

71. Following the models described in this essay and building on previous initiatives, Van Overwalle proposes an ‘inclusive patent’ regime that will co-exist with the traditional exclusive right—based patents. The ‘inclusive patent’ will offer a right to include, instead of a right to exclude, enabling the owner to include others. The latter will be able to control licensing conditions and ensure the compliance with open source requirements. This regime would be developed as a semi-codified regime (in this case the patent entitlement is provided by law) and as the open source copyleft type license (built by private parties). See G. Van Overwalle, ‘Inventing Inclusive Patent: From Old to New Open Innovation’,

emerge at a time when patents are being subject to greater amount of public criticism and scrutiny. Indeed, whether we are talking about the phenomena of anti-commons⁷², the phenomenon of patents trolls, or more generally about the ‘broken’ patent system, observers suggest that we are far from what patents were initially designed for, namely the progress of Science and in the interest of the public.⁷³

The models described above aim at creating safe environments for innovators by enhancing the freedom to operate for the latter. They insist on the rights of the users and leave aside the strong exclusive character traditionally attached to patents, by not making use of the exclusive aspects of patents, at least not in the traditional sense. Patents become structuring tools for constructing collaboration between actors of innovation. Patents are disarmed of their ‘weapon-like’ aspects and disarmed of their function of exclusion. They neutralize and harness the exclusive function to establish inclusivity. By creating safe environments for innovators and giving them freedom to operate, these models whatever form or methodology they might take may solve certain issues innovation has been facing. Indeed, patent trolls and the anti-common phenomenon have been considered as impediments to the innovation process. These models now cohabit (or will be cohabiting) with traditional exclusionary patents, as an alternative, not as a replacement, and their impact is yet to be measured: what about the incentives? what about economic viability? what about anti-competitive aspects?⁷⁴

in *Kritika: Essays on Intellectual Property*, Vol. 1, P. Drahos, G. Ghidini, H. Ullrich (eds.), Edward Elgar, 2015. See also S. Dussolier, ‘The Commons as reverse intellectual property or the model of inclusivity’, in *Concepts of Property in Intellectual Property Law*, Cambridge Intellectual Property and Information Law (No. 21), 2013, pp. 258—281.

72. M.A. Heller, R. S. Eisenberg, ‘Can Patents Deter Innovation? The Anti-commons in Biomedical Research’, *Science* 280, 698, 1998, pp. 698—701. The anti-commons phenomenon is the mirror image of the ‘Tragedy of the Commons’ according to which people will overuse shared resources. In an anti-common situation, people underuse scarce resources because there are too many owners blocking each other. This phenomenon would be particularly significant in biomedical research where upstream research as well as downstream products development are affected by the existence of concurrent fragments of IP rights. However, this phenomenon has been nuanced as to the negative impact it could have, and although the conditions are met to have an anti-common situation it might not be such a significant impediment in biomedical innovation. See J.P. Walsh, A. Arora, M. Cohen, ‘Research Tool Patenting and Licensing and Biomedical Innovation’, in W.M. Cohen and S. Merrill, eds. *Patents in the Knowledge-Based Economy*, National Academies Press, 2003.

73. See the numerous publications on the ‘broken’ patent system notably D.L Burk, M.A. Lemley, *The Patent Crisis and How the Courts Can Solve It*, University of Chicago Press, 2009. M. Boldrin, D. K. Levine, ‘The Case Against Patents’, *Journal Of Economic Perspective* Vol. 27, No.1, 2013. See also Electronic Frontier Foundation, ‘EFF Outlines Plan to Fix the Broken Patent System’, 2015, available at <https://www.eff.org/press/releases/eff-outlines-plan-fix-broken-patent-system> (accessed 15 November 2016); The Economist, ‘Time to fix patents’, at <http://www.economist.com/news/leaders/21660522-ideas-fuel-economy-todays-patent-systems-are-rotten-way-rewarding-them-time-fix> (accessed 15 November 2016).

74. For the normative aspects and the impacts of such models see G. Van Overwalle, ‘Inventing Inclusive Patent: From Old to New Open Innovation’, 2015, pp.41—46.

While these models may (or may not) be one of the many solutions to an overworked patent system, they most certainly change the way we understand and use patents. The economic logic and conventional views are tempered by the development of these models contrasting with what has been called by Lemley the ‘faith based IP system’ advocating for strong exclusive rights.⁷⁵ According to Lemley the ‘faith-based IP system’ is the idea that, instead of relying on evidence and questioning strong IP rights, one considers IP as a moral end in itself. The available evidence on IP is less conclusive and less clear-cut than ‘IP promotes innovation’ or ‘IP impedes innovation’.⁷⁶ Yet, instead of relying on evidence and if necessary challenging the strong exclusive right based system, one ‘believes’ in IP law.⁷⁷ The models described in this essay permit one to go beyond the common ‘anti-patent or pro-patent’ discourse,⁷⁸ as alternatives, as what Contreras has described as a ‘little-understood middle ground between the public domain and exclusive property rights’.⁷⁹ By reminding us that a patent is not a monolith, these models are in some way deconstructing the unequivocal perception we have about patents, patents are neither evil nor good, but are tools that can either be used to exclude (traditional exclusive right—based approach) or include. The various methodologies employed by the new models confirm the flexibility of the usage of patents as they can be used for defence, for spreading knowledge or both, etc.

Patents have been presented as instruments fostering innovation, yet we might have forgotten what ‘instrument’ might actually mean and we might have not explored all the potential of patents. One has to remember that patents, even in the traditional system (strong exclusive rights), are strategic tools structuring collaboration and promoting diffusion among the actors of innovation⁸⁰. These models

75. See M. Lemley, ‘Faith-Based Intellectual Property’, 62 UCLA L. Rev. 1328, 2015, p.9.

76. L. L. Ouellette, ‘Patent Experimentalism’, Virginia Law Review, Vol. 101, p. 65, 2015, pp 77 - 87. Ouellette addresses the issues of empirical methodology in patent law and advocates for randomized policy experiment to avoid bias and better inform policy makers.

77. Robert Merges, as quoted by Lemley would be typical of such kind of ‘belief’ : ‘Through all the doubts over empirical proof, my faith in the necessity and importance of IP law has only grown’. See M. Lemley, ‘Faith-Based Intellectual Property’, 2015, p.9.

78. F. Morin, K.Daley, E.R. Gold, ‘Having Faith in IP: Empirical Evidence of IP Conversions’, 2011, available at SSRN: <http://ssrn.com/abstract=1950541> (accessed 15 November 2016).

79. J. L Contreras, ‘Patent Pledges’, 2015, p.543.

80. J. Penin, ‘Le brevet comme Instrument de Coordination de l’Innovation Ouverte’ in P.Corbil, C. Le Bas, *Les Nouvelles Fonctions du Brevet*, Economica, 2011, pp. 63—79.

confirm the use of patents as instruments for collaboration but take this aspect to another level by chipping away at exclusive rights⁸¹. Exclusionary aspects of patents might have been promoted at the expenses of their inclusive aspects, thus these models encourage us to reconsider the instrumental aspect of patents by acknowledging their aptitude to also act as inclusive tools.

Although some of these models remain to be thoroughly analysed to appreciate their effects on innovation, some propositions have been made to encourage the use of patents as inclusive tools. For instance, Chien⁸² elaborates on creating a ‘open’ or ‘defensive-only’ option, in some ways similar to a ‘license of rights’⁸³ allowing patentees to obtain a discount on maintenance fees in exchange for pledging to enforce their patents for defensive purposes only. Parchomovsky and Mattioli⁸⁴ have proposed the creation of a ‘quasi-patent’ that would increase the use of invention by preventing inventors from enforcing their rights against non direct business competitors. As opposed to a traditional patent which grant the patent holder an exclusive right against everyone, a quasi-patent’ would only be enforceable against direct competitors, other entities will be free to use the quasi-patent’.⁸⁵ As their authors point out, a ‘quasi-patent’ might encourage the participation in networks such as the OIN⁸⁶ by allowing OIN participants (licensees and licensors) to protect themselves, within the very OIN network, against competitors.⁸⁷

The debate seems to have polarized in part around two opposing sides : those defending strong property rights and those defending access to knowledge.⁸⁸ This

81. In an Open Innovation ‘*la Chesbrough*’, this exclusive aspect of patents is kept and the use of patents is quite traditional, ‘open’ being understood as organisational. See J. Penin, ‘Are You Open’, An Investigation of the Concept of Openness for Knowledge and Innovation’, *Revue Economique*, 2013/1 Vol. 64, 2013, pp. 133–148.

82. C. Chien, *Exclusionary and Diffusionary Levers in Patent Law*, 2015, available at : <http://digitalcommons.law.scu.edu/facpubs/882>. (accessed 15 November 2016).

83. A license of rights enables a patentee to reduce its maintenance fees when he or she grants a license to anyone who is interested in having one. This type of license exists in the UK for instance : see UK Patents Act of 1977, Section 46 and <https://www.gov.uk/guidance/licensing-intellectual-property> (accessed 15 November 2016). See also Article 8 *Licences of right* of REGULATION (EU) No 1257/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection.

84. G. Parchomovsky, M. Mattioli, ‘Partial Patents’, *Columbia Law Review*, Vol. 111, No. 2, 2011, pp. 207-253

85. G. Parchomovsky, M. Mattioli, ‘Partial Patents’, 2011, p 226. The authors also propose the creation of a ‘semi-patent’ that would require disclosure of all research results in order to obtain a patent. This would require a stricter requirements for disclosure of information to enable the sharing of information to encourage information. p 209.

86. G. Parchomovsky, M. Mattioli, ‘Partial Patents’, 2011, pp 239-240.

87. *ibid.* Indeed, one has to remember that the OIN only covers Linux related patents which means that members of the network can still be competitors on other types of patents. It acts as a second layer of protection on top of the protection originally provided by the OIN and its licenses.

88. L. L. Ouellette, ‘Cultural Cognition of Patents’, *IP Theory*, Vol. 4, pp. 28-36, 2014, p 28.

essay is not about the evidence issue in patent law and does not claim to provide any answer to such a complex, yet fascinating issue, nor is it about deciding between ‘faithful’ and ‘unfaithful’ (i.e., non-consequential justifications vs consequential justifications of IP⁸⁹), but it does use the on-going opposition as an illustration. This essay proposed to be optimistic about reducing the polarizing effects of pro-patents/against-patents and about what patents can still achieve when used in a different manner and tried to show that new models can help overcoming oppositions to move past it. The described models acknowledge both sides of the debate —use of an exclusive right to foster access to patented technologies—breaking the binary distinction and reconciling exclusion/inclusion just as the open source and free software movement did in the copyright realm. These models might also solve the issue of uniformity and enable fine tuning to address issues in different technology sectors.⁹⁰ Hence, rethinking patents as inclusive instruments might reinvigorate the latter, which seem to be at the end of their rope. Whether successful or not, these ‘open’ models may have the merit of offering a different perception of patents by revealing their strong plasticity and by demonstrating that possibilities, on how patents can be used, may not have been exhausted yet. The traditional ‘*no-crabs-strong-exclusive-rights*’ is not the only option. By proposing an alternative way of using patents these models overcome the confrontation between those in favour of a strong patent system relying on exclusivity and those in favor of loosening it, and consequently may just give patents a new lease on life.

Like crabs, these models are odd-walking compared to more traditional uses of patents where exclusivity is thought to be the cornerstone. Yet, they may be the ones walking forward in the future.

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89. See M. Lemley, ‘Faith-Based Intellectual Property’, 2015 and the comments of D. L. Burk on such debate ‘On the Sociology of Patenting’, *Minn. Law Rev.*, forthcoming; UC Irvine School of Law Research Paper No. 2016-15, 2016. Available at SSRN : <https://ssrn.com/abstract=2740947>. Non consequentialism approach is not necessarily problematic.

90. each sector might require a different approach in how patents are used, for instance a sector particularly exposed to patent bullying would benefit from a defensive mechanism, whereas some other sectors could benefit more from a ‘spreading’ mechanism in a fast paced technological environment for instance.