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Trolls at the High Court?

Christian Helmers and Luke McDonagh*

Abstract: This article investigates the phenomenon of litigation undertaken by Patent Assertion Entities (PAEs), often referred to as ‘patent trolls’, within the legal system of the Patents Court (PHC) of England and Wales during the period 2000-2008. Our analysis shows that patent suits involving PAEs at the PHC are rare – they account for less than 6% of all patent cases. We suggest two reasons why the PHC does not provide a welcome venue for PAE litigation. Firstly, the majority of patent cases which reach a judgment in the UK result in a ruling invalidating the patent. Secondly, the costs regime in the legal system of England and Wales requires that the losing party pay the costs of the other side. In other words, even if its own costs are kept low, a PAE which loses a case may have to spend a substantial amount of money in order to cover the costs of the other side. When taken together, it is likely that these two aspects discourage litigation by PAEs at the PHC, which accounts for the low volume of cases when compared with other jurisdictions such as the US. We also offer interesting insights to the wider debate concerning whether it is likely that in the near future there will be a similar increase in PAE litigation in Europe as has already occurred in the US over the last decade. This article also discusses potential implications for the design of the proposed European Unified Patent Court.

1. INTRODUCTION

Patents are designed to encourage innovation by granting temporary, exclusive intellectual property rights (IPR) with respect to an invention, thereby enabling transactions concerning these inventions via licensing and assignment agreements. There is no doubt that the enforceability of patents in court is of crucial importance within this system. Without the possibility of taking an infringement action, the patent holder would have little leverage to prevent the copying of a patented technology, or to negotiate with parties who seek to use the patented technology. In this view, litigation undertaken by so-called patent-assertion entities (PAEs), sometimes also referred to as ‘nonproducing entities’ or ‘patent trolls’,¹ could be seen as achieving precisely this goal - enforcing the right to financial compensation for the use of a patented invention by third parties accords with the

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¹ In our analysis, we focus on companies that have been characterised as PAEs in the existing literature. This excludes universities and independent inventors, which is why we prefer to use the term PAE instead of non-producing entity or troll - Federal Trade Commission (FTC), *The Evolving IP Marketplace: Aligning Patent Notices and Remedies with Competition* (2011); accessible at <http://www.ftc.gov/os/2011/03/110307patentreport.pdf>.

underlying rationales of the patent system.² However, as will be discussed over the course of this article, litigation by PAEs has provoked a large amount of critical academic analysis, as well as unprecedented media scrutiny.³

In the literature, there is no single definition of ‘PAE’, though commonly it is a legal entity, often a registered company, which holds patents for certain products or processes, but which typically does not actually ‘produce’ any products of its own, and which furthermore has obtained its patents via means other than by conducting R&D itself.⁴ In this view, a PAE does not innovate – instead, a PAE’s business model focuses on enforcing its acquired patents, often via litigation against other companies which, unlike PAEs, are in the business of manufacturing and marketing new products.⁵ The aim of this tactic is to negotiate licence fees for the use of the patented technology – fees which have often been considered excessive relative to the contribution of the asserted patents to the allegedly infringing product.⁶ The potential success of this strategy rests upon the possibility that the activities of other innovative companies infringe upon the PAE’s patents. This is important because a PAE will typically assert a patent when a manufacturer has already invested the sunk costs of bringing a product to market.⁷ In this context, the threat of litigation from a PAE and a (preliminary) injunction handed out by a court could mean that producing companies are forced to place on ‘hold’ the marketing of the disputed product, or the launch of other new products, something which in turn could severely threaten the eventual profitability of the product and the future of the company.⁸ It is for this reason that PAEs are often given the

² J. McDonough, ‘The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy,’ *Emory Law Journal* 56 (2006), 189-211. N. Myhrvold, ‘The Big Idea: Funding Eureka,’ *Harvard Business Review* (March, 2010), paragraph 7; accessible at <http://hbr.org/2010/03/the-big-idea-funding-eureka/ar/1>.

³ For example National Public Radio, ‘The American Life, When Patents Attack’ (22 July 2011). See also <http://www.guardian.co.uk/law/2011/nov/09/patent-trolls-make-mischief>; http://www.washingtonpost.com/national/on-innovations/where-are-the-jobs-ask-the-patent-trolls/2012/05/07/gIQAdIE08T_story.html; <http://www.nytimes.com/2012/05/30/business/economy/tech-lawsuits-endanger-innovation.html>; <http://www.spiegel.de/netzwelt/gadgets/start-up-gegen-handy-hersteller-undurchsichtige-geschaefte-mit-apple-patenten-a-803175.html>; <http://business.financialpost.com/2012/07/23/apple-microsoft-settle-patent-fight-with-rim-foe> http://www.dlv.it/utm_source=dlvr.it&utm_medium=twitter.

⁴ There are many different definitions of PAEs and their main characteristics. The most common definition focuses on the lack of any productive and inventive activity. Other definitions also take into account the circumstances under which such PAEs acquire patents (e.g. from bankrupt companies). See E. S. K. Ng, ‘Patent Trolling: Innovation at Risk,’ *European Intellectual Property Review* 31(12) (2009), 593-608, 596. See also C. Chien, ‘Predicting Patent Litigation,’ *Texas Law Review* 90 (2011), 283-329, at 292, S. Subramanian, ‘Patent Trolls in Thickets: Who is Fishing Under the Bridge?,’ *European Intellectual Property Review* 30(5) (2008), 182-188, at 182; and description posted at <https://www.patentfreedom.com/about-npes/background/>.

⁵ Risch offers some evidence on the origin of patents enforced by PAEs in the US. He finds the large majority of patents to have been previously owned by producing entities. M. Risch, ‘Patent Troll Myths,’ *Seton Hall Law Review* 42 (2012), 457-499, at 484-486.

⁶ Layne-Farrar and Schmidt (2010) argue that from a theoretical point of view, depending on the downstream market structure there is no reason to expect non-practicing entities to charge higher (or even excessive) royalties than practicing entities. The crucial aspect is whether PAEs are able to exploit a patent hold-up, that is, to threaten a producer with an injunction after the producer has made the sunk investment. Empirical data on licensing fees are usually not available as the outcome of licensing negotiations is normally not disclosed in much detail. Licensing agreements usually occur as part of a settlement which is commonly not recorded as part of court proceedings. Bessen and Meurer (2012) offer some survey-based evidence for the US that indicates that the mean settlements costs due to the licensing agreement accepted by defendants sued by PAEs are on average US\$ 6.3 million. Their survey data suggests even higher numbers for licensing agreements that were arranged before a court case was filed, with average licensing fees amounting to US\$ 24.6 million. Still, it is difficult to gauge from these absolute figures whether the settlement costs are excessive. A. Layne-Farrar and K. M. Schmidt, ‘Licensing Complementary Patents: “Patent Trolls,” Market Structure and “Excessive” Royalties,’ *Berkeley Technology Law Journal* 25 (2010) 1121-1144; J. Bessen and M. J. Meurer, ‘The Direct Costs from NPE Disputes,’ *Boston University School of Law Working Paper* 12-34 (2012).

M. Reitzig, J. Henkel, and C. Heath, ‘On Sharks, Trolls, and Their Patent Prey – Unrealistic Damage Awards and Firms’ Strategies of “Being Infringed”,’ *Research Policy* 36 (2006), 134-154.

⁸ This situation may arise either because firms are unaware of existing patents or because the validity of existing patents is uncertain. C. Shapiro, ‘Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard Settings’ in Adam Jaffe et al (eds), *Innovation Policy and the Economy* (Cambridge, MA, MIT Press, 2001), 119-150, at 125. See also M. Lemley and C. Shapiro, ‘Patent Holdup and Royalty Stacking’ *Texas Law Review* 85 (2007) 1991-2049, J. Gregory, ‘The Patent Troll Next Door,’ *John Marshall Review of Intellectual Property* 6 (2007), 292-309 and C. Tucker, ‘Patent Trolls and Technology Diffusion,’ *TILEC Discussion Paper* 2012-030 (2012); accessible at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2136955. For an understanding of how poorly managed property systems can produce innovation problems see M. A. Heller, ‘The Tragedy of the Anti-Commons: Property in the Transition from Marx to Markets,’ *Harvard Law Review* 111(3) (1998), 621-688.

unflattering description ‘patent trolls’ – entities ‘lurking under the bridge’ whose only function is to extract licence fees from other companies, often via the threat of legal action or the actual taking of litigation.

Due to the fact that there is no one accepted definition of PAE or ‘patent troll’, it is sometimes suggested that a wider understanding of the concept should be adopted, focusing on ‘trolling behaviour’, rather than on a particular type of ‘troll’ company.⁹ In this view, the tactic of ‘trolling’ litigation could be undertaken by a number of different types of companies, including companies that do conduct their own R&D, and even companies which manufacture products. There is merit to this view - as discussed further below, there is evidence that PAE-style litigation is now widespread within certain industries, especially among the large technology manufacturers and producers including Nokia, Research in Motion, Apple, Microsoft, and Google. Nevertheless, the phenomenon of litigation undertaken by the ‘classic’ type of PAE is worth investigating. We describe our methodology for identifying the PAEs in our dataset in Section 3 of this article.

Furthermore, it is notable that the problem of the ‘patent troll’ arises during a period when many are questioning whether the practice of patenting actually lives up to the promise of increasing levels of innovation, especially within the information and communication technology (ICT) industries.¹⁰ For instance, a recent study notes that approximately one third of all European patents are not utilised for an industrial or directly commercial purpose, and furthermore it states that one sixth are used in order to ‘block’ competitors from engaging in research surrounding the protected patent.¹¹ Within this current debate, concerning the nature and value of the patent system, it is arguable that litigation by PAEs is of particular significance. While it is true in some respects that PAEs ‘enable transactions’, which is one of the aims of patenting, it is also true that the actions of PAEs may effectively stifle, and can even halt, innovation.¹² Indeed, it is often remarked that PAE litigation threatens rates of innovation and economic growth. For instance, it has been claimed that PAEs represent a “socially wasteful” business activity, diverting resources from more useful areas to the fora of litigation.¹³ If true, PAE litigation, in addition to creating an economic and legal quagmire, would also provide a challenge to the justificatory theories underlying the patent system.¹⁴

Within the global sphere of patent litigation, the majority of scholarship has focused on PAE litigation within the US jurisdiction, while there has been a comparative lack of similar analysis with regard to European jurisdictions, including the UK. With this in mind, this article sheds light on PAE litigation at the Patents Court (PHC) of England and Wales.¹⁵ We provide a detailed analysis of all the cases that involved a PAE filed between 2000 and 2008 at the PHC. We discuss the characteristics of the enforcement system that are directly relevant to litigation involving PAEs in England and Wales. This includes both an examination of the issues in each case, such as questions of validity and infringement, and a discussion of the ultimate results and costs of litigation. We

⁹ See E. S. K. Ng, ‘Patent Trolling: Innovation at Risk,’ *European Intellectual Property Review* 31(12) (2009), 593-608, at 596.

¹⁰ *The New York Times*, (15 July 15 2007) -

http://www.nytimes.com/2007/07/15/business/yourmoney/15proto.html?_r=1&ex=1342152000&en=17ab981b1b3cf1dd&ei=5090&partner=rssuserland&emc=rss.

¹¹ Study on Evaluating the Knowledge Economy: What are Patents Actually Worth? The Value of Patents for Today’s Economy and Society, Final Report, 23 July 2006, 10; accessible at http://ec.europa.eu/internal_market/indprop/docs/patent/studies/final_report_lot2_en.pdf

¹² C. Tucker, ‘Patent Trolls and Technology Diffusion,’ *TILEC Discussion Paper 2012-030* (2012); accessible at

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2136955.

¹³ J. Bessen, M. Meurer, and J. Ford, ‘The Private and Social Costs of Patent Trolls,’ *Boston Univ. School of Law, Law and Economics Research Paper* 11-45 (2011), 26-35, at 31.

¹⁴ For a discussion of the most frequently cited justifications for patent law, see F. Machlup and E. Penrose, ‘The Patent Controversy in the Nineteenth Century,’ *Journal of Economic History* 10(1) (1950), 1-26. For discussion of the need to reconcile the need for greater levels of innovation and economic growth with the justifications for stronger intellectual property rights protection see D. S. Davies, ‘The Early History of the Patent Specification,’ *Law Quarterly Review* 50 (1934), 86-109; E.C. Hettinger, ‘Justifying Intellectual Property,’ *Philosophy and Public Affairs* 18 (1989), 31-52; J. West, ‘Does Appropriability Enable or Retard Innovation,’ in H. Chesbrough et.al (eds.), *Open Innovation: Researching A New Paradigm* (Oxford, Oxford University Press, 2006), 109-133, at 111; V. Shiva, *Protect or Plunder? Understanding Intellectual Property Rights* (London, Zed Books, 2001), 21-26; O. Granstrand ‘Intellectual Property Rights for Governance in and of Innovation Systems’ in B. Anderson (ed.), *Intellectual Property Rights, Innovation, Governance and the Institutional Environment* (Cheltenham, Edward Elgar, 2006), 311-344, at 317; and L. Bently and B. Sherman, *Intellectual Property Law* (3rd ed.) (Oxford, Oxford University Press, 2008), at 339-340.

¹⁵ There is no unified legal system for the UK. England and Wales, Scotland, and Northern Ireland have separate legal systems and courts.

also draw on comparisons of the characteristics of the lawsuits, the litigating parties, and the litigated patents between the cases that involve PAEs and all other patent cases heard by the PHC. In addition, our data enable us to go one step further and to compare the patents involved in the PAE court cases with the overall population of patents protecting similar technologies.

In this context, it is notable that ‘patent trolls’ are much less visible in Europe than in the US. For this reason it has been remarked that the European patent system may contain unique factors which are capable of ‘taming’ the patent trolls.¹⁶ For example, commentators note that a crucial factor concerns the fact that software and business method patents are much more difficult to obtain in Europe than the US.¹⁷ Also of importance is the fact that even within the European Patent Convention (EPC) system, patents ultimately turn into national rights, which must be enforced before national courts, something which substantially increases the costs and complexity of litigation when compared to the US jurisdiction. In this article we offer two additional factors present within the patent enforcement system in England and Wales which appear to mitigate, or ‘tame’, PAE behaviour. Firstly, the majority of patent cases that reach a judgment in the UK result in a ruling invalidating the patent. In cases involving PAEs during 2000-2008, only in one minor part of one case was a PAE patent found to be valid. The likelihood of a patent being declared invalid by the PHC is therefore high. Secondly, the costs regime in the legal system of England and Wales requires that the losing party pay the costs of the other side. Given the relatively high costs of patent suits before the PHC,¹⁸ this means that, even if its own costs are kept low, a PAE which loses a case may have to spend a substantial amount of money in order to pay the costs of the other side. When taken together, these two aspects discourage litigation by PAEs at the PHC. As a result, within the UK jurisdiction the problems associated with PAEs stifling innovation appear to be somewhat mitigated. This could help explain the low number of cases involving PAEs before the PHC - they account for less than 6% of all patent cases between 2000 and 2008. Further to this, we present data regarding the type of patents that are enforced by PAEs and the defence mechanisms employed by the alleged infringers.¹⁹

Hence, over the course of this article we primarily seek to analyse the cases brought by PAEs before the PHC and to assess the characteristics of the patents enforced by PAEs in these cases. While this article therefore does not provide any direct answers with regard to the impact of PAEs on rates of innovation more generally, it does add a substantial amount of empirical evidence to this current debate. We also offer interesting insights to the wider debate concerning whether it is likely that in the near future there will be a similar increase in PAE litigation in Europe as has already occurred in the US over the last decade (see Section 2). This article also discusses what the characteristics of an enforcement system which aims to limit potentially socially disruptive behaviour by PAEs would be. This has not only potential implications for the design of the proposed European Unified Patent Court, but could also prove useful for the general understanding of incentives provided by enforcement systems for PAE litigation.

The following section discusses the concept of PAEs and the existing relevant literature in more detail. Section 3 provides a detailed analysis of all court cases before the Patents Court during the period 2000-2008 that involved a PAE, together with a discussion of the relevant characteristics of the patent enforcement system of England and Wales. Section 4 summarises our findings and offers some concluding thoughts.

¹⁶ A. Mayergoyz, ‘Lessons from Europe on How to Tame U.S. Patent Trolls,’ *Cornell International Law Review* 42 (2009), 241-270, at 257.

¹⁷ S. J. Marsnik and R. E. Thomas, ‘Drawing a Line in the Patent-Subject Matter Sands: Does Europe Provide a Solution to the Software and Business Method Patent Problem,’ *Boston College International and Comparative Law Review* 34 (2011), 227-328, at 230-233.

¹⁸ C. Helmers and L. McDonagh, ‘Patent Litigation in the UK,’ *LSE Law, Society and Economy Working Papers* 12/2012

¹⁹ Schwartz and Kesan (2012) criticise the economic approach of assessing the costs and benefits of PAE litigation and instead argue that the relevant issue is whether PAEs file frivolous lawsuits to enforce patents that should not have been granted and that are most likely not infringed by the alleged infringers. Our analysis, therefore, adds empirical evidence to the existing literature along the lines suggested by Schwartz and Kesan. D. L. Schwartz and J. P. Kesan, ‘Analyzing the Role of Non-Practicing Entities in the Patent System,’ *Illinois Public Law and Legal Theory Research Paper* 13-01 (2012).

2. PATENT-ASSERTION ENTITIES (PAEs)

The PAE business model is highly controversial. As noted above, the model envisages the PAE enforcing its acquired patents against producing companies. Therefore, for a PAE, a law suit primarily provides the opportunity for the negotiation and collection of settlement payments. Filing a law suit against a potential infringer may provide a PAE with leverage over a producing entity in a number of ways. For instance, due to the fact that patent litigation by PAEs is undoubtedly a worldwide phenomenon, it is possible for a PAE to file a law suit against a producing company simultaneously in multiple jurisdictions.²⁰ Via this multifaceted set of legal actions a PAE may be able to obtain an injunction preventing, or ‘holding up’, the sale of a product.²¹ Even if an injunction is not granted, or is only granted in a single jurisdiction/market, the mere possibility of this occurring may encourage the producing company to enter into a licence agreement with the PAE, which could in turn provide the PAE with a lucrative source of licensing revenue.²² In addition, alleged infringers may also prefer to make a quick settlement with the PAE instead of engaging in a lengthy and potentially costly lawsuit aimed at invalidating the PAE’s patent, a scenario which may enable a PAE to effectively enforce a weak patent which would otherwise be found invalid by a court.²³ Furthermore, settlements are commonplace in cases involving PAEs - it is very rare for defendants to be found by the court to have actually copied a patented technology.²⁴ Although it cannot be said that settlements between PAEs and producing companies always favour the PAE, as stated above there are notable examples of settlements which have involved a large producing company paying a substantial licence fee to a PAE.

In light of this, there is growing widespread concern among policy makers that patent litigation by PAEs is becoming a disruptive force with respect to product market competition and innovation.²⁵ There is ample anecdotal evidence to suggest that PAE litigation may have a disruptive effect on high-tech companies, especially in the telecommunication and software industries.²⁶ In the information and communication technology (ICT) sector profitability largely depends on products reaching the market place before a competitor’s similar product, therefore the problem of bringing to market a (new) product which is threatened by a ‘hold-up’ is particularly evident.²⁷ In addition, patents on ICT technologies are often characterised by low substitutability, which can attribute a disproportionate level of importance to an individual patent despite its relatively minor contribution to

²⁰ This opens the possibility for forum-shopping, meaning that PAEs may strategically choose their favoured jurisdiction to enforce a patent and use a favourable judgement to negotiate licensing agreements in other jurisdictions.

²¹ For example, IPCom, a PAE according to our definition, was granted an injunction by the district court in Düsseldorf, Germany, against manufacturers Nokia and HTC in April 2012 which forced Deutsche Telekom to stop selling Nokia and HTC phones.

²² Perhaps the most prominent example of this is shown by the case of a PAE called NTP, Inc., which obtained a settlement payment of US\$ 612.5 million with regard to an infringement action involving Research In Motion (RIM), the manufacturer of the ‘Blackberry’ device, in 2006. The case received much media attention, see for instance CNN (3 March 2006) http://money.cnn.com/2006/03/03/technology/rimm_ntp/ and MSNBC (3 March 2006) http://www.msnbc.msn.com/id/11659304/ns/technology_and_science-wireless/t/settlement-reached-blackberry-patent-case/.

²³ The alleged infringer faces a public good problem: invalidating the PAE-owned patent will likely benefit other companies, including its competitors, while it has to bear the costs on its own. For an example of a recent high cost settlement see Rambus’ \$900m settlement with Samsung; article accessible at <http://venturebeat.com/2010/01/19/rambus-and-samsung-bury-the-hatchet-with-900m-settlement/>.

²⁴ J. Bessen and M. Meurer, *Patent Failure: How Judges Bureaucrats and Lawyers Put Innovation at Risk* (Princeton, NJ, Princeton University Press, 2008), at 128. See also C. A. Cotropia and M. Lemley, ‘Copying in Patent law,’ *North Carolina Law Review* 87 (2009), 1421-1466.

²⁵ See generally Federal Trade Commission, *The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition* (2011); accessible at <http://www.ftc.gov/os/2011/03/110307patentreport.pdf>.

²⁶ See for example Julia Kollwe, ‘Patent Trolls in Piney Woods Make Mischief for Innovators Everywhere,’ *The Guardian* 9 November 2011).

²⁷ See high profile disputes between Apple and Samsung where each company attempted to block the sale of competing tablet computers:

<http://online.wsj.com/article/SB10001424052970203711104577200781450630136.html>;
<http://www.telegraph.co.uk/technology/samsung/8691707/Samsung-Galaxy-Tab-10.1-blocked-in-Europe.html>.

a product. In addition, patents on ICT-related technologies often cover software and business methods patents - patents which have been shown to often have fuzzy boundaries.²⁸ In particular, the existence of numerous ‘fuzzy’ software and business method patents enables the creation of ‘patent thickets’ i.e. fields of broad, overlapping patent claims.²⁹ Furthermore, the existence of standards and standard-essential patents, often necessitated by the need for interoperability, is also common in the ICT sector. This enhances the potential importance of individual patents, owned by PAEs, which cover ‘essential standards’. The available empirical evidence supports the conclusion that patents on ICT-related technologies are most frequently asserted by PAEs, whereas PAEs very rarely litigate patents in the areas of chemicals and pharmaceuticals.³⁰

Defenders of PAEs argue that the PAE business model enables the monetisation of patents, and by extension the monetisation of inventions, in the so-called “market for technology.”³¹ In this view, it is argued that the behaviour of PAEs is fully in line with the spirit of patent law because PAEs do enable transactions.³² Furthermore, an inventor may choose to assign, or sell, his or her patents to a PAE in order to maximise his own revenue stream because a PAE is likely to be in a better position to negotiate a higher licence fee than the individual inventor. This is especially plausible with regard to small-scale individual inventors who may lack the resources to enforce their patents against large manufacturing companies. It could also be argued that new ventures might benefit from the option of selling patents to PAEs as this may increase their salvage value in case of bankruptcy. However, recent scholarship pours scorn on the supposed ‘positive’ effects of PAE activities. Bessen et al. suggest that while PAEs have the effect of enabling a market for patents, this may not enable a market for technology. In fact, the behaviour of PAEs tends to inhibit a true market for technology by discouraging R&D in areas where there is a high probability of PAE litigation occurring. In addition, Bessen et al. demonstrate that very little of the revenue raised by PAEs via litigation finds its way back to inventors.³³ Bessen et al. remark that “there are a lot of big losers” from PAE litigation, “while hardly anyone benefits much.”³⁴

As discussed above, the notion of ‘PAE’ is not static. In fact, two new forms of PAE-types have come into view of late. In addition to PAE ownership, ICT patents are also often owned by product market competitors, such as Nokia, Research In Motion, Apple, Microsoft, Google, and Samsung. This increases the potential for litigation to occur. One new type of PAE is armed with patents assigned to it by large producing companies. From the point of view of the producing companies, the underlying purpose of this activity appears to be to make use of the PAE to attack the producing companies’ direct competitors, which illustrates that PAEs may have already become a tool for moving competition from the product market into the court room.³⁵ Often considerable uncertainty surrounds the assignment of patents to these PAEs, which makes it difficult to gauge the motives of litigation, and hence for competing companies to obtain reasonable settlement agreements.

²⁸ J. Bessen, M. Meurer, and J. Ford, “The Private and Social Costs of Patent Trolls”, *Boston Univ. School of Law, Law and Economics Research Paper* 11-45, (2011), 1-35; available at SSRN <http://ssrn.com/abstract=1930272> or at <http://dx.doi.org/10.2139/ssrn.1930272>.

²⁹ G. von Graevenitz, S. Wagner, and D. Harhoff, ‘How to Measure Patent Thickets – a Novel Approach,’ *Economics Letters*, Vol. 111 (2011), 6-9; and C. Shapiro, ‘Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard Settings’ in A. Jaffe et al. (eds.), *Innovation Policy and the Economy* (Cambridge, MA, MIT Press, 2001), at 124-127. See also *The Guardian*, (J. Halliday and C. Arthur, ‘Microsoft sues Motorola over Android – and all the other mobile lawsuits, visually,’ 4 October 2010); accessible at <http://www.guardian.co.uk/technology/2010/oct/04/microsoft-motorola-android-patent-lawsuit>.

³⁰ M. Risch, ‘Patent Troll Myths,’ *Seton Hall Law Review*, Vol. 42, (2012), 457-499, at 477-478.

³¹ N. Myhrvold, ‘The Big Idea: Funding Eureka!’ *Harvard Business Review* (March 2010), paragraph 7; accessible at <http://hbr.org/2010/03/the-big-idea-funding-eureka/ar/1>.

³² J. McDonough, ‘The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy,’ *Emory Law Journal* 56 (2006), 186-228, at 190.

³³ J. Bessen, M. Meurer, and J. Ford, ‘The Private and Social Costs of Patent Trolls,’ *Boston Univ. School of Law, Law and Economics Research Paper* 11-45, (2011), 1-35, at 28.

³⁴ *Ibid.*, at 33.

³⁵ In June 2012 Google accused Microsoft and Nokia of funneling patents to a PAE, Mosaid, in order to increase Mosaid’s patent pool, and thus its leverage at negotiating licence fees from companies such as Google – *The Guardian* (C. Arthur, ‘Microsoft and Nokia hit back at Google “patent troll” claims,’ 1 June 2012); accessible at <http://www.guardian.co.uk/technology/2012/jun/01/microsoft-nokia-google-patent-troll>.

Nevertheless, it is plausible that this tactic could be used to weaken a competing firm, or it could even enable a large company to push a smaller firm out of the market entirely. The other new PAE-type which has emerged is the so-called ‘patent mass aggregator’. These mass aggregators share many characteristics with PAEs, but they appear to raise the stakes of the game. Feldman and Ewing for example estimate that Intellectual Ventures (IV), probably the most well-known and notorious patent aggregator, owns around 30,000 to 60,000 patents worldwide and has spread the ownership of its portfolio across a cobweb of at least 1,200 shell companies.³⁶ To finance its activities, Feldman and Ewing report that IV has raised at least US\$5 billion in funding. Further to this, a lot of uncertainty surrounds the business of patent mass aggregators. It appears that their goal is to not only acquire patents for their own litigation purposes, but also to engage in agreements to generate licensing revenue for other patent-owning companies by enforcing their patents on their behalf, for instance by acting as exclusive licensees of the other companies’ patents. Mass aggregators can also provide patents to other companies so that these companies can use the patents as defence weapons in case they are ever sued for patent infringement. In a similar vein, mass aggregators may also choose to license patents to small PAEs, which then enforce them against third parties. The existence of new types of PAE illustrates the fact that the ‘PAE environment’ is in a constant state of flux, with new business models emerging frequently. However, these business models are often of dubious transparency and may operate for motives which are difficult to anticipate. For these reasons it is difficult to draw general conclusions when analysing ‘trolling behaviour’ or when searching for the ‘average PAE’, something which is acknowledged below in the context of our methodology for identifying the PAEs in our dataset.

While identifying PAEs can be a complex process, it is nonetheless clear that over the past decade the amount of court cases involving PAEs has exploded in the US. According to data from RPX, the number of cases increased from 499 in 2006 to 1,312 cases in 2011.³⁷ Moreover, not only has the absolute number increased dramatically, court cases involving PAEs also account for a considerably larger share in the total number of patent court cases in the US. Chien suggests that the share almost doubled from 20% in 2000 to 36% in 2008.³⁸ The dramatic increase in the number of court cases implies that also the number of companies that are sued by PAEs in US courts has surged from around 580 in 2001 to over 5,000 in 2011.³⁹

While the empirical literature on litigation involving PAEs is growing, especially in the context of the US jurisdiction, there is little evidence on the overall economic impact of PAE litigation. One exception is the work of Tucker, who looks directly at the effect of assertion of patents by PAEs on sales and innovation by allegedly infringing companies. In particular, Tucker assesses the impact of a lawsuit filed by PAE Acacia in 2007 against 13 producers of healthcare information technology.⁴⁰ The case is in many ways representative of a typical troll lawsuit: Acacia acquired two patents from two independent inventors, who had not asserted the patent themselves, for the purpose of enforcing it afterwards in the court of Eastern District of Texas, an infamous location for PAE patent lawsuits. Tucker finds that the defendants suffered a considerable drop in sales during the trial. Furthermore, this drop cannot be explained by an equivalent drop in demand for the concerned software. Instead the evidence suggests the drop is due to a halt in innovation as the number of new software releases plummeted to zero during the lawsuit. Tucker’s research shows that PAE litigation can negatively affect producing entities regardless of the outcome of the lawsuit - the Acacia case for example eventually settled. It also helps explain the findings by Bessen et al. who find that alleged infringers experience a fall in their stock

³⁶ T. Ewing and R. Feldman, ‘The Giants Among Us,’ *Stanford Technology Law Review* 1 (2012), 1-61; accessible at <http://str.stanford.edu/pdf/feldman-giants-among-us.pdf>.

³⁷ See <http://www.rpxcorp.com/index.cfm?pageid=45>.

³⁸ C. Chien, ‘Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents,’ *North Carolina Law Review* 87 (2009), 1571-1615, at 1572.

³⁹ See <https://www.patentfreedom.com/about-npes/litigations/>.

⁴⁰ C. Tucker, ‘Patent Trolls and Technology Diffusion,’ *TILEC Discussion Paper* 2012-030 (2012); accessible at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2136955.

market price as a direct consequence of litigation taken against them by PAEs. Overall this fall in stock market value exceeds the revenues recovered by the litigating PAEs, implying a net social loss.⁴¹

It is notable that even though PAEs litigate on a global basis, the majority of the available empirical evidence on litigation involving PAEs and their associated impact on innovation, including the results discussed above, is based on litigation before US courts.⁴² Indeed, while there has been some anecdotal evidence on the activity of PAEs outside of the US, empirical evidence has largely been missing.⁴³ It is thus unclear whether patent trolls are largely confined to the US legal system or whether they pose similar challenges in other jurisdictions, notably the major European markets. It is necessary to consider the potential for similar surges in troll litigation to occur in European jurisdictions, and the UK in particular. However, the lack of available empirical evidence on PAE litigation in Europe, combined with concern over the potential negative impact of trolls upon innovation rates of European companies, has led to a great deal of uncertainty.⁴⁴ With this in mind, over the course of section 3 we provide the first thorough empirical study of PAE litigation at the PHC.

3. ASSESSING PAE LITIGATION BEFORE THE PHC

As stated above, within the sphere of global patent litigation, numerous commentators recognise that the European patent system appears to contain specific features that make PAE litigation less lucrative.⁴⁵ Notably, under the EPC system it is more difficult to obtain patents for software and business methods than it currently is under US law, which means that the problem of ‘over-broad’ patents with ‘fuzzy’ boundaries is less noticeable in Europe.⁴⁶ In applying the EPC, the European Patent Office (EPO) and the UK courts will only accept a patent on a computer program or a business method invention if it has an appropriate ‘technical’ element.⁴⁷ However,

⁴¹ J. Bessen, M. Meurer, and J. Ford, ‘The Private and Social Costs of Patent Trolls,’ *Boston Univ. School of Law, Law and Economics Research Paper* 11-45 (2011), 26-35.

⁴² M. Risch, ‘Patent Troll Myths,’ *Seton Hall Law Review* 42 (2012), 457-499.

⁴³ Opitz and Pohlmann provide a brief case study of the litigation activity of two German PAEs, Papst Licensing GmbH & Co. Kg and IPCom GmbH. M. Opitz and T. Pohlmann, ‘The Patent Troll Business: An efficient Model to enforce IPR?’ (2010); accessible at http://www.lem.sssup.it/WPLem/documents/papers_EMAEE/pohlmann2.pdf. See also generally S. Subramanian, ‘Patent Trolls in Thickets: Who is Fishing Under the Bridge?’, *European Intellectual Property Review* 30(5) (2008), 182-188, and S. Thambisetty, ‘SMEs and Patent Litigation: Policy-Based Evidence Making?’, *European Intellectual Property Review* 32(4) (2010), 143-145.

⁴⁴ The lack of comparative data on patent litigation in Europe has been noted by P. Leith, *Software and Patents in Europe* (Cambridge, UK, Cambridge University Press, 2007), at 185.

⁴⁵ A. Mayergoyz, ‘Lessons from Europe on How to Tame U.S. Patent Trolls,’ *Cornell International Law Review* 42 (2009), 241-270, at 257; S. J. Marsnik and R. E. Thomas, ‘Drawing a Line in the Patent-Subject Matter Sands: Does Europe Provide a Solution to the Software and Business Method Patent Problem,’ *Boston College International and Comparative Law Review* 34 (2011), 227-328, at 230-233.

⁴⁶ Article 52, European Patent Convention (EPC); accessible at <http://www.epo.org/law-practice/legal-texts/html/epc/2010/e/ma1.html>. Patents Act 1977 section 1(2), corresponding to Article 52(2) EPC. See also A. Mayergoyz, ‘Lessons from Europe on How to Tame U.S. Patent Trolls,’ *Cornell International Law Review* 42 (2009), 241-270, at 258-259.

⁴⁷ For UK cases see *Navitaire Inc v Easyjet Airline Co* [2004] EWHC 1725 (Ch), *Aerotel v Telco and Macrossan's application* [2006] EWCA Civ 1371, available at <http://www.bailii.org/ew/cases/EWCA/Civ/2006/1371.html>. See *Case T 0208/84 - 3.5.1* and *Symbian Limited v Comptroller General of Patents* [2008] EWCA Civ 1066. For EPO cases see *Vicom* (1986) T0208/84 O.J. EPO 14, *Pension Benefits* (2000) T0931/95, *Hitachi/Auction method* (2004) T258/03 and *Microsoft/Data transfer with expanded clipboard formats* (2006) T0424/03.

the meaning of technical in this context is of uncertain definition,⁴⁸ which means that software and business method patents are less strong and generally less prevalent in Europe than in the United States.⁴⁹

Another important reason why patent trolls are less prevalent in litigation in Europe is the absence, at present, of a unitary European patent. That is, once a patent has been granted by the EPO, it has to be validated into national patents at each national patent office. This in turn means that patents have to be enforced and invalidated in each EPC member state within which the patent is individually in force. The requirements of multi-jurisdictional litigation has important consequences for the complexity and costs involved, while the potential reward may only be an injunction which is confined to the specific member state.⁵⁰ From the perspective of a PAE, this may make undertaking litigation in Europe less attractive relative to the US. For this reason, given the fact that a Unified Patent Court (UPC) for Europe is on the horizon, some commentators have speculated whether this will have the effect of increasing or decreasing troll litigation.⁵¹ At this stage, given the fact that the details of the court's make-up have not yet been decided, it is not possible to give a firm assessment of the potential impact of the UPC. However, by analysing the strengths and weaknesses of the PHC, we aim to demonstrate the characteristics of a patent enforcement system that limits potentially socially litigation by PAEs.

3.1 CHARACTERISTICS OF THE ENFORCEMENT SYSTEM OF ENGLAND AND WALES

Patent litigation at the PHC is guided by the Civil Procedure Rules (CPR).⁵² Although infringement cases filed by patent-holders are common, and may provoke a counter-claim for revocation, it is not unusual for claimants to file suit seeking the revocation of a patent. In such a case a defendant may choose to counter-claim for infringement. In the context of the ICT sector a third type of case might involve a party seeking to challenge the 'essentiality' of a patented 'standard'. In a case where patent infringement has been proven, the possible restitution measures which may be granted by the court can include a public declaration of the defendant's infringement, an order for disclosure of information related to the allegedly infringing product, an injunction to stop the infringement, the delivery or destruction of infringing goods, the payment of damages, as well as the receipt of the relevant profits earned by the infringer.⁵³ It is generally the case that an injunction may be stayed pending an appeal.⁵⁴ Nonetheless, it is usually the case that the PHC will not grant a stay of its own proceedings pending foreign proceedings. In spite of this, the PHC will sometimes grant a stay with regard to EPO opposition proceedings, but only where the relevant circumstances require it. For example, as described below, in one case in our dataset involving a PAE, a stay was granted pending EPO opposition proceedings.

Moreover, it is generally acknowledged that patent litigation before the PHC can be a lengthy process - cases filed before the PHC often take a year or more to make it to full trial.⁵⁵ It is also often stated that litigation at the

⁴⁸ See generally J. Pila, 'Software Patents, Separation of Powers and Failed Syllogisms: a Cornucopia from the Enlarged Board of Appeal of the European Patent Office,' *Cambridge Law Journal* 70(1) (2011), 203-228; R. B. Bakels, 'Software Patentability: What are the Right Questions?,' *European Intellectual Property Review* 31(10) (2009), 514-522; D. Booton, 'The Patentability of Computer-Implemented Inventions in Europe,' *Intellectual Property Quarterly* 1 (2007), 92-116; and M. Likhovski, 'Fighting Patent Wars,' *European Intellectual Property Review* 23 (2001), 267-274.

⁴⁹ The first US case to recognise business method patents was *State St. Bank & Trust Co. v Signature Fin. Group, Inc.*, (1998) 149 F.3d 1368, 1374-1375 (Fed Cir. 1998). See also *AT&T Corporation v Excel Communications, Inc.*, (1999) 172 F.3d 1352, 1361 (Fed Cir. 1999), *In re Bilski* 545 F.3d 943, 88 USPQ 2d 1385 (2008) and *Bilski v Kappos* 000 U.S. 08-964 (2010).

⁵⁰ A. Mayergoyz, 'Lessons from Europe on How to Tame U.S. Patent Trolls,' *Cornell International Law Review* 42 (2009), 241-270, at 263-265.

⁵¹ For an assessment of the pros and cons of the UPC see House of Commons European Scrutiny Committee, *The Unified Patent Court – Help or Hindrance?* (2012); accessible at <http://www.publications.parliament.uk/pa/cm201012/cmselect/cmeuleg/1799/1799vw.pdf>.

⁵² <http://www.justice.gov.uk/courts/procedure-rules/civil>.

⁵³ C. Greenhalgh, J. Philips, R. Pitkethly, M. Rogers, and J. Tomalin, 'Intellectual Property Enforcement in Smaller UK Firms,' *Report for the Strategy Advisory Board for Intellectual Property Policy (SABIP)* (2010), 1, 50; accessible at <http://www.ipo.gov.uk/ipresearch-ipenforcement-201010.pdf>.

⁵⁴ Furthermore, pending appeal, an order for revocation is always stayed – Freshfields Bruckhaus Deringer LLP, *A Guide to Patent Litigation in Europe – England and Wales* (2011) 3-4 (Freshfields Bruckhaus Deringer LLP hereafter referred to as Freshfields)..

⁵⁵ Freshfields, *A Guide to Patent Litigation in Europe – England and Wales* (2011), 1-6..

PHC tends come at a ‘high cost’ for both claimants and defendants.⁵⁶ In addition, some commentators argue that the UK courts tend to be ‘anti-patent’ – it is often suggested that patents tend to be invalidated more frequently before the PHC when compared to other courts in other jurisdictions.⁵⁷ With respect to infringement cases, this view of the PHC might lead potential claimants, wary of having their patents invalidated, to seek to avoid litigation in the UK. On the other hand, potential defendants may regard the UK as a propitious jurisdiction for challenging the validity of patents and/or claiming non-infringement.⁵⁸ With regard to the case outcomes and costs of patent litigation at the PHC, we validate these claims empirically in a companion paper using data on all patent cases filed at the Patents Court (PHC) from 2000 to 2008.⁵⁹ In addition to our analysis of PAE lawsuits undertaken below, we also draw on these previous data where relevant.

3.2 DATA SOURCE

For our overall study, we assembled a dataset that contains all patent court cases at the PHC during the period 2000-2008, a total of 255 cases.⁶⁰ In this article we single out all cases, a total of 15, that involve a PAE, regardless of whether the PAE is the claimant or defendant. We have detailed information on the characteristics of the court cases, the parties involved and the litigated patents, which we obtained from the court records as well as a number of external databases. The appendix provides a detailed discussion of how we constructed our dataset.

The analysis of litigation involving PAEs in the context of the UK is in many ways easier than in similar work on PAEs in the US. The main reason for this is that the number of litigants is significantly smaller, which allowed us to search manually for PAEs among all 580 litigants (claimants and defendants).

As noted above, it is extremely difficult to definitely state that a certain entity is a PAE. Nonetheless, to undertake the requisite analysis there is a need to identify a broad area of ‘PAE litigation’. In order to examine the field of PAE litigation within our overall dataset, we utilised a list of 130 PAEs which was assembled based on the existing literature and databases. We also double checked any names in our list of litigating parties that we could not find in our list of PAEs but that we could not easily associate with R&D or some productive activity. By relying on the existing evidence to identify PAEs, we generally avoid having to take a definitive stance on whether a given company should be regarded as a PAE.

On the basis of the materials available to us, we decided to include eight companies contained within our dataset under the framework of ‘PAE litigation’ - Rambus Inc., Document Security Systems, Gemstar TV Guide International Inc., Inpro Licensing, Interdigital Technology Corporation, IPcom GmbH, Sisvel and Visto Corporation. Rambus Inc. and Gemstar were identified as PAEs by Fischer and Henkel.⁶¹ Goode has identified Document Security Systems as a PAE⁶² while McCurdy has noted that IPcom GmbH is a PAE.⁶³ Interdigital Inc. and Inpro Licensing were identified as PAEs by Shrestha.⁶⁴

⁵⁶ M. Burdon, ‘The UK: Can a High-Cost Country Change its Way?’, *WIPO Magazine* (2010); K. Weatherall, E. Webster, and L. Bently, ‘IP Enforcement in the UK and Beyond: A Literature Review’, SABIP Report Number EC001 (2009), 1; accessible at <http://www.ipo.gov.uk/ipresearch-ipenforcement-200905.pdf>.

⁵⁷ G. Moss, M. Jones, and R. Lundie-Smith, ‘Just How ‘Anti-Patent’ are the UK Courts?’, *Journal of Intellectual Property Law & Practice* 5 (2010), 148-157, at 148.

⁵⁸ *Ibid.*

⁵⁹ C. Helmers and L. McDonagh, ‘Patent Litigation in the UK,’ *LSE Law, Society and Economy Working Papers* 12/2012.

⁶⁰ For a detailed description of the data see C. Helmers and L. McDonagh, ‘Patent Litigation in the UK,’ *LSE Law, Society and Economy Working Papers* 12/2012.

⁶¹ T. Fischer and J. Henkel, ‘Patent Trolls on Markets for Technology – An Empirical Analysis of Trolls’ Patent Acquisitions,’ Working Paper (2011), 1-36, at 30; accessible at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1523102.

⁶² M. Goode, ‘Document Security Systems: Nothing But A Patent Troll’ (2007); accessible at <http://seekingalpha.com/article/45256-document-security-systems-nothing-but-a-patent-troll>; See also ‘DMC: A Long History of Silly, Fruitless Litigation,’ (2006); accessible at <http://www.asensio.com/Data/Pdfs/717.pdf>

We took care to exclude potential examples of ‘PAE litigation’ where we thought it appropriate. Within our list, Sisvel is an interesting example as it was created out of a pool of patents on behalf of innovative companies including Philips and France Telecom.⁶⁵ As such this case represents an example of a newer type of ‘PAE litigation’. Furthermore, Cook and Bevan argue convincingly that Sisvel is indeed a PAE.⁶⁶

Our data also include a case that involves Qualcomm Corporation, which some have argued may share some of the characteristics of a PAE.⁶⁷ However, Qualcomm’s case does not fall into our understanding of ‘PAE litigation’ and thus, is excluded. One reason for this is that the specific case in our database involves two patents on mobile telephony that were invented by Qualcomm.⁶⁸ Another reason is that in our study of the literature we found little or no reference to Qualcomm being involved in PAE litigation.

Visto (known as Good Inc. since March 2009) is a software company that, in addition to patent licensing, also performs innovative research and development.⁶⁹ Therefore, it is not a non-producing entity or patent troll. Nonetheless, we include the cases involving RIM and Visto⁷⁰ in our analysis of PAE litigation. There are several reasons for considering the disputes between these companies in our analysis. First, Visto established a direct link to a known non-practicing entity, NTP, shortly before Visto commenced litigation against RIM. At the time, NTP was already engaged in a protracted lawsuit against RIM which ended in a US\$ 612.5 million settlement in March 2006 in NTP’s favour.⁷¹ Not long before the settlement, in December 2005, NTP acquired an equity stake in Visto and entered a licensing agreement under which NTP licensed patents to Visto.⁷² Shortly thereafter, in May 2006, Visto sued RIM in the US for infringement of four patents related to wireless data transmission.⁷³ The case followed earlier infringement suits against Microsoft, Seven Networks, and Good Technology.⁷⁴ In fact, at this stage Visto has a rather lengthy history of patent assertions,⁷⁵ which is another reason to characterise cases brought by Visto within the category of ‘PAE litigation’. Third, Visto received capital investment of US\$35 million from Altitude Capital Partner, a company which specializes in IP monetization, in early 2007 - while still engaged in the lawsuit with RIM.⁷⁶ The existence of factors such as the link with NTP, the equity investment by

⁶⁵ D. P. McCurdy, ‘Patent Trolls Erode the Foundation of the U.S. Patent System,’ *Science Progress* 1 (2009) 78, at 82.

⁶⁶ S. K. Shrestha, ‘Trolls or Market-Makers? An Empirical Analysis of Nonpracticing Entities,’ *Columbia Law Review* 110 (2010), 114-160, at 160; accessible at <http://www.columbialawreview.org/assets/pdfs/110/1/Shrestha.pdf>.

⁶⁷ S. Subramanian, 186.

⁶⁸ W. Cook and D. Bevan, ‘The Ultimate Leverage Tacticians,’ *Managing Intellectual Property* 5 (2007).

⁶⁹ <http://www.decryptedtech.com/editorials/qualcomms-split-for-protection-or-aggression>

⁷⁰ *Qualcomm Incorporated v Nokia Corporation* [2008] EWHC 329 (Pat); [2008] EWHC 777 (Ch).

⁷¹ Visto created push email services for mobile devices and a browser-based application suite.

⁷² *Research in Motion UK Ltd v Visto Corporation; Visto Corporation v Research in Motion & Anor* [2007] EWHC 900 (Ch); [2007] EWHC 1921 (Pat); [2007] Info. TLR 325; [2008] EWHC 335 (Pat); [2008] Bus. LR D89; [2008] EWHC 819 (Pat); stay application appealed to Court of Appeal [2008] EWCA Civ 153; [2008] 2 All ER (Comm) 560 (cases HC06C03912 & HC06C042270). *Research in Motion UK Ltd v Visto Corp; Visto Corp v Research in Motion UK Ltd & Anor* [2008] EWHC 3025 (Pat); [2008] EWHC 3026 (Pat).

US cases were also taken, but there was a worldwide settlement between the parties in 2009; details accessible at

<http://www.bloomberg.com/apps/news?pid=newsarchive&sid=ax7YieZi0gy0> and

http://www.fr.com/files/uploads/publications/Northern-District-of-California/RIM_v_Visto_NDCA_07cv3177_2-26-2008.pdf

⁷³ <http://press.blackberry.com/press/2006/pressrelease-981.html>

⁷⁴ <http://www.prnewswire.com/news-releases/visto-and-ntp-sign-patent-licensing-agreement-55539132.html>;

<http://www.businessweek.com/stories/2005-12-14/ntp-sticks-it-to-rim>

⁷⁵ The patents are: US6023708, US6085192, US6708221, and US6151606. http://news.cnet.com/2100-1039_3-6066898.html?part=rss&tag=6066898&subj=news

⁷⁶ <http://www.prnewswire.com/news-releases/visto-files-legal-action-against-microsoft-for-misuse-of-vistos-proprietary-technology-55546717.html>; http://news.cnet.com/Good-Technology-hit-with-wireless-e-mail-patent-suit/2100-1014_3-6033319.html

⁷⁷ <http://patentexaminer.org/2012/01/visto-longtime-patent-litigant-kicks-off-2012-with-a-new-patent-suit>

⁷⁸ <http://www.altitudecp.com/portfolio.html>; <http://www.techdirt.com/articles/20070219/012917.shtml>;

<http://www.pehub.com/590/take-visto-out-of-deadpool>; <http://www.prnewswire.com/news-releases/visto-corporation-secures-35-million-in-financing-from-altitude-capital-partners-57958367.html>; http://www.forbes.com/free_forbes/2007/0507/044.html

Altitude Capital, and its track record of patent lawsuits has led some commentators to place Visto's litigious behaviour within the field of 'PAE litigation'.⁷⁷ Therefore, although it is clear that Visto cannot be categorized as a NPE,⁷⁸ in our view there are sound arguments to include the *Rim v Visto* case in our set of PAE cases. This said, the case serves to illustrate the difficulty in classifying companies as PAEs – where this is not unambiguously possible, the object of analysis has to be at the case-level and the decision ultimately requires some subjective judgment.

In addition to detailed information concerning the court cases and patents involved in the 15 cases that involve PAEs, for comparative value our study also uses detailed information on all other patent cases before the PHC, as well as of comparative patents which have not been involved in litigation. The appendix describes these additional data in more detail.

3.3 PAE CASES

In this section, we provide a detailed discussion of the 15 court cases that involve PAEs filed before the PHC between 2000 and 2008. We discuss the characteristics of these cases at three levels: at the level of the court case, at the level of the individual patents involved in the cases and at the level of the litigating parties.

With respect to the court cases, Table 1 provides an overview. It lists all 15 cases, the claimants, defendants, the claim at issue, the outcome of the case, and the year in which the case was lodged. The table shows that there has been no clear-cut increase in PAE litigation over time. While it is true that there was only a single PAE case filed in 2000, whereas there were seven cases filed in 2008, five of these seven cases revolved around the same dispute between Nokia and IPCom (see discussion below). Moreover, no new case was filed in 2007. In contrast, in 2006 there were four cases involving four different PAEs and two such cases in 2005. This means that while the number of cases increased after 2003, there was no continued increase in court cases involving PAEs.

The first case, which involved two joined applications heard as one case,⁷⁹ *Rambus v Micron* and *Rambus v Hyundai*, Rambus claimed infringement and sought an injunction, damages and delivery up with respect to an invention in the area of semiconductor technology featuring Rambus' European patent. The defendants counterclaimed for revocation. The PHC case was stayed subject to the outcome of a related EPO hearing on the validity of the relevant patent. The EPO subsequently revoked the patent and in 2004 the PHC apportioned costs between the parties as described below.⁸⁰

In a long running dispute⁸¹ between Nokia Corporation, the well-known mobile phone manufacturer, and Interdigital, a PAE, multiple patents belonging to each party were in dispute over the course of three cases. The

⁷⁷ V. E. Luxardo, "Towards a solution to the problem of illegitimate patent enforcement practices in the United States: an equitable affirmative defense of "Fair Use" in patent. *Emory International Law Review* Vol. 20(2) (2006), 791, at 805; see also.

<http://righttcreate.blogspot.com/2006/05/why-patent-trolls-win.html>; <http://mcguirelaw.com/2006/05/22/is-qualcomm-just-like-ntpvisto>; <http://allanyoung.com/2008/07/01/patent-bridge-bridge-is-falling-down>;

⁷⁸ http://www.businessweek.com/the_thread/techbeat/archives/2006/06/visto_another_m.html

⁷⁹ *Rambus Inc v Micron Europe Ltd/Rambus Inc v Hyundai Electronics UK Ltd*, Laddie J., December 19, 2000 (unreported).

⁸⁰ *Rambus Inc v Hynix Semiconductor UK Ltd and another* [2004] EWHC 2313 (Pat); [2004] All ER (D) 587 (Jul). Hynix Semiconductor UK Limited was previously known as Hyundai Electronics UK Limited. Although the EPO annulled the patent in Europe, the parties proceeded to have later disputes in the US with regard to patents and competition law, with Rambus losing both actions in May 2011 (patent) and November 2011 (antitrust) – accessible at <http://www.marketwatch.com/story/court-vacates-rambus-patent-case-win-vs-hynix-2011-05-13>;

<http://www.crowell.com/PDF/2011-05-13-Micron-v-Rambus-Fed-Cir.pdf>;

<http://www.reuters.com/article/2011/11/16/us-rambus-micron-verdict-idUSTRE7AF1XL20111116>.

⁸¹ *Nokia Corporation v Interdigital Technology Corporation*; *Interdigital Technology Corporation v Nokia Corporation* [2006] EWHC 759 (Pat); [2006] EWHC 802 (Pat); [2007] EWHC 3077 (Pat); [2008] EWHC 504 (Pat); [2008] EWHC 969 (Pat); on appeal to Court of Appeal - [2006] EWCA Civ 1618 (cases HC05C02026 & HC06C04422 which were heard together in one hearing, but split apart in other hearings). See also earlier case of HC04C01952 - stay application hearings in *Nokia Corporation v Interdigital Technology Corporation* [2004] EWHC 2920 (Pat); stay application on appeal to Court of Appeal - [2005] EWCA Civ 614 – this case eventually settled.

first case, in which Nokia sought revocation of three of Interdigital's patents, was settled -- only stay applications were heard by the PHC and CA.⁸² Following this, during 2005 Nokia took a second case to have the PHC declare 29 of Interdigital's patents as non-essential to the third generation mobile telecommunications standard in Europe (3G UMTS). The number of patents in suit was eventually whittled down to four patents by the time of the PHC judgment,⁸³ which granted to Nokia declarations of non-essentiality for three out of four patents. The PHC held that only claim six of the remaining patent would be infringed. In December 2006 Interdigital filed suit in the third case which it undertook against Nokia with respect to the alleged non-essentiality of 35 of Nokia's patents regarding the 3G UMTS. The series of cases was eventually settled during 2008.⁸⁴ Unfortunately we possess no information on the terms of the settlement agreement.⁸⁵

In the 2006 case of *Research in Motion v Inpro*⁸⁶ (a case which T-Mobile joined as Part 20 defendants⁸⁷) the facts concerned a patent on a hand-held, or 'field', computer featuring a small display which could access the Internet. The PHC and the Court of Appeal held the patent invalid on the ground of obviousness.⁸⁸

In *Sandisk v Koninklijke Philips*,⁸⁹ another case which arose during 2006, one of the defendants was Sisvel,⁹⁰ an Italian PAE set up by the other defendants -- Philips, France Telecom, IRT, and TDF -- to hold a pool of patents related to MPEG audio technology, and MP3 players in particular. Sisvel claimed that four of its patents were essential to the manufacture of Sandisk's MP3 audio players. However, Sandisk refused Sisvel's offer of a licence for the use of the patents. Following this refusal, Sisvel then attempted to enforce the patents by utilising the European Border Detention Regulation to block the import of Sandisk's MP3 audio products into the EU. At the High Court Sandisk took both an action alleging breach of competition law and an action relating to Sisvel's patents. Only the patent action is relevant to our study.⁹¹ With regard to the patent issues the PHC gave judgment on 4 initial applications - it struck out Sandisk's case seeking a declaration that the 4 patents were 'non-essential' to MP3 players, ordered Sandisk to disclose product descriptions of its MP3 players, ordered a separate trial of the defendants' application to amend one of its patents, and allowed Sandisk to amend its grounds of invalidity to plead that the invention was not patentable. However, the case did not reach a full trial hearing at the PHC because Sandisk eventually settled and took a licence from Sisvel.⁹²

The case of *European Central Bank v Document Security Systems*⁹³ represents another case where the validity of a PAE's patent was challenged before the PHC. Document Security Systems (DDS) is a PAE which holds patents

⁸² *Nokia Corporation v Interdigital Technology Corporation* [2004] EWHC 2920 (Pat); stay application on appeal to Court of Appeal - [2005] EWCA Civ 614.

⁸³ *Nokia Corporation v Interdigital Technology Corporation* [2007] EWHC 3077 (Pat).

⁸⁴ The settlement was noted in *The EE Times* (J. Walko, 'Nokia, InterDigital settle some IP disputes,' 7 February 2008); accessible at <http://www.eetimes.com/electronics-news/4192537/Nokia-InterDigital-settle-some-IP-disputes>.

⁸⁵ The parties settled with regard to UK proceedings, but cases between the same parties continue in the US as of August 2012 -- see <http://www.intomobile.com/2008/07/07/nokia-and-interdigital-settle-patent-case-in-uk/>; <http://www.businessweek.com/news/2012-08-01/interdigital-wins-u-dot-s-dot-appeal-in-patent-fight-with-nokia>.

⁸⁶ *Research in Motion UK Ltd v Inpro Licensing S.A.R.L. (v (i) Research in Motion UK Limited (ii) T-Mobile (UK) Limited (Part 20 defendants)* [2006] EWHC 70 (Pat); on appeal [2007] EWCA Civ 51.

⁸⁷ Part 20 defendants are defendants who are brought into the case via a counter claim -- in this case the counter claim was made by Inpro for infringement against both RIM and T-Mobile. See http://www.justice.gov.uk/courts/procedure-rules/civil/rules/pd_part20.

⁸⁸ Inpro sought to enforce their patent across the EC, but was unsuccessful in another action brought in the German Court in Munich where their German patent was invalidated. There is also a US case which found no infringement; accessible at <http://press.rim.com/newsroom/press/2006/pressrelease-1041.html> and <http://caselaw.findlaw.com/us-federal-circuit/1058146.html> http://www.kirkland.com/files/Inpro_II.pdf.

⁸⁹ *Sandisk Corporation v Koninklijke Philips Electronics N.V., France Télécom S.A., TDF, Institut Für Rundfunktechnik GmbH, Societa Italiana Per Lo Sviluppo Dell'Elettronica S.P.A.* [2006] EWHC 3100 (Pat).

⁹⁰ Società Italiana per lo Sviluppo dell'Elettronica spa.

⁹¹ With regard to the competition law action, the PHC granted judgment in favour of defendants - it held it had no jurisdiction to determine the substantive competition law-based claim. *Sandisk Corporation v Koninklijke Philips Electronics N.V., France Télécom S.A., TDF, Institut Für Rundfunktechnik GmbH, Societa Italiana Per Lo Sviluppo Dell'Elettronica S.P.A.* [2007] EWHC 332 (Ch).

⁹² Case was settled but financial terms not disclosed - <http://www.bizjournals.com/sanjose/stories/2007/03/12/daily71.html>. See also S. Subramanian, 'Patent Trolls in thickets: Who is Fishing Under the Bridge?', *European Intellectual Property Review* 30(5), (2008), 182-188, at 186.

⁹³ *European Central Bank v Document Security Systems Inc* [2007] EWHC 600 (Pat); [2008] EWCA Civ 192.

related to banknote anti-counterfeiting technology. The DDS patent was ultimately held to be invalid by the PHC in 2007 due to the issue of added matter, a ruling which was upheld by the Court of Appeal in 2008.⁹⁴

During 2008, judgment was granted in *RIM v Visto* by the PHC in favour of RIM. The PHC ruled that the Visto patent was invalid. Nevertheless, Visto “won” on the issue of infringement – the PHC stated that had the patent been valid it would have been infringed. Furthermore, following a counterclaim by Visto, RIM conceded that two of its patents were invalid.⁹⁵ A later case taken by RIM to revoke three of Visto’s divisional patents, with Visto counterclaiming to revoke four RIM patents, was settled.⁹⁶

The 2009 PHC case of *Gemstar v Virgin*⁹⁷ related to three of Gemstar's European patents, which covered various aspects of electronic programme guides (EPGs) for TV set top boxes. In 2009, the PHC found that all three patents were invalid for a variety of reasons including excluded subject matter, lack of novelty and lack of inventive step. In 2011 the Court of Appeal affirmed the decision of the PHC.⁹⁸

Another example in our dataset saw a PAE, IPCom, engage in a series of five cases⁹⁹ with Nokia during hearings in 2009 and 2010.¹⁰⁰ Nokia sought revocation of IPCom's patents¹⁰¹ before the PHC. IPCom responded by alleging infringement by Nokia concerning the same patents. Four out of five of the cases settled. With regard to the case which did proceed to judgment, both the PHC and the Court of Appeal held that two of IPCom’s patents were invalid - one for obviousness and one for lack of novelty and obviousness. The two parties have continued to litigate against each other, with the most recent case decided in February 2012.¹⁰² However, these later cases fall outside our dataset because they were filed post-2008. Nonetheless, the existence of recent cases, notwithstanding earlier settlements, illustrates the complexity at the heart of PAE litigation, as well as potentially ongoing nature of, these types of cases.

Regarding general conclusions on the subject of PAEs, there were in total 15 patent cases filed during the period 2000-2008, a relatively small number. Eight PAEs were involved – Rambus, Interdigital, Visto, Inpro, IPCom, DDS, Gemstar and Sisvel. Strikingly, in most cases the revocation of the PAE’s patents was sought – only two out of the 15 cases involved an initial infringement claim at the PHC by a PAE (the cases filed by Rambus and Gemstar). On the other hand, eleven cases were filed seeking to revoke the patent(s) held by PAEs – see Table 2. One additional case was filed seeking to declare the PAE patents non-essential to the relevant industry standard and one more was filed by a PAE to declare a producing company’s patents non-essential (both cases were part of the *Nokia v Interdigital* dispute).

⁹⁴ ECB also filed claims to invalidate the Patent in France, Germany, the Netherlands, Austria, Italy, Spain, Luxembourg, and Belgium, in an attempt to completely invalidate the patent in all nine jurisdictions. To date, the Patent has been held to be valid in Germany.

<http://www.thefreelibrary.com/Document+Security+Systems+to+Move+Forward+with+Infringement+Suit+vs....-a0172571704>;
<http://kluwerpatentblog.com/2010/12/22/ecb-cashes-in-at-dutch-coa-dss%E2%80%99-patent-revoked/>.

⁹⁵ *Research in Motion UK Ltd v Visto Corporation; Visto Corporation v Research in Motion & Anor* [2007] EWHC 900 (Ch); [2007] EWHC 1921 (Pat); [2008] EWHC 335 (Pat); [2008] EWHC 819 (Pat); stay application appealed to Court of Appeal [2008] EWCA Civ 153 (cases HC06C03912 & HC06C042270).

⁹⁶ *Research in Motion UK Ltd v Visto Corp; Visto Corp v Research in Motion UK Ltd & Anor* [2008] EWHC 3025 (Pat); [2008] EWHC 3026 (Pat). US cases were taken as well, but there was a worldwide settlement between the parties in 2009; accessible at

<http://www.bloomberg.com/apps/news?pid=newsarchive&sid=ax7YicZI0gy0>;
http://www.fr.com/files/uploads/publications/Northern-District-of-California/RIM_v_Visto_NDCA_07cv3177_2-26-2008.pdf.

⁹⁷ *Gemstar- Tvguide International Inc & Ors v Virgin Media Ltd & Anor* [2009] EWHC 3068 (Ch); [2009] EWHC 3552 (Pat).

⁹⁸ *Gemstar- Tvguide International Inc & Ors v Virgin Media Ltd & Anor* [2011] EWCA Civ 302.

⁹⁹ Although 6 cases were filed, 2 were joined and heard as one case – we count this as one case in our dataset.

¹⁰⁰ *Nokia GMBH v IPCom GmbH & Co KG; IPCom GMBH & Co KG v Nokia UK Limited; Nokia OYJ (Nokia Corporation)* [2009] EWHC 3482 (Pat); [2010] EWHC 789 (Pat); [2010] EWHC 790 (Pat); on appeal [2011] EWCA Civ 6.

¹⁰¹ We are grateful to Bird & Bird LLP for providing us with the patent numbers for this case. The relevant numbers were not listed in the court records available to us.

¹⁰² Nokia and IPCom are still engaged in litigation before the UK courts as of Feb 2012: *Nokia OYJ v IPCom GMBH & Co KG* [2011] EWHC 1470 (Pat) - HC10 C01233 and *Nokia GMBH v IPCom GMBH & Co. KG* [2012] EWHC 225 (Pat) - HC09 C04868. There have also been recent cases in Germany <http://www.ipeg.eu/?p=2445>;

<http://www.electronista.com/articles/12/04/25/epo.revokes.patent.from.ipcom.for.3g.connections/>.

Six PAE cases end with a full judgment by the PHC, with one further judgment acknowledging the outcome of EPO proceedings. The corresponding case outcomes are striking: only with respect to one minor issue in a single case, during the dispute between Nokia and Interdigital, was infringement found by the court, and this was in the context of a case where three other PAE patents were found to be non-essential and not infringed. Instead, in five cases the patents were revoked by the UK courts. In addition, the patent in dispute in the *Rambus v Micron* and *Rambus v Hyundai* case that was stayed at the PHC was revoked by the EPO. When the UK and EPO rulings are taken together, there is an overall revocation rate of 85% for cases that ended with a judgment.¹⁰³ This figure is substantially larger than the numbers found for court cases in the US involving PAEs. Risch (2012) for example finds an invalidation rate of 28% of PAE cases that ended with a judgement on merits while Shresta (2011) only finds 16% of PAE patent cases to end with the invalidation of a PAE patent.

Nevertheless, in eight cases out of 15 cases the outcome was a settlement, which most likely involved a payment to the PAE in each case (as in the settlement involving Sandisk and Sisvel).¹⁰⁴ However, of these eight cases which were settled, four were effectively part of the same long-running dispute between Nokia and IPCom and another two were part of the dispute between Nokia and Interdigital. Therefore, if cumulative ‘disputes’ between parties rather than individual cases are examined, we find that four out of eight disputes between PAE cases and other companies ended with a settlement.

Interestingly, with respect to the five *Nokia v IPCom* cases and the three *Nokia v Interdigital* cases in our dataset, in each saga the PHC issued one ruling. In *Nokia v IPCom*, two IPCom patents were revoked by the PHC, while In *Nokia v Interdigital*, three out of four Interdigital patents were declared non-essential and non-infringed. With respect to both of these sagas, it is possible that these rulings, which largely went against the PAEs, were influential on the eventual settlement agreements and would suggest settlements in favour of Nokia rather than the PAEs.

Table 2 compares the claims in the PAE cases summarised above with the population of patent cases filed at the PHC during 2000-2008. In the population of cases, the most frequent claim is for the infringement of a patent (45%), whereas in PAE cases, as discussed above, by far the most frequent claim is for the revocation of a patent (73%). This suggests that companies may proactively attempt to invalidate patents owned by PAEs in the UK. Similarly, it is possible that a company, having already been targeted by a PAE in another jurisdiction, may make the strategic decision to use litigation before the PHC of England and Wales in order to invalidate in the UK the equivalent of the PAE patents asserted against the company in the other jurisdiction.

Regarding the case outcomes, Table 3 shows that for the 240 non-PAE cases during 2000-2008, by far the most likely outcome is the revocation of a patent regardless of the claim of the action (revocation occurs in 25% of infringement cases and 43% of revocation cases). The total absolute numbers are considerably lower for PAE cases; hence a 50% revocation rate for infringement claims should be interpreted with caution. Indeed, it is interesting to note that all revocation cases ended either with the invalidation of a patent or a settlement - four out of 11 revocation cases (36%) ended with the invalidation of a patent by the PHC and the remainder settled. This means that revocation is the most likely outcome of a judgment at the PHC regardless of whether the case involves a PAE or not. Further to this, it is striking that the settlement rate for revocation claims is considerably larger in cases that involve PAEs than in the population of patent cases. In addition, regarding appeals for all non-PAE cases during 2000-2008, from our analysis¹⁰⁵ we know that about a third of all non-PAE cases proceeded to the Court of Appeal, where in 80% of cases the judgment of the PHC was upheld. Regarding

¹⁰³ This finding disagrees with Hosie’s claim that PAEs do not enforce weak patents. S. Hosie, ‘Patent Trolls and the New Tort Reform: A Practitioner’s Perspective,’ *A Journal of Law and Policy for the Information Society* 4 (2008), 75-87.

¹⁰⁴ The settlement was noted by Sisvel on its website - <http://www.sisvel.eu/index.php/sisvel-news/160-sisvel-and-audio-mpeg-grant-sandisk-an-mpeg-audio-patents-license>. See also *Silicon Valley/San Jose Business Journal* (‘SanDisk, Sisvel settle patent dispute,’ 16 March 2007); accessible at <http://www.bizjournals.com/sanjose/stories/2007/03/12/daily71.html>.

¹⁰⁵ This is established in a companion paper C. Helmers and L. McDonagh, ‘Patent Litigation in the UK,’ *LSE Law, Society and Economy Working Papers* 12/2012.

appeals in PAE cases, 100% of the initial decisions of the PHC were upheld by the CA, though this statistic also reflects the fact that only a small number of PAE cases were appealed from the PHC to the CA. Overall the high rate of invalidation of patents at the PHC would probably discourage PAE litigation.

In light of the high likelihood of revocation of patents owned by PAEs, it is worth taking a closer look at the litigated patents and considering whether the patents concerned are of particularly low quality. Figure 1 plots the age (measured as the difference between the priority date of a patent and the beginning of the law suit) distributions of the patents in dispute in the 15 PAE cases and those in the other 240 cases heard by the PHC between 2000 and 2008.¹⁰⁶ The figure shows that neither patents aged ≤ 5 years nor >20 years are involved in PAE disputes. Most of the patents in PAE lawsuits are either between six and ten years or 16 and 20 years old, whereas in the population of court cases, most patents are between six and 15 years old. In any case, this evidence suggests that these patents have been visible to potential infringers for a substantial amount of time. By this rationale, it is logical to conclude that any uncertainty concerning the protected technologies ought to have disappeared by the time the patents are enforced.¹⁰⁷

As noted above, the available evidence in the existing literature suggests that patents asserted by PAEs tend to be overwhelmingly ICT related, with most patents covering inventions in the areas of telecommunication and digital communication.¹⁰⁸ Figures 2 and 3 confirm that the patents involved in the PAE High Court cases are overwhelmingly concentrated in the ICT sector. This is significant because, as described above, ICT patents have certain distinctive characteristics which make them attractive to trolls. The PHC data provide a particularly striking illustration of the concentration of patents involved in PAE litigation in ICT because overall the majority of the cases in the population of lawsuits heard by the PHC during 2000-2008 involve pharmaceutical patents. Hence, while pharmaceutical patents represent the largest share of patents in the population of PHC cases generally, there is not a single patent protecting chemical or pharmaceutical inventions found within our set of PAE cases. Figure 3 breaks down the technologies protected by the patents involved in the 15 PAE lawsuits. Little surprisingly, most patents protect inventions concerning the transmission of digital content.

In addition, regarding the quality of PAE patents, it is acknowledged that directly assessing 'patent quality' is difficult.¹⁰⁹ Instead of attempting to qualitatively assess PAE patents individually, in our study we indirectly assess quality by measuring patent value. We do this because patent quality and value are positively correlated,¹¹⁰ therefore by comparing the value of the patents involved in the PAE suits with other litigated and non-litigated patents, we can gain some insights as to the overall quality of the patents. Table 3 compares the PAE patents with set of control patents. We measure patent value by a range of metrics established in the literature, including forward citations, references to prior art in form of patents (backward citations) and the non-patent literature, the size of the patent family, the number of inventors, and the number of different IPC subclasses as a rough measure of patent breadth. The comparison with the overall population of litigated patents suggests that the patents involved in PAE lawsuits do not differ in a statistically significant way for all value metrics, except for

¹⁰⁶ The set of patents involved in PAE cases excludes the 35 patents owned by Nokia whose standard essentiality was contested by Interdigital.

¹⁰⁷ However, Appendix Table 1 serves as a note of caution with regard to the 'visibility' of the patents as more than half of all patents do not show the PAE as the legal owner in EPO's Espacenet online database (<http://worldwide.espacenet.com>).

M. Reitzig, J. Henkel, and F. Schneider, 'Collateral Damage for R&D manufacturers: How Patent Sharks Operate in Markets for Technology,' *Industrial and Corporate Change* 19 (2010), 947-967.

¹⁰⁹ Definitions in the legal literature regard patent quality as the degree to which a granted patent satisfies the legal patentability requirements at a given patent office and is likely to withstand invalidity proceedings in court or before an administrative body – see R. P. Wagner, 'Understanding Patent-Quality Mechanisms,' *University of Pennsylvania Law Review*, 157 (2009), 2135-2173; and S. W. Graf, 'Improving Patent Quality through Identification of Relevant Prior Art: Approaches to Increase Information Flow to the Patent Office,' *Lewis & Clark Law Review* 11 (2007), 495-519. This suggests that the quality of a given patent could be measured by the outcome of an infringement/invalidation suit. However, this approach is of limited use in this context because we are interested in assessing whether a given patent that has been invalidated was indeed of low quality.

¹¹⁰ Patent value is determined by a larger set of factors than patent quality - see discussion in footnote 95 above.

backward citations and the number of IPC subclasses. Patents involved in PAE cases tend to have fewer backward citations, which may indicate that they are less derivative of existing technologies. In contrast, they tend to cover a larger number of IPC subclasses, which may be an indication that they tend to be broader. Nevertheless, this seems to suggest that these patents are not of obviously less value, and therefore of less quality, than the average litigated patent before the PHC. However, we know that most patents that are litigated before the PHC protect pharmaceutical inventions, which may imply that this is the wrong comparison. In order to strengthen our comparison, we draw a control sample of patents which protect similar ICT technologies that have not been involved in litigation.¹¹¹ The results are striking: the lower panel in Table 4 suggests that these litigated patents are of higher value than those not litigated according to all value metrics (except for the number of inventors).

Therefore, two primary conclusions emerge from our comparisons at the patent-level. Firstly, according to our value metrics, patents asserted by PAEs are not significantly different from the average patent involved in lawsuits before the PHC between 2000 and 2008. This is interesting especially because we know that the patents involved in PAE disputes protect mostly inventions on digital data transmission whereas most of the other litigated patents are on pharmaceutical compounds and processes. Secondly, these patents are nevertheless more valuable than non-litigated patents that protect similar ICT inventions. This indicates that PAEs judiciously select the patents that they enforce within the set of ICT patents potentially available to them.¹¹² Still, if it is true that the patents involved in PAE litigation are more valuable, and therefore of greater quality, than comparable non-litigated patents, the fact that there is nonetheless still a high likelihood of their revocation by the PHC is surprising.

Finally, we have a closer look at the firms involved in litigation with PAEs and compare them to other firms that were involved in patent litigation albeit not involving a PAE. Table 5 compares the distribution of companies involved in PAE cases with the population of companies involved in lawsuits before the PHC between 2000 and 2008.¹¹³ The table shows that two thirds of the 12 companies (see Appendix Table A2)¹¹⁴ that engaged in a lawsuit with a PAE are in the high-tech industry. Two companies are in the telecommunication sector, which are telecom companies T-Mobile and Nokia Siemens Networks. Another two companies are classified in the “Other Services” and “Business Services” categories, which are the Virgin Media companies. The distribution reflects the striking difference with the population of court cases already pointed out at the patent level: there are no pharmaceutical or chemical companies involved in litigation with PAEs whereas in the population of court cases, pharmaceutical and chemical companies account for around a third of litigating parties. In contrast, there are relatively fewer telecommunication and high-tech companies in the population of litigants.

3.4 ASSESSING THE COSTS OF PATENT LITIGATION FOR PAES

It is generally acknowledged that the costs of taking a patent case at the PHC are substantial.¹¹⁵ Regarding specific cost sums, from the available data on all patent cases at the PHC during the period 2000-2008 we

¹¹¹ We draw a random sample of control patents that share the same priority year, authority, and IPC subclasses with the litigated PAE patents.

¹¹² This is confirmed by case studies, see for example M. Opitz and T. Pohlmann, ‘The Patent Troll Business: An efficient Model to enforce IPR?’ (2010), accessible at http://www.lem.sssup.it/WPLem/documents/papers_EMAEE/pohlmann2.pdf.

¹¹³ We were unable to find SIC codes for 11 out of 538 registered companies (i.e. 2%).

¹¹⁴ This comparison omits the European Central Bank.

¹¹⁵ Jackson L.J., *Civil Litigation Costs Review: Final Report* (December 2009), 248-257; accessible at <http://www.ciarb.org/information-and-resources/2010/01/22/Review%20of%20Civil%20Litigation%20Costs%20Final%20Report.pdf>. See also K. Weatherall, E. Webster, and L. Bently, *IP Enforcement in the UK and Beyond: A Literature Review* (2009), at 40; accessible at <http://www.ipo.gov.uk/ipresearch-ipenforcement-200905.pdf>. J. Phillips, ‘IP Litigation, the New Money-Spinner,’ *Journal of Intellectual Property Law & Practice*, 1(8) (2006), 497.

estimate that the costs, encompassing both sides' expenses, of a full trial at the PHC can amount to between £1million and £6million.¹¹⁶

Moreover, it is important to note that in England and Wales the substantive legal issues and the issues of costs and damages are dealt with separately. In addition, under CPR section 44 the unsuccessful party is required to pay the other party's costs. However, in the context of patent litigation, it is often the case that this rule is not strictly applied.¹¹⁷ Nonetheless, as a general rule it is the case that the successful party will recover about two-thirds of its legal fees, depending on how the issues were won and lost.¹¹⁸ However, not all cases proceed, post-trial, to a full hearing on costs - cost issues are often settled between the parties.¹¹⁹ For this reason, it is often the case that there are no court records available regarding the specific amount of costs and damages allotted to each side in each case. Consequently, the analysis of the costs data for PAEs undertaken here is based upon an evaluation of the records which are available.

As noted above, following two joined applications,¹²⁰ *Rambus v Micron* and *Rambus v Hyundai*, the patent actions were stayed subject to the outcome of a related EPO hearing, which subsequently revoked Rambus' patent. Following the EPO ruling, the PHC assessed the costs payable to the defendants. Micron's costs were estimated at £698,000 while Hynix's (previously known as Hyundai Electronics) costs were noted at £233,000. The PHC stated that Rambus was liable for both defendants' costs but did not make a ruling on the overall amount payable to each by Rambus. However, Rambus was ordered to pay £125,000 to each defendant as interim costs resulting from the stay.¹²¹ Regarding the costs of cases involving PAEs, the PHC case of *Gemstar v Virgin* is of note. The PHC conducted a hearing on cost allocation. The PHC heard that the defendants' costs up and including the High Court judgment, after an 11 day hearing, were estimated at £2.4 million, while the claimants' costs were estimated at £1.9 million. Regarding the substantive issues of the PHC case, Virgin won most issues, crucially on the invalidity of the patents, and only lost on a small number of minor prior art issues. Consequently, the PHC projected that there should be a 13.5% costs deduction. Therefore 86.5% of Virgin's costs ought to be payable by Gemstar to Virgin (86.5% of £2.4 million is £2,076,000).

At the high end of the costs scale, the costs arising from the joined cases involving RIM and Visto are of note. The PHC trial lasted six days, though there were a number of other applications and hearings throughout the saga, including a CA hearing regarding a stay application which lasted one day. At the costs allocation hearing, the PHC stated that the costs of the case ought to be divided proportionate to the issues won at trial. In this respect, the PHC stated that Visto ought to pay RIM 66% of RIM's total assessed costs and RIM ought to pay Visto 51% of Visto's total assessed costs. However, RIM's costs were estimated at nearly £6 million while Visto's costs were estimated at £1.6 million. The PHC acknowledged that there was a great disparity between the cost levels of each side, but declined to place a cap on costs.

As stated above, a series of cases occurred which involved a PAE, IPCom, and Nokia. At a costs allocation hearing in 2010 the PHC stated that it was clear that Nokia had won on most of the substantive issues, mainly concerning the invalidity of two patents, during the 11-day trial. With regard to the series of cases, the PHC heard that Nokia's costs had reached £1.3 million by the end of January 2010, whereas IPCom's had reached

¹¹⁶ We substantiate this claim in a companion paper C. Helmers and L. McDonagh, 'Patent Litigation in the UK,' *LSE Law, Society and Economy Working Papers* 12/2012. The figure is in line with Freshfields, *A Guide to Patent Litigation in Europe – England and Wales* (2011), 8. and G. Duncan, "Challenging Competitors' Patents in the UK - Patent Revocation" *D Young & Co Intellectual Property Articles & Updates* (2010); accessible at <http://www.dyoung.com/article-patentrevocation>.

¹¹⁷ *Smithkline Beecham v Apotex* [2004] EWCA Civ 1703; *Actavis v Merck* [2007] EWHC 1625 (Pat); *Generics v Lundbeck* [2007] EWHC 1606 (Pat) and *Monsanto Technology v Cargill International* [2007] EWHC 3113 (Pat).

¹¹⁸ Freshfields, *A Guide to Patent Litigation in Europe – England and Wales* (2011), 8.

¹¹⁹ Freshfields, *Patent Litigation in Europe – England and Wales* (2007), 1.

¹²⁰ *Rambus Inc v Micron Europe Ltd/Rambus Inc v Hyundai Electronics UK Ltd*, Laddie J., December 19, 2000 (unreported).

¹²¹ *Rambus Inc v Hynix Semiconductor UK Ltd and another* [2004] EWHC 2313 (Pat); [2004] All ER (D) 587 (Jul). Hynix Semiconductor UK Limited was previously known as Hyundai Electronics UK Limited.

approximately £300,000.¹²² The PHC stated that Nokia was entitled to its costs, though the court did not apportion a specific percentage. For IPCom this would have come as a sharp blow because although its own costs (£300,000) were much smaller than Nokia's (£1.3 million), as the losing party it was liable to pay the other side's costs as well as its own. In a separate hearing on the same day, the PHC also had to discuss costs for other related cases in the series. Floyd J. stated: "The costs are very substantial, exceeding on both sides the sum of £2 million. Nokia's costs come in close to £3 million."¹²³

The PHC awarded Nokia a 66% share of its costs. Considering that its overall costs were around £3 million, IPCom were likely to be liable to pay Nokia around £2 million.

In contrast to the US legal system where costs are not recoverable, for PAEs, losing the substantive issues of validity in an infringement case before the PHC can have serious consequences. Even if the PAE can keep its own costs at a low level, if the PAE loses the case it will probably have to pay a large proportion of the other party's costs, which may be substantial. In the cases discussed above, we observe that the PAEs were indeed liable to the payment of substantial amounts to the winning parties. This may represent an important restraining factor with regard to the ability of PAEs to sue in the UK – especially relative to the US where costs are non-recoverable. The available evidence for the US shows that PAEs lose a substantial share of their lawsuits, which is also much larger a fraction than that of producing companies,¹²⁴ which means that such cost-shifting could have a potentially large effect on PAEs' ability to litigate.¹²⁵

It is also interesting to note that this characteristic of the enforcement system in England and Wales seems to outweigh the potential positive effect of a high-cost system on attracting PAE litigation. PAEs may find it easier to file nuisance lawsuits in jurisdictions in which engaging in a lawsuit is extremely costly because alleged infringers may prefer a slightly less costly settlement with a certain outcome to a potentially ruinous protracted legal dispute. Hence, in principle, the enforcement system of England and Wales could attract PAEs. But our empirical evidence suggests that the combination of a high likelihood of losing a case and the liability to paying the winner's (substantial) costs of engaging in the legal action outweighs any benefits that a high-cost system may entail for PAEs.

4. CONCLUSION

We analyse all patent court cases involving PAEs before the PHC during 2000-2008 to show that the PHC does not provide a welcome venue for PAEs to undertake litigation. Firstly, the majority of cases involving a PAE which reach a judgment result in a ruling invalidating the patent. In cases involving PAEs during 2000-2008, only in one minor part of one case was a PAE patent found to be valid. The likelihood of a patent being declared invalid by the PHC is therefore high, especially so in comparison to the available evidence on PAE litigation in the US. In our analysis, we argue that the costs regime in the legal system of England and Wales, which requires that the losing party must pay the costs of the other side, acts as another break on PAE litigation. In the PHC enforcement system, a PAE which loses a case may have to pay a substantial amount of money to pay the costs

¹²² *Nokia GMBH v IPCom GMBH & Co KG* costs hearing [2010] EWHC 790 (Pat).

¹²³ *Nokia GMBH v IPCom GMBH & Co KG* costs hearing [2010] EWHC 791 (Pat), paragraph 1.

¹²⁴ J. Allison, M. Lemley, and J. Walker, 'Patent Quality and Settlement among Repeat Patent Litigants,' *The Georgetown Law Journal* 99 (2011), 677-712.

¹²⁵ This potential seems to have been recognized by Rep. Peter de Fazio and Rep. Jason Chaffetz who proposed a bill in August 2012 in the US House of Representatives (the 'Saving High-Tech Innovators from Egregious Legal Disputes (SHIELD) Act of 2012') that would force claimants to pay defendants' legal costs in case they lose their action and the court finds that "the party alleging the infringement of the patent did not have a reasonable likelihood of succeeding." This mechanism is limited to computer hardware or software patents (as defined by the bill). See https://www.eff.org/sites/default/files/SHIELD_ACT_0.pdf and <http://www.globallegalpost.com/corporate-counsel/shield-act-set-to-defend-tech-companies-from-patent-trolls/>.

of the other side even if its own costs are kept low. When taken together, the high likelihood of having a patent invalidated combined with the large costs which tend to accrue if a case is lost appear to discourage litigation by PAEs. In fact PAE litigation at the PHC is relatively uncommon when compared to other jurisdictions such as the US:¹²⁶ only 15 out of 255 patent cases involved a PAE, where a substantial number of these cases were between the same parties. We only find 8 PAEs to have been involved in litigation before the PHC during the nine-year period studied, and in most cases these were not infringement cases but cases where manufacturers attempted to 'clear the way' by bringing patent revocation cases before the court.¹²⁷ As a result, there is good reason to assume that within the UK the problems associated with PAEs stifling innovation are somewhat mitigated (at least for the period of our study). Nevertheless, eight out of fifteen cases involving PAEs resulted in a settlement, which shows that even with respect to PHC cases PAE litigation may result in lucrative financial settlements. With regard to the characteristics of the enforcement system, our study demonstrates that the provision of a court which undertakes an in-depth analysis of patent validity, combined with a 'loser pays' costs approach, helps to discourage PAE litigation. These two elements, among others, appear to work against the possibility that a surge in PAE litigation, such as that which has already occurred in the US, will occur in Europe. This ought to be taken into account with respect to the proposed Unified Patent Court, the details of which are currently being debated by European policy makers.

¹²⁶ C. Chien, 'Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents,' *North Carolina Law Review* 87 (2009), 1571-1615, at 1572.

¹²⁷ Most of the litigated patents have been granted by the EPO. Yet, since EPO patents have to be validated separately in each country signatory to the European Patent Convention, the invalidation of an EPO patent by a court in one jurisdiction has no direct implications on its validity in any of the other jurisdictions. This means that a PAE patent that has been invalidated by the PHC can still be enforced, for example, in Germany (provided it has been validated there). Nevertheless, companies can use the favourable PHC ruling in parallel proceedings to press for favourable settlements in other jurisdictions. This, in turn, implies that companies may not be primarily interested in 'clearing the way' in the UK, but use the enforcement system of England and Wales strategically for other purposes.

Appendix - Data description

We collected data on all court cases filed between 2000 and 2008 at the PHC, the Court of Appeal and the House of Lords/Supreme Court. Due to the possible long lag time between the filing of a case and a final decision, in particular if the decision rendered by the first instance is appealed, we can only include court cases that were filed before 2009 to avoid the presence of a substantial number of potentially still pending cases in our dataset. Given our interest in patent litigation, we exclude all cases that represent an appeal to an administrative decision taken by the UKIPO. We complemented the data with data from court cases heard before the PCC (Central London County Court) which we obtained from the UKIPO. Because the information on cases at the PCC had to be collected directly from the PCC, we only have detailed information on cases heard in 2007 and 2008.

We collected the data on court cases at the PHC from a range of sources. Our starting point was the Patents Court Diary which lists all cases which are scheduled for a hearing or an application including, for example, a case management conference.¹²⁸ This means, in principle, the Diary contains all cases for which the claim form has been served and to which the defence has responded. The Diary provides basic information on court cases, including the case number, the names of claimants and defendants (usually only the first claimant and defendant), their legal representatives, the date the hearing was fixed, as well as the hearing dates and the duration of the hearing. In a number of cases, the Diary also notes additional information, such as whether a case was discontinued because of a settlement or stay. We use the information from the Diary to search for court records on the website of the British and Irish Legal Information Institute,¹²⁹ the case database of Lexis Nexis,¹³⁰ as well as Thomson Reuters's Westlaw database.¹³¹ However, these sources did not offer any records for a number of cases (mostly those settled at an early stage). For these cases we searched additional sources, such as media websites, blogs or the websites of legal representatives for information.

The most basic information that we collected for all cases includes the names of all litigating parties, their country of residence (the country in which a firm is registered), the type of litigating party (e.g. company, individual, etc.), the year the claim form was served, and the type of IPR in dispute. Additional detailed information on the case was collected for all court cases that involved a patent. The information was collected and input into a standardised format.¹³² The standardised template contains information on the proceedings/decision type, litigating parties, the IPR in dispute, the claims made in the case, the relief applied for, the outcome/content of the judgment, and any information on the value, costs, and potential damages associated with the case. We also include information on related cases within the England and Wales jurisdiction as well as abroad if mentioned in the available court records.

While our datasets represent the most comprehensive database gathered so far on the subject of patent litigation in the UK, at least two caveats are in order.¹³³ Firstly, obviously the court data provides us only with data on cases that have made it to court. Relying on the court diary, however, means that we only observe cases that not only have been filed to the court, but were allowed to proceed at least to the case management stage. There is no information available on the number of cases that are dropped between the serving of the claim form and the case appearing on the diary. However, informal conversations we conducted with practitioners lead us to believe that this figure is negligible. Secondly, since we had to assemble the information with regard to each court case, often relying on different sources, in many cases the available court records are incomplete. For example, while we may have the judgment of the PHC, we may not have records for all preceding applications. There is nevertheless a core set of variables which we were able to obtain for all cases. However, the investigation of

¹²⁸ http://www.hmcourts-service.gov.uk/cms/list_patents_diary.htm.

¹²⁹ <http://www.bailii.org>.

¹³⁰ <http://www.lexisnexis.co.uk>.

¹³¹ <http://www.westlaw.co.uk>.

¹³² The standardised case template was created in collaboration with Ulrike Till.

¹³³ The data used by Moss et al. (see footnote 57) only contain court cases between January 2008 and August 2009 heard by the Patents County Court, the Patents Court, the Court of Appeal, and the House of Lords.

certain specific aspects of patent litigation, such as the issue of costs, focuses on the subset of court cases for which more detailed information is available.

As part of our analysis we combine the information obtained from court records with detailed information on the parties as well as the specific patents involved in the law suits. The names of the litigating parties were matched to Compustat, Bureau van Dijk's FAME and AMADEUS, and the ICC British Company Directory databases in order to obtain information on firms' characteristics and financials. Detailed information on the litigated patents was obtained from EPO's Espacenet and PATSTAT (version October 2011). We also draw on PATSTAT to construct a control sample of patents that have not been litigated. The control sample consists of non-litigated patents that share the same priority year, priority filing authority, and IPC subclasses with the litigated patents in the 15 PAE court cases. This control sample allows us to compare the characteristics of litigated patents with those of patents that were not subject of litigation at the invention level (the priority filing).

Figure 1: Comparison of litigated patents by age

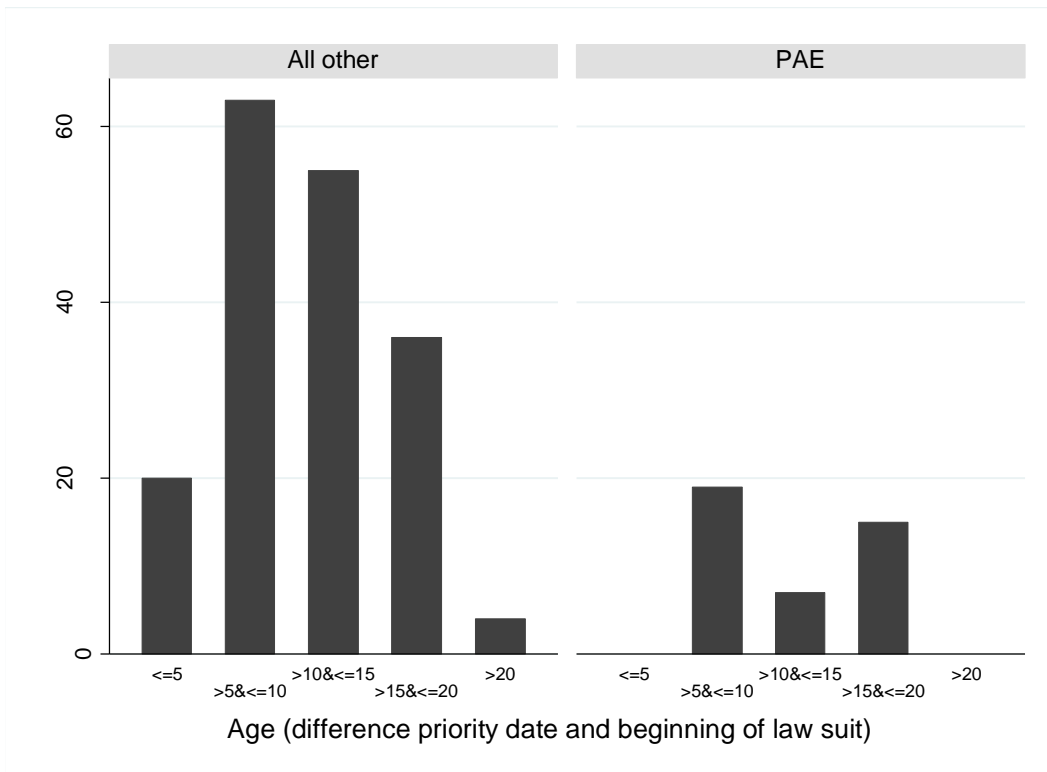
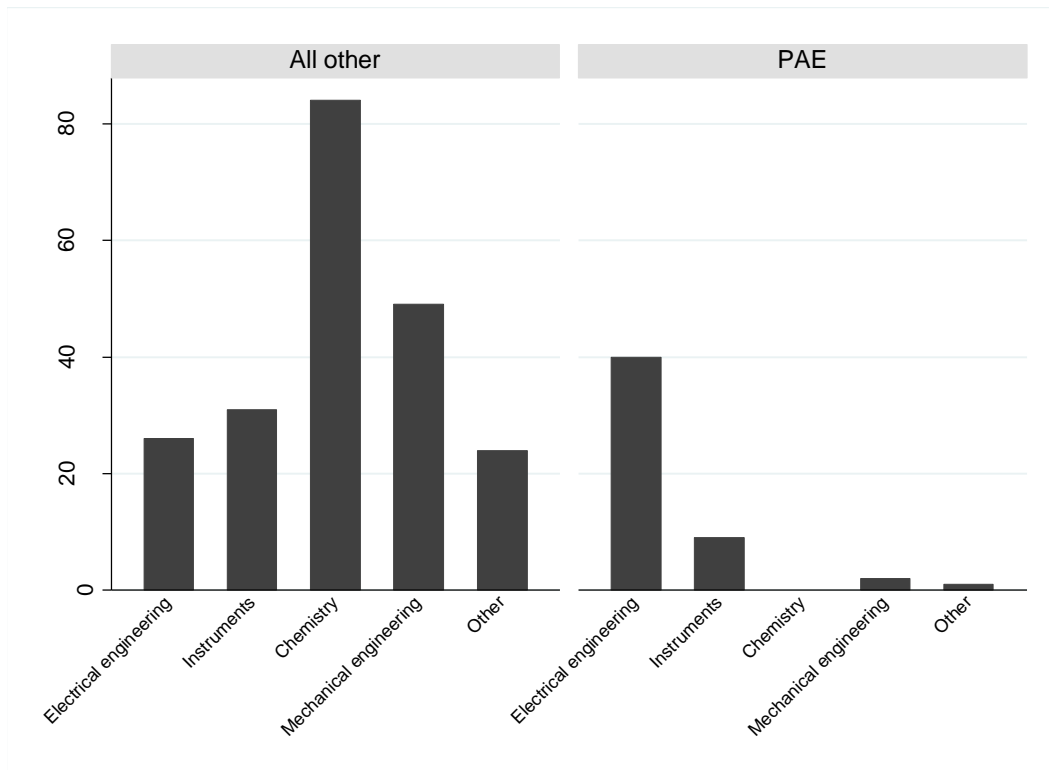


Figure 2: Comparison of litigated patents across technology classes



Note: Other includes: Furniture & games, other consumer goods, and civil engineering.

Figure 3: Distribution of patents in PAE cases across technology classes

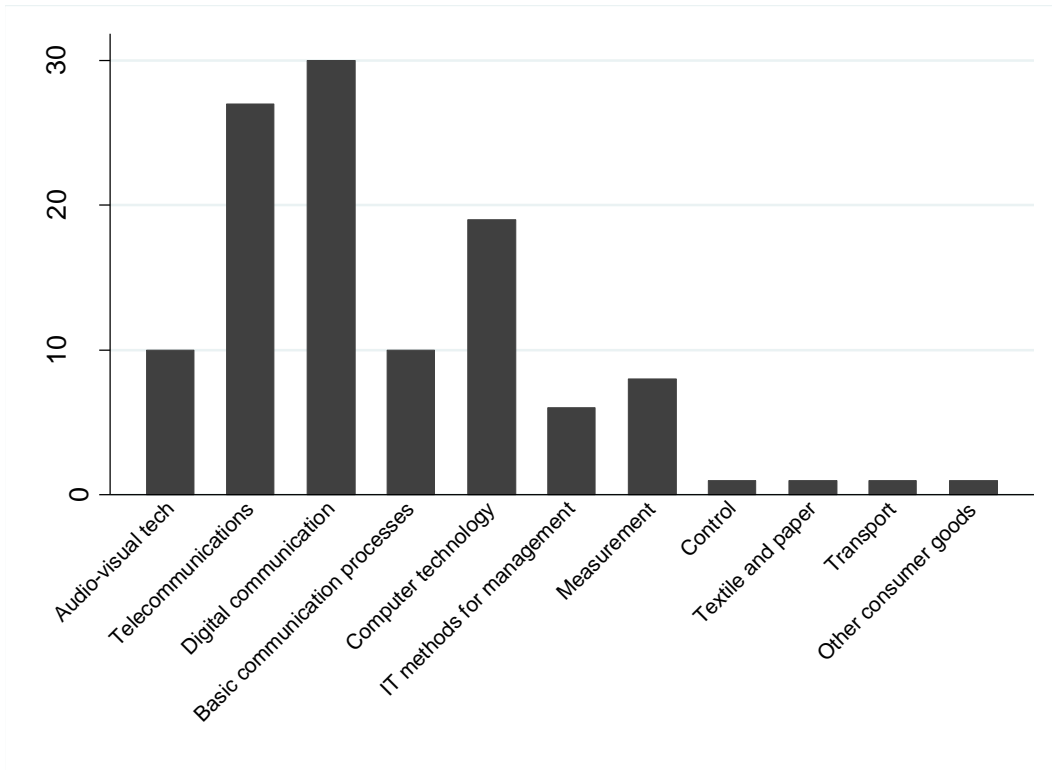


Table 1: All cases involving PAEs

Year [#]	Case Reference	Claimant	Defendant	Claim	Outcome
2000	HC00C4176/HC00C4177	Rambus inc	Hyundai Electronics UK Ltd Micron Europe Ltd	infringement	stayed*
2004	HC04C01952	Nokia	Interdigital Technology corp.	revocation	settled
2005	HC05C01175	T-Mobile UK Ltd Research in Motion UK Ltd	Inpro Licensing sarl	revocation	revoked
2005	HC05C02026	Nokia	Interdigital Technology corp.	non-infringement/ standard essentiality	3 out of 4 patents not infringed
2006	HC06C00615/HC06C00835	Sandisk	Koninklijke Philips Societa Italiana per lo Sviluppo dell'Elettronica spa (SISVEL) Institut für Rundfunktechnik GmbH TDF France Telecom s.a.	revocation	settled*
2006	HC06C03912/HC06C04227	Research in Motion Ltd Research in Motion UK Ltd	Visto corp	revocation	revoked
2006	HC06C04422	Interdigital Technology corp	Nokia Nokia Siemens Networks oy Document Security Systems (DDS)	non-infringement/ standard essentiality	settled
2006	HC06C01151	European Central Bank	IPcom gmbh	revocation	revoked
2008	HC08C02525	Nokia Nokia Germany gmbh Nokia UK Ltd	IPcom gmbh	revocation	revoked
2008	HC08C02526	Nokia Germany gmbh	IPcom gmbh	revocation	settled
2008	HC08C02527	Nokia Germany gmbh	IPcom gmbh	revocation	settled
2008	HC08C02528	Nokia Germany gmbh	IPcom gmbh	revocation	settled
2008	HC08C02530	Nokia Germany gmbh	IPcom gmbh	revocation	settled
2008	HC08C02901	Research in Motion UK Ltd Research in Motion Ltd	Visto corp	revocation	revoked
2008	HC08C00200	Gemstar TV Guide International inc United Video Properties inc Starsight Telecast inc	Virgin Media Payments Ltd Virgin Media Ltd	infringement	revoked

Notes:

PAEs marked in bold

[#]Year refers to the year in which the lawsuit was initiated (filing of claim form)

* Pending EPO opposition (eventually revoked by EPO)

* Sandisk took a license from SISVEL

Table 2: Comparison claims

	<i>Claim</i>			
	<i>All*</i>		<i>PAE</i>	
	# Cases	%	# Cases	%
Infringement	107	44.6%	2	13.3%
Revocation*	68	28.3%	11	73.3%
Other	27	11.3%	2	13.3%
NA	38	15.8%	0	0.0%
Total	240	100.0%	15	100.0%

Notes:

* Excludes PAE cases

* Includes partial revocation

Table 3: Comparison outcomes

Outcome

<i>Claim</i>	<i>Infringed</i>		<i>Valid, not infringed</i>		<i>Revoked*</i>		<i>Settled</i>		<i>Other</i>		<i>NA</i>		<i>Total</i>	
	All*	PAE	All*	PAE	All*	PAE	All*	PAE	All*	PAE	All*	PAE	All*	PAE
Infringement	15% 16	0% 0	10% 11	0% 0	25% 27	50% 1	24% 26	0% 0	11% 12	50% 1	14% 15	0% 0	107	2
Revocation*	4% 3	0% 0	22% 15	0% 0	43% 29	36% 4	19% 13	64% 7	9% 6	0% 0	3% 2	0% 0	68	11
Other	4% 1	50% 1	4% 1	0% 0	4% 1	0% 0	11% 3	50% 1	63% 17	0% 0	15% 4	0% 0	27	2
NA	0% 0	0% 0	0% 0	0% 0	0% 0	0% 0	53% 20	0% 0	3% 1	0% 0	45% 17	0% 0	38	0
	20	1	27	0	57	5	62	8	36	1	38	0	240	15

Notes:

* Excludes PAE cases

* Includes partial revocation

Table 4: Comparison PAE vs other litigated & non-litigated patents

	<i>Mean</i>		<i>Std. Dev.</i>		<i>T-test**</i>	<i>Min</i>		<i>Max</i>		<i># Obs.</i>	
	Control	PAE	Control	PAE	difference	Control	PAE	Control	PAE	Control	PAE
Comparison with other litigated patents*											
Backward citations	3.76	2.39	4.22	2.67	1.99	0	0	21	10	168	41
Forward citations	11.10	5.82	22.87	15.52	1.39	0	0	161	62	168	41
Non-patent references	1.85	1.73	4.04	2.20	0.19	0	0	38	10	168	41
Family Size***	19.63	24.34	20.80	23.73	-1.26	1	1	140	69	168	41
Number of inventors	2.86	3.05	2.23	2.15	-0.48	1	1	19	9	167	41
Number of IPC Subclasses	2.27	3.92	1.29	2.43	-5.99	1	1	8	9	168	41
Comparison with non-litigated patents*											
Backward citations	1.09	2.39	2.11	2.67	-3.84	0	0	17	10	1,661	41
Forward citations	1.99	5.82	7.23	15.52	-3.22	0	0	169	62	1,661	41
Non-patent references	0.34	1.73	1.08	2.20	-7.83	0	0	13	10	1,661	41
Family Size***	7.31	24.34	9.17	23.73	-11.03	1	1	183	69	1,661	41
Number of inventors	2.59	3.05	1.90	2.15	-1.51	1	1	22	9	1,556	41
Number of IPC Subclasses	1.03	3.92	0.18	2.43	-44.08	1	1	3	9	1,661	41

* Other litigated patents means all available patents litigated at the PHC between 2000-2008 excluding those involved in PAE cases

x Control patents matched to PAE patents on priority filing year and authority as well as IPC subclasses.

** Differences that are statistically significant at <5% level in bold.

*** Defined according to EPO'S DOCDB family definition.

Table 5: Comparison industry distribution

<i>Sector</i>	<i>All other cases*</i>		<i>PAE Cases*</i>	
	<i># Firms</i>	<i>%</i>	<i># Firms</i>	<i>%</i>
Business services	19	3.8%	1	8%
Chemicals/pharma	170	33.9%		
Computer services	21	4.2%		
Construction	4	0.8%		
FIRE**	3	0.6%		
Food etc	1	0.2%		
Hightech	83	16.6%	8	66.7%
Metals & machinery	64	12.8%		
Other manufacturing	26	5.2%		
R&D services	13	2.6%		
Textiles & apparel	4	0.8%		
Trade	39	7.8%		
Transportation	7	1.4%		
Wood & paper	6	1.2%		
Other services	16	3.2%	1	8%
Telecommunications	15	3.0%	2	17%
Petroleum & refining	10	2.0%		

Notes:

* Excludes PAE cases

* Excludes the European Central Bank

** FIRE: finance, insurance, and real estate

Table A1: All patents of PAE cases

#	Case reference	Patent number							
1	HC00C4176/HC00C4177	EP0525068							
2	HC04C01952	GB2174571	GB2208774	GB2224114					
3	HC05C01175	EP0892947							
4	HC05C02026	EP0515610	EP0855807	EP1062749	EP1210777				
5	HC06C00615/HC06C00835*	EP0402973	EP0599824	EP0599825	EP0660540	EP0400755	EP0708533	EP0751520	
6	HC06C03912/HC06C04227	EP0996905	EP1096727	EP1126662					
7	HC06C04422								
8	HC06C01151	EP0455750							
9	HC08C02525	EP0540808	EP1186189	EP1273147					
10	HC08C02526	EP1214813	EP1287716	EP1252779					
11	HC08C02527	EP1083758	EP1273147	EP1121760					
12	HC08C02528	EP1238474	EP1240758	EP0880836					
13	HC08C02530	EP0581929	EP0962084	EP1083763	EP1316199				
14	HC08C02901	EP1722321	EP1783675	EP1785927					
15	HC08C00200**	EP0969662	EP1377049	EP1613066					

Notes:

Shaded gray patents have different assignee name than PAE name in EPO's Espacenet online database

Patents (EP1096727, EP1126662) marked in bold are owned by Research in Motion

* Patents assigned to Philipps.

** Patents EP0969662 and EP1613066 assigned to co-claimant United Video Properties inc and EP1377049 to co-claimant Starsight Telecast inc.

Table A2: Overview PAEs and Non-PAEs

#	Non-PAE	PAE
1	European Central Bank	Document Security Systems (DDS)
2	Hyundai Electronics UK Ltd	Gemstar TV Guide International inc
3	Micron Europe Ltd	Inpro Licensing sarl
4	Nokia	Interdigital Technology corp
5	Nokia Germany gmbh	IPcom gmbh
6	Nokia Siemens Networks oy	Rambus inc
7	Nokia UK Ltd	Societa Italiana per lo Sviluppo dell'Elettronica spa (SISVEL)
8	Research in Motion Ltd	Visto corp
9	Research in Motion UK Ltd	
10	Sandisk	
11	T-Mobile UK Ltd	
12	Virgin Media Ltd	
13	Virgin Media Payments Ltd	
