THE FUTURE OF THE SMALL SOFTWARE FIRM: A CASE FOR THE PROPER BALANCE OF LAWS PROTECTING SOFTWARE AND COMPETITION

Thesis submitted for the degree of

Doctor of Philosophy

at the University of Leicester

by

Jacqueline S. Walsh B.A.(H), LL.B, MBA

Faculty of Law

University of Leicester

February 2013

THE FUTURE OF THE SMALL SOFTWARE FIRM: A CASE FOR THE PROPER BALANCE OF LAWS PROTECTING SOFTWARE AND COMPETITION

Jacqueline S. Walsh

ABSTRACT

The software industry is a significant economic driver of innovation for many sectors in both the US and EU. Small software firms make important contributions to innovations that advance the progress of technology. Using the competitive principles of fostering innovation, ensuring economic efficiency and promoting consumer welfare, this paper examines how intellectual property laws and competition policy in both the US and the EU are undermining the future success of the software industry. In software sectors, the small software firm is faced with insurmountable challenges due to the improper use of existing copyright and patent laws to protect the unique characteristics of software. Although the argument for *sui generis* legislation is not new, evidence is mounting which suggests that small software firms will become increasingly non-competitive without substantial legal reform.

The divide between large and small firm participation in the intellectual property system continues to grow. The characteristics that make the software industry important to consumers - network effects, interoperability and standardization - are also the characteristics which will ultimately harm consumer welfare by the reduction of innovative products and services. While large firms are able to overcome major obstacles present in the industry through patent portfolios and cross-licensing arrangements, small firms are precluded from activities that ensure their ability to compete in the global industry. A *sui generis* software law is not a real possibility today, but a second tier patent approach to solving this market failure deserves further research and consideration. Competition law provides limited potential to support the small software firm, but a major shift in policy will be required for it to become an effective regulatory tool. The EU is far better positioned to be the leader in including small firms in the competitive analysis of dynamic industries such as software.

ACKNOWLEDGEMENTS

It takes a community to raise a child, or in this case, to write a thesis. My community starts with my family. To my husband, Geordie, thank you for the sacrifices you made for me to see this through. To my boys, Brogan and Rylan, I am amazed by your patience and understanding of why mommy has not been around. I look forward to being your wife and mother again. To my mother, Daphne, who has affectionately become known as "meals on wheels," thank you for taking care of me and my family. To my father, Gordon, thank you for inspiring me without even knowing it. To my mother-in-law, Gloria, and my father-in-law, Gordon, thank you for the weeks you spent at my house so I could focus on the task at hand. To my brothers, Glenn, Wayne and Stephen, thank you for always being proud of me. To my supervisor, Dr. Adam Cygan, thank you for your guidance and valuable input, and for helping me find the determination to persevere. To Jane Sowler, who made the challenges of distance learning a little more bearable, thank you. To my colleagues, thank you for your words of encouragement and your voices of reason, with special thanks to Dr. Jose Lam, Janice Ryan, Erika Parrill, Kelly Brown, Dr. Jennifer Buckle, Sylvia Osmond, Julie Pitcher and Dr. Paul Wilson. To Dr. Sonya Corbin Dwyer, thank you for all your words of encouragement and especially for the cookies in my mailbox. To Veronica Connors, Debbie Walker, and Kim Tiller, thank you.

TABLE OF CONTENTS

CHAPTER 1: LITERATURE REVIEW AND METHODOLOGY

INTRODUCTION

This thesis examines why the software industry is subject to market failures due to the lack of *sui generis* legislation to deal with the ownership, protection and exploitation of intellectual property derived from software. Market failure, in this context, refers to the imbalance of market power afforded to large firms in the software industry and the relative lack of power experienced by small software firms in this global marketplace. By the very nature of their smallness, small firms face a number of challenges that are not experienced by their larger counterparts. However, it is argued here that the uniqueness of software and the software industry results in unprecedented discrimination against small firm competitiveness that can only be resolved through regulation.[1] The characteristics of small technology-driven firms must be taken into account in order to understand how to best serve these important entities. As well, the special qualities of software itself and the industry as a whole must be revisited by academics and policy makers if there is going to be any significant improvement in the fate of small software companies. Now that the software industry has been in existence for over 60 years, there is ample literature and experience to reflect upon, as well as to build on, for future change.

Two economic forces that have helped shape the 21st century are small businesses and software technologies. The substantial contributions these two economic drivers make to the global marketplace are often understated, and the small software firm is most often left unnoticed in favour of large firm players such as Microsoft and IBM. This thesis is premised on three critical points which will be argued throughout. First,

---

[1] Whether this regulation can and should be domestic or global will be discussed in various contexts throughout this thesis.

small software firms are very important for innovation and competitiveness in the software industry. Second, a combination of the uniqueness of software, the characteristics of small software firms and the current state of intellectual property and competition laws is having and will continue to have a negative effect on innovation, efficiency and competitiveness in the software industry. Third, *sui generis* intellectual property laws, radical intellectual property reform and/or a refocus of the goals of competition policy[2] will be required to right these wrongs.

The purpose of this literature review is to illustrate the fundamental issues being addressed in academic writings relating to intellectual property, competition law and the software industry. The fields of intellectual property and competition law have been discussed separately and widely within the context of the software industry. This review will focus on those that help provide a sound overview of basic theoretical principles and current arguments in this area while advancing the position taken in this thesis. The prevailing research looks at the interaction between intellectual property and competition law as they influence the software industry, with particular influence from economic policy. Although intellectual property, competition policy and the software industry have been the subject of much scholarly work, the perspective of the small firm has never been examined in a comprehensive manner within these dynamics. Thus, the literature review will position this thesis within the existing body of academic writings and critically show how the standpoint of the small software firm, although relevant and important within the scholarly context, has been forgotten to the detriment of the software industry in particular and consumer welfare in general.

---

[2] In the United States, competition law is often referred to as antitrust law. For consistency, all references will be to competition law regardless of the jurisdiction.

THE SOFTWARE INDUSTRY AND THE COMPETITIVE LANDSCAPE

Over the past 25 years, the tendency in the academic literature regarding intellectual property and competition is to treat the software industry as a unique and all-encompassing industry. Discussions regarding software are less likely to be bundled with other high-technology industries, such as bio-technology, unless the purpose of the analysis is to provide comparisons between the various sectors. This trend is likely due to the recognition that software is so distinctive from a regulatory perspective as to require specialized analytical treatment. In order to properly capture the nuances of the industry and the technology, this thesis takes an expansive view of software technologies, defined broadly as programs and other operating information used by a computer.[3]

It is not surprising that the software industry has received such a high profile. In the United States, the software industry was responsible for employing 1.7 million people in 2007.[4] In the EU during this same period, software and related services were responsible for over 4 million jobs.[5] In 2010, the top 100 software vendors in the US generated revenues of USD171 billion in software sales and services[6] and the EU's top 100 software vendors generated €31 billion.[7] The world software market is predicted to exceed USD357 billion by 2015.[8] Growth in the software sectors of both

---

[3] <http://oxforddictionaries.com/definition/english/software> accessed 15 February 2013. Note that the several classifications of software and a further explanation of the software industry can be found in Chapter 3. This definition should not be confused with patent eligibility criteria used by various patent offices around the world. The lack of a consistent definition of software and its repercussions for patentability purposes will be discussed in Chapter 4.

[4] Business Software Alliance, 'Software Industry Facts and Figure' <www.bsa.org/country/Public%20Policy/~/.../sw_factsfigures.ashx> accessed 23 October 2010

[5] Computing Technology Industry Association, *Promoting the European Software Industry* (White Paper, October 2008) <www.sme-union.eu/viewdoc.php?LAN=en&FILE=doctext&ID=790> accessed 23 October 2010

[6] Software Top 100, 'Top 100 Software Companies in the United States 2010' (December 1010) <http://www.softwaretop100.org/top-100-software-companies-in-the-united-states-2010> accessed 10 September 2012

[7] Truffle 100, 'Ranking of the Top 100 European Software Vendors' (October 2011) <http://www.truffle100.com/2011/ranking.php> accessed 10 September 2012

[8] Market Line, 'Global Software Industry Profile' (December 2011) < http://www.reportlinker.com/ci02072/Software.html> accessed 10 September 2012

jurisdictions has traditionally outpaced other industries and this trend is predicted to continue in the upcoming years.

Equally as impressive as the economic contribution of the software industry itself; software technologies have an enormous impact on many other industries such as manufacturing, telecommunications, financial services, health and all internet-based businesses. It is inconceivable how people can lead a productive life today without the heavy influence of software. Software has been compared to a wave that relentlessly moves across economic landscapes; forming, transforming and shattering industries such as the home entertainment, automobile, newspaper and gaming sectors.[9] Software has been called a "general purpose" technology and described as having an impact on society similar to electronic motors and steam engines.[10] Because software is embedded in so many products and services today, it continues to be a key driver of innovation and competition in many industries. Consumers continue to demand faster, smarter and more efficient software solutions for their home computing needs, but they also demand faster, smarter and more efficient video games, cars, cell phones, appliances, banking and reading tools, to name but a few. Software, then, not only makes processes and products more efficient and productive from a business point of view, it makes consumers' lives more productive and fulfilled through its functionality and ability to increase efficiencies. For these reasons, software is arguably one of the most important sectors of the economy today.

---

[9] DS Evans, A Hagiu and R Schmalensee, *Invisible Engines: How Software Platforms Drive Innovations and Transform Industries* (The MIT Press 2006)
[10] J Bessen and MJ Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators At Risk* (Princeton University Press 2008) 258

It is this relentless forming and transforming of industries that has landed software the reputation of being a Schumpeterian industry. Schumpeterian markets are named after Joseph Schumpeter, an influential economist in the 1940s who argued that temporary monopolies were an important component in a healthy economy.[11] Schumpeter believed that temporary monopolies provided incentive for entrepreneurs to create innovations. Such monopolies would last only until a better product came along replacing the existing monopoly. Schumpeter coined the phrase "creative destruction" to explain this phenomenon. It follows that such markets must be dynamic, innovative, and volatile.

The software industry is the prime example of a market in which temporary monopolies lead to increased innovation. There are higher rates of turnover in the software industry than in other markets.[12] Software monopolies are protected by such barriers to entry as intellectual property laws, economies of scale and network effects. Unlike traditional monopolies, market leaders in software do not command a high price for their products and are not generally concerned with others in the market competing against them on price. Although pricing is often the focal point of discussion in the static analysis of competitive markets, price is not an overriding concern with software. Software prices are generally well above marginal costs as software firms contend with extremely high fixed costs to produce the software product and then extremely low (even nominal) costs to reproduce each unit of the

[11] J Schumpeter, *Capitalism, Socialism, and Democracy* (3rd edn Harper, New York 1950)
[12] See RP Merges, 'Patents, Entry and Growth in the Software Industry'(2006) University of California Berkeley School of Law Working Paper <http://ssrn.com/abstract=926204> accessed 7 July 2010; IM Cockburn and MJ MacGarvie, 'Entry, Exit and Patenting in the Software Industry' (2006) National Bureau of Economic Research, Working Paper No. 12563 <http://www.nber.org/papers/w12563> accessed 8 July 2010; MS Giarrantana, 'The Birth of a New Industry: Entry by Start-ups and the Drivers of Firm Growth: The Case of Encryption Software' (2003) 33(5) Research Policy 787; and JR Allison, A Dunn and RJ Mann, 'Software Patents, Incumbents and Entry', (2007) 85(7) Texas Law Review 1579

software product. Instead, software firms compete largely on quality and functionality.[13]

The competitive landscape for software has been described as "competition for the market" as opposed to "competition in the market." Firms compete to displace market leaders by creating more innovative products. Thus, leaders "risk being obliterated by the superior products that regularly emerge from intense dynamic competition."[14] It is this fragility of market leadership that pushes incumbents to continue to innovate instead of relying solely on their market position as monopolists to reap the gains of their existing products. The volatility and uncertainty of the market result in high rates of failure among software companies. This is not seen as a weakness in the software industry, but instead as a precondition of a successful innovative market. The high rates of failure notwithstanding, the software industry also boasts a high number of new entrants.[15] Why, based on the above analysis, would new entrepreneurial firms dare to enter the fray and engage is such risky activity as software production? The answer is twofold. First, entry into the software game is not difficult. There are few significant capital start-up costs.[16] A software company can be started with limited resources and very little by way of equipment. It is the long development cycle and challenges of commercialization that often restrict the ability of small firms to get their products to market. Today, the abundance of government funding, angel investment and venture capital support allow under-capitalized firms to

---

[13] See Chapter 5, section entitled "Shifting Competition Policy to Consider Small Software Firms", for a discussion on how traditional competition models based on price are not appropriate in dynamic industries such as software.

[14] R Schmalensee, 'Antitrust Issues in Schumpeterian Industries' (2000) Papers and Proceedings of the One Hundred Twelfth Annual Meeting of the American Economic Association 90(2) The American Economic Review 192

[15] RP Merges, 'Software and Patent Scope: A Report from the Middle Innings'
(2009) 85 Texas Law Review 1627; RJ Mann, 'Do Patents Facilitate Financing in the Software Industry?' (2005) 83(4) Texas Law Review 961

[16] Software owners were often labeled "garage entrepreneurs" for their ability to start firms with few resources. For example, Google is a highly profitable software company started by two entrepreneurs in a garage.

make a stake in the software market. Second, success in the software industry can be highly lucrative. Software companies that have developed "killer apps," known in the industry as applications that create a significant impact and revolutionize a product or process, have experienced significant financial gains.

The market structure of an industry is considered to be an important factor in its overall competitiveness and innovativeness.   In highly innovative industries, economists believe that the most favourable climate consists of a "subtle blend of competition and monopoly," with some monopoly power in the form of concentration, but with a healthy mix of new entrants given the "role that newcomers play in making radical innovations."[17] In industries succeeding on rapid technological change, there is a place for firms of all sizes. "Technical progress thrives best in an environment that nurtures a diversity of sizes and, perhaps especially, that keeps barriers to entry by technologically innovative newcomers low."[18] In fact, the software industry consists of mostly small players.[19] With tens of thousands of firms worldwide, it has a very low concentration compared to most other industries.[20]

The above description of the competitive landscape of the software industry suggests that the environment for healthy rivalry in software is about as perfect as can be expected. The industry experiences substantial growth each year, outpacing other industries on a regular basis; it appears to be highly innovative as companies constantly strive to be leaders in their market; and there is evidence that there is a

---

[17] FM Scherer and D Ross, *Industrial Market Structure and Economic Performance* (3rd edn, Houghton Mifflin Company 1990) 660
[18] ibid 654
[19] IBIS World, 'Software Publishing in the US: Market Research' (September 2012) <http://www.ibisworld.com/industry/default.aspx?indid=1239> accessed 18 September 2012 reports that there are 19,780 software publishing firms in the US alone; Mann (n 15) and Merges (n 15) cite this as rational to support their view that the software industry is healthy.
[20] M Campbell-Kelly, 'Not All Bad: An Historical Perspective on Software Patents' (Spring 2005) 11 Michigan Telecommunications and Technology Law Review 191, 245 suggests that the software industry is "unusual" in this regard.

healthy mix of large and small firms in the industry. This somewhat blushing account of the software industry begs the question as to why one would suggest (as this author did in the introduction) that the software industry is subject to market failure due to the lack of competitiveness of the small software firm. There are some who argue that the software industry is functioning exactly as it should and there is no need for further regulatory intervention.[21] It is proposed herein that a partial reason for the success of the software industry to date is because of the inclusion in the marketplace of the small entrepreneurial software firm.[22] To exclude this important entity from participating would be detrimental to the overall success of the industry and contrary to the best interests of society going forward. As was alluded to above, and will be argued in more detail below, small software firms are a critical part of the innovativeness and competitiveness of the software industry. Instead of ensuring that barriers to entry are kept to a minimal, there is evidence that these barriers are rising. This trend has to be reversed. These entities have been abandoned by government policy and the two regulatory regimes that promote competition and innovativeness in the software industry: intellectual property and competition laws.

INTELLECTUAL PROPERTY AND COMPETITION IN SOFTWARE

Temporary monopolies are considered to be the key drivers of innovation and advancement of the software industry. Because of the nature of software, these temporary monopolies would not exist without the protection afforded to software by intellectual property rights. The main asset and the principle output of software firms is intellectual property. This fact is very important to understanding the competitive nature of all firms in the sector. The unique characteristics of software itself and how

---

[21] Mann (n 15); Merges (n 15); and M Campbell-Kelly (n 20)
[22] But see Campbell-Kelly (n 20) 195 who sees it as a concern in the software industry that will be mitigated over time.

the intellectual property is created, owned, protected and exploited inevitably results in monopolistic behavior and has a significant impact on interfirm rivalry and cooperation within the industry.

Today software is considered a hybrid technology in the sense that it attracts all four major forms of intellectual property protection – patents, trade secrets, copyright and trademarks.[23]   Not many technologies can boast this complexity as the intellectual property right protects different aspects of the same product. The components of a software program can be broken down into the source code, the binary or object code, the graphical user interfaces, splash screens, databases, graphics, imbedded documents such as "ReadMe" files and directories. A software product might also contain third party products such as open source. The underlying functionality and the corresponding know-how can have significant value.

The debate in academia as to the most effective form of intellectual property regulation for software has been heated and longstanding. It is far from settled today. Scholarly arguments have traditionally focused on two main aspects of protection; what form of protection is effective and what scope of protection is sufficient. In the 80s and 90s, it was evident that the nature of software was creating more legal questions than could be answered under existing laws. Given the ease of duplication, adaptation and modification of software by third party free-riders, copyright law seemed like the obvious form of protection as such rights are generally available only to the copyright holder. Arguments for and against including software as a literary work under existing copyright law centered around what parts of computer programs

---

[23] Although trademarks are in important consideration in the competitiveness of small software firms, the issues arising under trademark law are not substantially different for large and small firms and are not particularly problematic from a regulatory perspective. Therefore, trademarks will not be discussed in detail in this thesis.

were actually literary works and whether non-literal elements such as systems, processes, routines, structure, organization and functionality were properly protected under copyright law.[24] Early commentators looked at the effects of over-protection and under-protection of software on the competitiveness of the industry.[25] Despite reservations about including software under existing copyright laws, the US government made it so in 1980.[26] Over the years that followed, the US judiciary sufficiently narrowed the scope of copyright protection for software so as to provide a somewhat stable and predictable environment for how copyright infringement cases would be decided.[27] It was quickly evident to the players in the software industry that copyright law was limited in its ability to protect what was clearly the most valuable component of software – functionality. Copyright law was not equipped to prevent competitors from imitating functionality through the creation of unique software code.

The US Supreme Court opened the door for the patenting of software in 1981 in *Diamond v Diehr*.[28] While US courts struggled with the proper test for software patentability over the next several years[29], the landmark case of *State Street Bank & Trust Co. v Signature Financial Group, Inc* in 1998 stated that as long as the program

---

[24] See, for example MT Chapman, 'Copyright Law – Putting Too Much Teeth into Software Copyright Infringement Claims: Whelan Associates v. Jaslow Dental Laboratory' (Summer 1987) 12 The Journal of Corporation Law 785; A Charlesworth, 'Copyright in Computer Programs: Back to Basics?'(April 1995) 145 National Law Journal 596

[25] See S Breyer, 'The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs' (1970) 84 Harv. L. Rev. 281 for an early view of the issues with protecting software via the US Copyright Act; See KW Dam, 'Some Economic Considerations in the Intellectual Property Protection of Software' (1995) 24 Journal of Legal Studies 321 for a view that copyright protection for software provides a sound basis for an economically efficient system.

[26] In 1991, The European Community Directive on the Legal Protection of Computer Programs solidified the US approach, standardizing copyright protection for software across the EU. Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111 (codified version) (referred to herein as the "Computer Directive")

[27] Seminal cases include *Apple Computer, Inc. v Franklin Computer Corp* 714 F 2d 1240 (3d Circuit 1983) (confirming copyright protection for operating system programs); *Apple Computer, Inc. v Microsoft Corp* 799 F Supp 1006 (ND Cal 1992) aff'd, 35 F 3d 1435 (9th Cir 1994) (confirming test for infringement in graphical user interfaces); *Computer Associates International, Inc v Altai, Inc* 982 F 2d 693 (2d Cir 1992) (confirming test for copyright infringement of the structure, organization and sequence of computer programs).

[28] *Diamond v Diehr* 450 US 175, 187 (1981)

[29] US Courts repeatedly asked Congress to deal with the issue of patentability of software. See M Guntersdorfer, 'The Death of *State Street*' (2008-2009) 9 Wake Forest Intellectual Property Law Journal 1

had a practical utility, it was patentable.[30]   Growth in software patenting has been

unprecedented.   By 2002, software patents represented nearly 15% of all patents

granted in the United States.[31]   Despite the explicit language in the European Patent

Convention[32] prohibiting the patentability of computer programs, the early EU

experience was very similar to the US history described above.   Cases heard by the

European Patent Office ("EPO") Boards of Appeal as early as 1984 illustrated that

programs with mathematical algorithms could be patented.[33]   Over 30,000 software

related patents were granted by the EPO by 2003.[34]   Today, software patent

applications continue to outpace all other categories in the US, the EU and around the

world.[35]

The proper mix of intellectual property rights for software still baffles industry experts

and policy makers in the fields of intellectual property and competition law.   The

United States Department of Justice and the Federal Trade Commission spent five

years (from 2002-2007) holding public consultations and writing reports[36] regarding

intellectual property and competition for the purpose of making recommendations to

---

[30] *State Street Bank & Trust Co v Signature Financial Corp, Inc* 149 F 3d 1368, 1374 (Fed Cir 1998)

[31] J Bessen and R Hunt, 'The Software Patent Experiment' (March 2004) 3 Federal Reserve Bank of Philadelphia Business Review Journal 22 < www.phil.frb/files/br/br304rh.pdf >; The software patent boom and its consequences for the small software firm is considered in Chapter 3.

[32] Section 52 of the European Patent Convention ("EPC") defines patentable inventions. Clause 2(d) specifically excludes programs for computers as being non-technical and therefore not patentable.

[33] European Patent Office Decision T 0208/84 3.5.1 15 July 1986 *Vicom*

[34] A Grosche, 'Software Patents – Boon or Bane for Europe?' (September 2006) 14 International Journal of Law & Information Technology 257, 277; Because of the limited wording in the EPC and the inability of the EU Parliament to allow the patentability of software *per se*, the EPO continues to have a more conservative approach to software patenting, requiring a "technical contribution."

[35] J Bessen, 'A Generation of Software Patents' (June 2011) Boston University School of Law Working Paper No. 11-31, 15 <www.bu.edu/law/faculty/scholarship/workingpapers/2011.html> accessed 25 August 2012 finds that the growth of software patents in the US has outpaced all other classifications; The EPO website states that patent applications for computer-based inventions have the highest growth rate among all patent categories presented to the European Patent Office over the past few years, see <www.epo.org/news-issues/issues/computers/software.html> accessed 23 August 2012; and see WIPO IP Facts and Figures 2012 (2012) 21 < www.wipo.int/freepublications/en/statistics/.../wipo_pub_943_2012.pdf> accessed 5 September 2012 reporting that software patent applications have the highest rate of all patent filings worldwide.

[36] See Federal Trade Commission, 'To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy' (October 2003) <www.ftc.gov/os/2003/10/innovationrpt.pdf> accessed 19 July 2011; and see US Department of Justice and the Federal Trade Commission, 'Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition' (April 2007) <www.ftc.gov/reports/index.shtm#2007> accessed 19 July 2011

reform the US Patent Act.[37]   The debate ranges from those who believe that copyright

law alone strikes the proper balance of protection to those who believe a *sui generis*

type of intellectual property is the only solution to the complex issue. Those that

support copyright alone suggest that it provides sufficient oversight of software so as

to deter rapid duplication from second-comers, but not too much protection so as to

result in under-investment in research and development and hamper innovation.[38]

Copyright was thought to provide an adequate legal system to promote the

appropriability of software without creating monopolies or rent-seeking issues.[39]

Similarly, some argue that patent law is simply not required as the software industry

will continue to be innovative because of the level of competition in the marketplace.[40]

The most controversial debate in intellectual property law that still rages today is

whether patent law is the most appropriate form of protection for computer

programs. As described below, there is an overwhelming amount of literature taking

issue with the use of existing patent laws to cover the unique aspects of software and

the dynamics of the software industry.[41] The amount of information on the topic is

vast and complex. Only those issues that relate to the competitiveness of the small

software firm will be addressed herein. Issues raised in this controversy include the

---

[37] These reports were highly influential in the recently enacted patent reform; Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011). US patent reform and its impact on small software firms is addressed in Chapter 5.

[38] See J Bessen and E Maskin,' Sequential Innovation, Patents and Imitation' (2000) Working Paper, Department of Economics, MIT <www.researchoninnovation.org/patent.pdf > accessed June 15 2010 ; and see J Church and R Ware, 'Network Industries, Intellectual Property Rights and Competition Policy' in RD Anderson and NT Gallini (eds), *Competition Policy and Intellectual Property Rights in the Knowledge-Based Economy* (University of Calgary Press 1998)

[39] Dam (n 25)

[40] Merges (n 15) 1632 states that legal issues are only of secondary importance in software and that technological change is sufficient for competition and innovation; See also M Lemley, 'Ignoring Patents' [Spring 2008] Michigan State Law Review 19 arguing that the software industry is flourishing because large players are ignoring competitors' patents.

[41] But see Merges (n 15) arguing that the legal system is integrating software into patent law and software firms are integrating patents into their competitive strategies; and see BL Smith and SO Mann, 'Innovation and Intellectual Property Protection in the Software Industry: An Emerging Role for Patents' (2004) 71 University of Chicago Law Review 241 stating that software patents play a positive role in promoting technological innovation.

following: the quality and validity of software patents;[42] the ability of patent laws to account for unique aspects of software;[43] the value of patents to facilitate innovation in the software industry,[44] with particular emphasis on its impact on sequential and follow-on innovation;[45] the effectiveness of patents to promote entry and success within software markets, including transaction costs and patent clearing;[46] strategic patenting issues such as patent thickets, patent pools, cross-licensing and infringement threats;[47] and the adequacy of the institutions (judiciary and patent offices) to deal with software patents.[48]   What is evident from a review of the literature is that software patents are problematic on many levels. What is also apparent is the lack of research and debate on the effects this dysfunctional intellectual property system is having on the entry, growth and survival of the small software firm.   There is little discussion as to whether patent reform can benefit small software firms.   Software patents are seen as a large firm issue.

There is another line of arguments advocating for a *sui generis* form of intellectual property law designed specifically for software.   Those promoting specialty legislation

---

[42] JR Allison and MA Lemley, 'Empirical Evidence on the Validity of Litigated Patents' (1998) 26 AIPLA Quarterly Journal 185, finding that one third of all software patents litigated are invalidated; MH Webbink, 'A New Paradigm for Intellectual Property Rights in Software' [2005] Duke Law and Technology Review 12 argues that the software industry is producing thousands of inherently meaningless patents of dubious value.

[43] SL Garfinkel, RM Stallman and M Kapor, 'Why Patents are Bad for Software' [Fall 1991] Issues in Science and Technology, discusses the patenting of algorithms; KL Durell, 'Intellectual Property Protection for Computer Software: How Much and What Form is Effective' (September 2000) 8(3) International Journal of Law and Information Technology 231 states that current laws do not show a true understanding of the nature of software.

[44] Webbink (n 42) argues software patents are discouraging innovation in the software industry; Bessen and Hunt (n 31) find a negative correlation between software patents and R&D intensity.

[45] Bessen and Maskin (n 38) find that software patenting reduces innovation and social welfare.

[46] Cockburn and MacGarvie (n 12) find software has an entry deterring effect; IM Cockburn and MJ MacGarvie, 'Patents, Thickets and the Financing of Early-Stage Firms: Evidence from the Software Industry' (Fall 2009) 18(3) Journal of Economics & Management Strategy 729 find that transaction costs of innovating are increasing in the software industry.

[47] Bessen and Meurer (n 10) argue that the number of lawsuits involving software patents is problematic; S Macdonald, 'Bearing the Burden: Small Firms and the Patent System ' (2003) Journal of Information Law and Technology 1, 17 <www2.warwick.ac.uk/fac/soc/law/elj/jilt/2003_1/macdonald/ > accessed 30 April 2009 states "Just as there is no necessary place for innovation in the strategic use of patents, there is no obvious place for the entrepreneur."; M Noel and M Schankerman, 'Strategic Patenting and Software Innovation' (June 2006) Centre for Economic Policy Research Discussion Paper No. 57012006 <http://sticerd.lse.ac.uk/dps/ei/ei43.pdf> accessed 3 June 2009 find that strategic patenting reduces R&D investment in the software industry; J Bessen and R Hunt, 'An Empirical Look at Software Patents' (Spring 2007) 16(1) Journal of Economics & Management Strategy 157 argue that firms are engaged in a patent arms race as the rise in software patents cannot be explained by R&D investment or productivity growth.

[48] Bessen and Meurer (n 10) 217

are concerned with the under-protection of copyright law, the over protection of patent law and the overall uncertainty regarding the scope of protection with two intellectual property regimes in play.[49] One of the most referenced articles was written in 1994 by two intellectual property lawyers, a computer specialist and an industry expert.[50] Arguing for a *sui generis* form of software protection, the authors take a market economics approach, arguing that the real value of software for the consumer and the basis for competition is functionality. In the early days of the software industry, there were fewer barriers to entry, no brand names, no market leaders, no install base, but they predicted that "factors that provide sufficient protection and lead time in the early days of an industry may not suffice as the industry matures."[51] It is argued in this thesis that this early prediction made by the authors of the Manifesto has proven true to the detriment of the small software firm in particular and that this market failure will damage the software industry over time.[52]

Despite the success of the software industry to date, the number of issues that could interfere with its success in the years ahead creates skepticism as to whether the industry can sustain its current level of entrants and technological advancements. The sheer amount of controversy which continues to the present day over the use of existing copyright and patent laws to regulate the software industry leads one to conclude that *sui generis* legislation would have been the more appropriate route for policy makers to take. Small firms represent a healthy threat to the sustainability of

---

[49] For early commentary, see for example, E Galbi, 'Proposal for New Legislation to Protect Computer Programming' (1970) 17 Bulletin of the Copyright Society 280; P Samuelson, 'Creating a New Kind of Intellectual Property: Applying the Lessons of the Chip Law to Computer Programs' (1985-1986) 70 Minnesota Law Review 471; P Samuelson, 'Benson Revisited: The Case Against Patent Protection for Algorithms and other Computer-Related Inventions' (1990) 39 Emory Law Journal 1025

[50] P Samuelson and others, 'A Manifesto Concerning the Legal Protection of Computer Programs' (1994) 94 Columbia Law Review 2308; This article will be referred to herein as the "Manifesto."

[51] ibid 2369

[52] The pros and cons of *sui generis* software protection are discussed further in Chapter 4.

large firms as leaders in software markets. It will be argued in this thesis that the current legal regimes are providing artificial barriers to entry and survival for the small software firm that are too great to overcome. Intellectual property laws are no longer used for the purposes of protection, but to strategically keep small firms out of the system and minimize them as a threat. Subtle changes to the existing systems will not be enough to overcome this market failure. The creation of a new form of intellectual property specific to software in the 1980s would have provided a stable foundation for the software industry and it would not be resting on a house of cards today.

COMPETITION LAW AND SOFTWARE

The Oxford Dictionary defines competition as the activity or condition of striving to gain or win something by defeating or establishing superiority over others.[53] This constant struggle for superiority is what economists believe causes firms to develop new technologies and constantly seek ways to improve their processes, products and services. Competition provides incentives for companies to allocate their limited resources in the most efficient manner. Thus, competition encourages economic efficiency which is the key to economic growth. Healthy competition means that consumers will have access to products and services that are subject to constant improvements in terms of quality and utility. Consumers will also have a greater variety of products and services to choose from at competitive prices. Because of the importance of competition to the economic health of a nation, governments around the world have developed policies and legislation to deter companies from taking advantage of their market power to the detriment of other players in the market and to punish those companies that exercise their dominance in an unfair manner.

---

[53]< http://oxforddictionaries.com/definition/competition> accessed 21 September 2011

Competition law is a complex and multifaceted area which receives significant attention from academics on a variety of subject matter. In the last fifteen years, an entire body of literature has been written on the interaction between competition law and intellectual property. Because of its unique characteristics, software has again become a subject area in its own right that has created substantial debate. This increased activity is due to a number of factors. First, as was addressed above, there remains substantial controversy over the effect the current intellectual property regime is having on the competitiveness of the software industry, so it seems appropriate for competition experts to weigh in on the issue.[54] Second, the importance of intellectual property in today's technology-driven business world is causing policy-makers and academics to seek ways to improve the legal systems that regulate technology. Third, the revelation that commerce requires technologies that are both inter-dependent and standardized creates a new level of complexity that must be examined. Fourth, the relative size of the patent portfolios that some of the large technology firms have (and their ability to purchase large patent portfolios) is raising red flags for enforcement agencies. And finally, the now famous *Microsoft* cases[55] in the United States and the European Union have sparked a flurry of opinions from each side of the Atlantic and renewed the interest of many as to how to properly balance what might seem to be two interrelated legal systems with competing goals. Again, the volume of literature on this subject of competition law and intellectual

---

[54] Competition law and patent law have a long history. See Federal Trade Commission 2003 (n36) 14-18 for a good summary of how patent law and competition policy have trumped each other over the last one hundred years.

[55] *United States v Microsoft Corp* 253 F 3rd 34, 50 (DC Cir 2001); Case COMP C-3/37.792 *Commission v Microsoft* Corporation [2004]; Case T-201/04 *Microsoft Corporation v Commission of European Communities* [2007] 5 C.M.L.R. 11; Relevant competition law aspects of the *Microsoft* cases are discussed in Chapter 5.

property is overwhelming. This paper will focus only on the principles of competition law that relate directly to the software industry.[56]

Why does the software industry command the interest and respect of economists and competition experts? Monopolies created by IBM[57] and Microsoft have led to antitrust proceedings and a plethora of academic and media commentaries about how the software industry should be regulated under existing competition laws. Given the broad, all-encompassing nature of competition law, many believe that policy makers should react cautiously to what might appear to be anti-competitive behavior induced by intellectual property laws. Software is such a dynamic and transitory industry that policies derived to address issues arising in the old economy are no longer relevant. To over-burden the software industry with competition rules would result in stifling innovation and under-investment in R&D.

Acknowledging that software is a unique technology that can give rise to unconventional market conditions, Richard Posner wrote in 2001 that there is "renewed concern for aspects of competition law with respect to the new economy."[58] Posner differentiated software from traditional industries for which current competition laws were created, stating that the new economy consists of volatile markets, modest capital requirements, high rates of innovation, quick and frequent entry and exit, network externalities and high rates of vertical integration.[59] Each of these characteristics affects the competitiveness of the industry and the way in which

---

[56] The US and EU take different approaches to the regulation of competition. These differences will be discussed in Chapter 5 from the perspective of improving the competitiveness of small software firms.
[57] In the late 1960s, IBM was under presser from US antitrust authorities for displaying anti-competitive behavior. IBM decided to unbundle software from its hardware products. See M Campbell-Kelly, *From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry* (MIT Press 2004) 6.
[58] RA Posner, *Antitrust Law* (2nd edn, The University of Chicago Press 2001) 245
[59] ibid 246

competition policy must be applied. Yet, Posner believed that existing competition policy was well equipped to deal with the industry.[60]

The vast majority of the issues that arise under competition law in the software industry relate to two key aspects of software; software creates network effects and software is developed in a sequential nature. Within these two broad concepts lie multiple issues related to the characteristics of software and the software industry. Issues include, but are not limited to, interoperability and reverse engineering;[61] refusal of dominant players to license; standardization;[62] patent monopolies;[63] cross-licensing;[64] and increased litigation. Because licensing is the key process for buying, selling and trading in software, licensing practices among competing firms become the over-arching activity which is scrutinized by competition enforcement agencies and policy makers.[65]

---

[60] Posner's issue was not with competition analysis tools, but with the institutional framework consisting of the judiciary, lawyers and enforcement agencies. Difficult issues of fact arise because of technical complexity, standardization and the adequacy of copyright, patents or trade secrets, making it difficult to find competent neutral experts to advise judges, lawyers and enforcement agencies. See ibid 256. See also ML Katz and C Shapiro, 'Antitrust in Software Markets' in Jeffrey A Eisenach and Thomas M Lenard (eds) *Competition, Convergence and the Microsoft Monopoly* <http://faculty.haas.berkeley.edu/shapiro/software.pdf > accessed 3 April 2011 arguing that while there is no single unique feature in software unknown in competition law, the issues taken collectively create subtleties in the application of competition policy.

[61] See D Curley, "Interoperability and Other Issues in the IP-Antitrust Interface: The EU Microsoft Case' (2008) 11(4) Journal of World Intellectual Property 296 for a discussion of how interoperability is affected by licensing, open standards and reverse engineering.

[62] See for example, G Lea and P Hall, 'Standards and Intellectual Property Rights: an Economic and Legal Perspective' (2004) 16 Information Economics and Policy 67, arguing that large firms cooperate to complete the system required for standardization; and see JJS Watts and DR Baigent, 'Intellectual Property, Standards and Competition Law: Navigating a Minefield' (2002) 2 International Engineering Management Conference, IEEE International 837 < http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1038547&isnumber=22258> accessed 6 March 2011 discussing the impact of standard setting on patent infringement and large company cross-licensing practices.

[63] For example, see Church and Ware (n 38) arguing that network externalities in the software industry can result in sustained market dominance by locking in the install base.

[64] For example, see P Regibeau and K Rockett, 'The Relationship Between Intellectual Property Law and Competition Law: An Economic Approach' (June 2004) University of Essex Discussion Paper Series <www.essex.ac.uk/**economics**/discussion-papers/papers.../dp581.pdf> accessed 7 March 2011, arguing that cross-licensing is fine for complementary technologies but should be viewed as suspicious in the case of substitute technologies; and Church and Ware (n 38) argue that standard setting is done informally through cross-licensing.

[65] It is for this reason that both the US and the EU have guidelines for the licensing of intellectual property. In the US, see US Department of Justice and the Federal Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property (April 1995) available at <www.justice.gov/atr/public/guidelines/0558.htm> accessed 5 January 2010; in the EU, see Guidelines on the Applications of Article 81 of the EC Treaty to Technology Transfer Agreements [2004] OJ C101/2 available at <http://ec.europa.eu/competition/antitrust/legislation/transfer.html> accessed 5 January 2010.

In innovation markets, one of the purposes of competition law is to regulate the use of intellectual property rights when such rights become the reason for market power.[66] The traditional method of measuring market power and dominance relates to a calculation of market share.[67] Such metrics are not necessary to prove a firm in the software industry has market power. Market leaders in software become dominant due to their ability to control the technology used by large install bases of consumers and by holding strong intellectual property rights. The more customers a software vendor has, the more customers wish to buy the product. As well, competitors want to ensure their products are compatible with the product at the center of the install base so as to have access to a greater percentage of customers. Such network effects are considered to be barriers to entry into particular market segments. The software producer that holds the technology that has become a *de facto* standard within a market segment will also have the ability to behave in a dominate manner against competitors. Other companies wishing to interoperate with this standard must find ways to gain access to the underlying technology. Issues of interoperability and reverse engineering arise. Compatibility of rival technologies is important for strengthening innovative markets such as software. When the dominant player in the market refuses to disclose or license the technology, competitiveness within the industry is diminished.

---

[66] Much of the literature on the subject area of intellectual property and competition law focuses on defining circumstances under which competition law should override legitimate intellectual property rights. See for example, Regibeau and Rockett (n 64); J Drexl, *Research Handbook on Intellectual Property and Competition Law* (Edward Elgar Publishing Limited 2008); SD Anderman, *The Interface Between Intellectual Property Rights and Competition Policy* (Cambridge University Press 2007); RD Anderson, 'The Interface Between Competition Policy and Intellectual Property in the Context of the International Trading System' (1998) Journal of International Economic Law 655; IS Forrester, 'Regulating Intellectual Property Via Competition? Or Regulating Competition Via Intellectual Property? Competition and Intellectual Property: Ten Years On, The Debate Still Flourishes' (2005) European University Institute, EU Competition Law and Policy Workshop/Proceedings <www.eui.eu/RSCAS/.../Competition/2005/200510-CompForrester.pdf > accessed 27 February 2011.
[67] The issue is considered in the context of the small software firm in Chapter 5, section entitled "Shifting Competition Policy to Consider Small Software Firms."

Software is a sequential innovation. Improvements are made to a product in an incremental manner, building upon previous technology. Therefore, the rights necessary to bring new software products to market are often owned by a competitor. There may be a large number of overlapping rights which must be secured for follow-on innovation so as not to infringe on a competitor's technology. A number of competitive issues arise in this scenario. For example, large firms have developed significant patent portfolios that allow them to manage the risk of infringement. These firms cross-license their patent portfolios to each other and they no longer concern themselves with fears of costly litigation. The analysis in the following chapters show how issues of interoperability, standardization, licensing, cross-licensing and litigation are very significant issues to the competitiveness of the small software firm. Yet, the literature to date has not provided a strong and coherent analysis from the position of small companies in this space.

Small software firms have been abandoned by competition policy and the intellectual property system. The next section attempts to explain this disassociation through a review of the objectives of both legal regimes. It is time to revisit the significant role that small firms play in this innovative market. Competition policy needs to be refocused if there is going to be any future for the small firm in the software marketplace. This is especially true if policy makers do not attempt to improve the intellectual property regime relating to the protection of software.

THE OBJECTIVES OF COMPETITION LAW AND INTELLECTUAL PROPERTY

The utilitarian theory is the overriding rational for the enactment of intellectual property rights in the developed world. While there are other theories of intellectual

property,[68] the utilitarian approach is the most widely accepted in the US and EU and is more relevant to the commercial exploitation of intangible assets being discussed in this thesis.[69] The theory suggests that there is value to society when useful inventions perform meaningful work and satisfy needs of consumers. To maximize social welfare, lawmakers have to strike a delicate balance to entice creativity by granting exclusivity to the inventor while at the same time allowing optimal, widespread distribution of the invention to society. Such inventions are protected from imitators by temporary monopolies so as to allow creators to reap the benefits of their efforts and prevent free-riders from profiting. It is this monopoly power that has been the cornerstone of intellectual property law and its implications position intellectual property squarely within the framework of competition analysis.

The utilitarian theory of intellectual property advocates that society as a whole is the intended beneficiary of intellectual property rights. Although exclusive use of the invention is granted to the creator and thus temporarily limits the potential benefits to society, intellectual property law recognizes that considerable time, effort, money and risk is often expended in the process. The inventor should be able to recoup some of these costs by offering the benefit of the creation to the public for a fee. In the long term, the invention is made available to the public for their use and thereafter disclosed to increase the overall knowledge of the invention to the public. The public interest is, therefore, paramount because of the increased commercial activity (income

---

[68] PS Menell, 'Intellectual Property: General Theories' (2003) Levine's Working Paper Series No. 618897000000000707 <http://www.dklevine.com/archive/ittheory.pdf> accessed 29 January 2011
[69] This theory was captured in the United States Constitution in 1787 (art. 1, S. 8, cl 8) when the US Congress stated that the purpose of patents and copyrights was to "promote the progress of science and useful arts." See D.I. Bainbridge, *Intellectual Property* (6th edn, Pearson Education Limited 2007) 347 for early justification of intellectual property in England.

and employment opportunities), development of new inventions (technological change and innovation), and disclosure of useful information (knowledge spillover).

Innovation, a widely accepted and celebrated outcome of properly balanced intellectual property rights, is complementary to the goal of maximizing social welfare. Society benefits when innovative processes create products and services with greater efficiency and thus at a lower price. Innovation is also responsible for the offering of quality and choice in a number of products and services. Economic efficiency is created through knowledge spillover in two important ways. First, when inventions are disclosed, other companies wishing to enter the market are able to improve upon existing invention. Second, and perhaps more importantly, newcomers to the market do not reinvent products that others have already brought to the market place, thus wasting valuable time and resources on reinventing existing discoveries.

The theory of complementarity suggests that intellectual property and competition policy work together.[70] This is especially true in the software industry given the nature of software; its ease of copying, the sequential nature of innovation, and the network effects caused by the consumer need for compatibility and standardization. As illustrated above, intellectual property laws can lead to dominant market conditions that can have a negative effect on competition. The intellectual property regime cannot, acting alone, always create the proper environment for innovation. Without the application of competition law, such dominance would lead to abuse in the marketplace. Likewise, competition policy is not equipped to deter free riding or prevent imitation of software products that were created because of the time, money

---

[70] Drexl (n 66) 44-45 states that the theory of complementarity is now commonly supported by many experts and is the most appropriate starting point for understanding the economic approach to the interface between intellectual property and competition law.

and effort of the inventor. Intellectual property and competition law work together, at least in theory, to ensure the most appropriate market conditions for the promotion of healthy competition. Therefore, it is important to include an analysis of the role of competition law in any argument which suggests that current intellectual property laws are closing competitive markets for small firms in the software industry.

Today there is a consensus in the literature and among policy makers that the common goal of intellectual property law and competition law is to enhance consumer welfare[71] through spurring innovation and creating economic efficiencies.[72] The realization that intellectual property and competition regimes have technological change and innovation as a mutual interest did not come about without years of debate and heavy input from economists.[73] Competition is now seen as the primary driver for companies to innovate, thus providing the consumer with increased technological output.[74] It is only through effective competition that the consumer receives the optimum mix of products and services of continuously improved quality at the most reasonable price.[75]

Despite the fact that competition rules were first used in both the United States and European Union as a means of protecting small businesses against the anti-competitive

---

[71] See, for example, R Whish, *Competition Law (*6th edn, Oxford University Press 2009). Consumer welfare as an economic goal has received much attention in the academic literature. See B Orbach, 'The Antitrust Consumer Welfare Paradox' (December 2010) 7(1) Journal of Competition Law and Economics 133 for a discussion of how consumer welfare used in the economic sense should not be used in relation to competition policy. See also D Ireland, 'Competition Policy, Intellectual Property and the Consumer', in RD Anderson and NT Gallini (eds), *Competition Policy and Intellectual Property Rights in the Knowledge-based Economy* (University of Calgary Press 1998) showing that consumers are interested in more than price, quality, and choice. They are concerned with such issues as market failure, fairness, ethics, and natural justice.

[72] Policy makers and the judiciary in the US and EU did not always look upon intellectual property and competition policy in such a favorable manner. This issue will be discussed in Chapter 5 in the section entitled "Shifting Competition Policy to Consider Small Software Firms."

[73] See Anderman (n 66); and see J Lianos, 'Competition Law and intellectual Property Rights: Is the Property Rights' Approach Right?' in J Bell and C Kilpatrick (eds) *Cambridge Yearbook of European Legal Studies* Volume (Volume 8, Hart Publishing 2005-2006).

[74] See for example the Federal Trade Commission (2003) (n 36) in which interviewees from the software industry state that competition is the prime reason for innovation.

[75] Consumer welfare has been stated by both the US and EU competition authorities as being the single goal of competition policy. Despite these stated goals, there are nuances in each jurisdiction as to how consumer welfare is defined. These differences and their effect on the future of small software firms are discussed in Chapter 5.

behaviour of large, dominant firms,[76] today there is no mention of the interests of small firms in US competition law.[77] This omission is purposeful based on current economic belief that protecting the longevity of small firms is actually counter to the principles of consumer welfare and economic efficiency. Writings by influential economists from the Chicago School of Economics such as Bork[78] and Posner[79] first highlighted the fact that saving small inefficient firms from failure was not in the best interest of the consumer. It was argued that market pressures should make the determination of whether small firms should survive. If small entities are treated as a special interest group under competition law, it is likely that valuable resources would be wasted on firms that cannot survive without such assistance. Consumers would be the ultimate losers as they would be supporting weak firms through taxes without seeing the benefit through efficient processes and lower prices. Thus, a non-interventionist attitude is promoted in the US and small firms are no longer singled out as an interest group worthy of protection.

It will be argued throughout this thesis that this blanket policy statement is not suitable for all small firms in all industries. It is not the premise of this thesis that small software firms should be systematically protected from the dominating behaviors of large firms regardless of their ability to be competitive. There is nothing wrong with

---

[76] See L Parret, 'Shouldn't We Know What We Are Protecting? Yes We Should! A Plea for a Solid and Comprehensive Debate About the Objectives of EU Competition Law and Policy' (August 2010) 6(2) European Competition Journal 339 arguing that objectives such as fairness and non-discrimination are no longer advocated as they are interpreted as protecting competitors and specific sectors such as small firms; J Kirkwood and RH Lande, 'The Fundamental Goal of Antitrust: Protecting Consumers, Not Increasing Efficiency' (2008) 84(1) Notre Dame Law Review 191, 207 argue that there is nothing left from the "big business is bad, small business is good" rational for antitrust; M Motta, *Competition Policy, Theory and* Practice (Cambridge University Press 2004) for a history of the purpose of US competition law, with the defense of small firms being the reason for the introduction of US legislation in 1890.

[77] The EU position is not quite as definitive. The differences between the US and EU treatment under competition law is addressed in detail in Chapter 5. In the EU, there is express recognition that concerted practices between two small firms are unlikely to distort the market. See the Commission Notice on Agreements of Minor Importance which do not Appreciably Restrict Competition under Article 101(1) of the Treaty of the Functioning of the European Union ("TFEU") [2001] OJ C368/07.

[78] RH Bork, *The Antitrust Paradox: A Policy at War with Itself* (The Free Press 1978) 7 argues that the "survival or comfort of small business" is not a legitimate goal of US competition law.

[79] Posner (n 58) 22 states that "Antitrust enforcement is not only an ineffectual, but a perverse, instrument for trying to promote the interests of small businesses as a whole."

the concept of survival of the fittest. What is argued is that intellectual property laws have artificially and unfairly discriminated against the small software firm to such a great extent that they cannot be competitive regardless of whether they are economically efficient. In the end, the exclusion of this special group will be detrimental to the industry. How is it efficient for a small software firm to engage in considerable time, effort and money (often from tax payers) to undergo major R&D projects, and develop innovative and cutting edge technology only to have to abandon it when the firm is unable to utilize the intellectual property system on a level playing field with large firms? At the same time, large firms have been given the opportunity to use the same system to help ensure that small firms cannot succeed.

SMALL SOFTWARE FIRMS – CONSUMER WELFARE, INNOVATION AND ECONOMIC EFFICIENCY

Today it is widely accepted that the interface between intellectual property and competition policy is the promotion of consumer welfare, innovation and economic efficiency. Over time, the focus on these objectives has resulted in discrimination against small firms in the software marketplace.[80] Small firms are considered inefficient and therefore it is against public policy to protect them. Large firms are seen as the only legitimate source of innovation because they have the resources to expend on R&D efforts. In this section, these myths about the small software firm will be refuted. It is only through the strong representation of small firms in the software market that this industry will continue to thrive.

The definition of small business varies widely from country to country. Each country applies its own standards and uses different factors to classify a business as "small",

---

[80] See P Julien, 'Small Business as a Research Subject: Some Reflections on Knowledge of Small Businesses and Its Effects on Economic Theory' (1993) 5 Small Business Economics 157 suggesting that economists ignore small businesses because economies of scale are not applicable to them; they are only a transitory existence; and they are never going to be international leaders.

often for funding purposes. These factors include number of employees, revenues and profits. In this thesis, the focus is on "small", thus definitions such as those used by the Small Business Administration in the US are not suitable as they portray much larger companies than are being discussed herein.[81] For the purposes of this thesis, the definition of small business commonly used in the EU will be adopted – firms with fewer than 50 employees and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million.[82]

Consumer Welfare

A purely consumer-oriented view of competition law would omit concern for the welfare of small business. Such a strict position is ill-considered and damaging if promoted in innovation markets. It presumes that all small firms are inefficient and therefore detrimental to the economy. In fact, the statement is ironic considering the increased attention, funding and promotion of entrepreneurship in new innovative firms by governments all across the developed world. The competitiveness of the small firm is a salient public policy issue as it is tied very closely to economic development and the increased standard of living of a society.

Economic development is the "nucleus of a nation's master plan for continued prosperity and existence."[83] Factors such as job creation and increased technological capacity have long been two key sources of economic development. Small firms make important contributions to both. In the United States in 2009, SMEs (less than 500

---

[81] The US Small Business Administration classifies small businesses based on industry and range from 500 to 1500 employees. The classifications by industry can be found at <http://www.sba.gov/sites/default/files/files/Size_Standards_Table(1).pdf> accessed 15 February 2013.

[82] Commission Recommendation 2003/361/EC of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises [2003] OJ L124 <http://europa.eu/legislation_summaries/enterprise/business_environment/n26026_en.htm> accessed 15 February 2013

[83] ML Clark III and RN Saade, 'The Role of Small Business in Economic Development of the United States: From the End of the Korean War (1953) to the Present' (September 2010) 2 Office of Advocacy, US Small Business Administration <http://www.sba.gov/advocacy/7540/12143 > accessed 3 May 2010

workers) accounted for fifty percent of the country's private, nonfarm real gross domestic product and fifty percent of all Americans working in the private sector were employed by SMEs.[84] In the EU in 2008, over ninety-nine percent of the enterprises had less than 250 employees, with ninety-two percent having less than 10 employees.[85] Sixty-seven percent of the non-financial business employees of the EU in 2008 worked for small to medium sized firms (less than 250 employees).[86]

Small firms create jobs and stimulate new industries. In the US, SMEs with fewer than 500 employees were responsible for sixty-four percent of net new jobs created between 1993 and 2008, with one-third of these jobs coming from new start-ups.[87] Thus, entrepreneurial firms are key contributors of job creation. Small firms in high-growth sectors in the US have been instrumental in creating innovative products and pushing the boundaries to develop new sectors of the economy. Almost half of all the employment growth in the EU from 2002 to 2008 can be attributed to small micro firms (firms with less than 10 employees).[88]

Just how vital these firms are is evident not only in these statistics, but in the amount of money and effort that governments put into their creation and sustainability. The United States government passed the Small Business Act and created the Small Business Administration in 1953.[89] In the years that followed, the US Government

[84] Small Business Administration, 'The Small Business Economy: A Report to the President' (United States Government Printing Office 2010) <www.sba.gov/sites/default/files/sb_econ2010.pdf> accessed 29 April 2011
[85] EIM Business & Policy Research, 'European SMEs under Pressure: Annual Report on EU Small and Medium-Sized Enterprises 2009' (2010) Prepared for the Directorate-General for Enterprise and Industry <http://ec.europa.eu/enterprise/.../pdf/dgentr_annual_report2010_100511.pdf> accessed 29 April 2011
[86] ibid
[87] B Headd, 'An Analysis of Small Business and Jobs' (March 2010) 359 Small Business Administration Office of Advocacy <www.archive.sba.gov/advo/research/rs359tot.pdf> accessed 29 April 2011
[88] EIM Business & Policy Research (n 85)
[89] Section 2 (a) of The US Small Business Act (1953) Public Law 85-536 reads as follows:
"The essence of the American economic system of private enterprise is free competition. Only through full and free competition can free markets, free entry into business, and opportunities for the expression and growth of personal initiative and individual judgment be assured. The preservation and expansion of such competition is basic not only to the economic well-being but to the

increased its understanding and support for small businesses through various funding programs and legislative initiatives.[90] In 2009, the US Government introduced several policy initiatives to address the concerns of small business owners and created several stimulus packages in an attempt to assist these important entities during the US recession.[91] To help address issues arising out of its financial crisis, the EU took similar measures and introduced initiatives targeted at small firms in its European Economic Recovery Plan in 2008. The EU's "Small Business Act"[92] was adopted in June 2008 and is considered the first comprehensive small business policy framework for the EU and its Member States.[93] The goal of this legislation is to improve the competitiveness of small firms in the European Union by helping these entities overcome obstacles to growth and success.

Governments around the world understand that innovation is a catalyst for economic growth and that small firms play a significant role in bringing innovative ideas into the marketplace.   Most developed nations have strategies to improve the level of innovative outputs offered by the business sectors. It is not surprising that the focus of many of these strategies in on the small technology-based firm. These entities play a particularly important role by providing breakthrough technologies that help spur the commercialization of new products that benefit the consumer. In the US, for example,

---

security of this Nation. Such security and well-being cannot be realized unless the actual and potential capacity of small business is encouraged and developed."
[90] For a detailed history of US programs relating to small businesses, see Clark III and Saade (n 83).
[91] For details, see Small Business Administration (n 84).
[92] See the Commission of the European Communities < http://ec.europa.eu/enterprise/policies/sme/small-business-act/> accessed 5 September 2011. The EU "Small Business Act" not a legal instrument but has been endorsed by the European Council and European Parliament. The introduction to the "EU Small Business Act" states:
Dynamic entrepreneurs are particularly well placed to reap opportunities from globalisation and from the acceleration of technological change. Our capacity to build on the growth and innovation potential of small and medium-sized enterprises (SMEs) will therefore be decisive for the future prosperity of the EU. In a globally changing landscape characterised by continuous structural changes and enhanced competitive pressures, the role of SMEs in our society has become even more important as providers of employment opportunities and key players for the wellbeing of local and regional communities. Vibrant SMEs will make Europe more robust to stand against the uncertainty thrown up in the globalised world of today.
[93] 'Europe's Small Business Act strengthens small businesses and drives growth' (EUROPA Press Release, 23 February 2011) <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/218 > accessed 29 April 2011

the Strategy for American Innovation includes the "Startup America" initiative to encourage high-growth entrepreneurial ventures in an attempt to stimulate the US economy.[94] Similarly in the EU, enhancing the innovativeness of small firms is a key component if its Europe 2020 strategy and the European Commission considers "Innovation Union" to be its flagship initiative.[95] This new policy has become an important driver of the "EU Small Business Act."

Innovation and Economic Efficiencies

Schumpeter spoke of the importance of entrepreneurs, large R&D generating firms, patents, temporary monopolies and healthy competition as being key elements in the promotion of innovation. As prophetic as Schumpeter was, he did not offer the magic formula for how to fit these contradictory concepts together in a given industry to maximize innovative output and reduce unnecessary social and economic costs. Is it more important to protect large firms or small firms? Does a choice have to be made to support one size to the detriment of the other? Public policy must support the advancement of both types of companies. It is argued herein that carefully drafted intellectual property laws should promote the success of both small and large firms, and should not be biased against one size. In this section, it is argued that the security of small software firms is critical to the fostering of innovation, a key objective of both intellectual property and competition laws.

---

[94]See National Economic Council, Council of Economic Advisers, and Office of Science and Technology Policy, 'A Strategy for American Innovation: Securing our Economic Growth and Prosperity' (February 2011) <www.whitehouse.gov/sites/default/files/.../InnovationStrategy.pdf > accessed 29 April 2011
[95] European Commission, 'Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions: Europe 2020 Flagship Initiative: Innovation Union' (SEC 1161, 2010) <http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=keydocs> accessed 29 April 2011

The question most often considered in the literature is whether large firms are more innovative than small firms.[96] For example, in a recent report from Federal Trade Commission and Department of Justice in the United States dealing with patent reform and the competitiveness of innovative markets, the authors spent considerable time discussing whether large firms or small firms were more innovative.[97] While this is an interesting discussion and may have value in terms of setting industrial policy, the answer should not be a determining factor in setting policy for either intellectual property or competition law. All sources of innovation should be encouraged and supported. Such all-encompassing legal systems are designed to foster innovation in all segments of all markets. To favour one interest group over another (whether done with purpose under competition law or without purpose under intellectual property law) will have long-standing effects on the advancement of an industry. All players bring their own strengths to the marketplace and to exclude them is counterproductive to the goal of innovation. The question to be asked is what are all the sources of innovation and how can the laws be balanced to provide the best possible means of success for all those entities making relevant contributions.

Schumpeter argued that large firms and monopolies were critical for the advancement of innovation. This statement was supported by the fact that large firms have greater access to resources, both human and financial, and thus would have a greater opportunity to invest in and perform R&D. He also believed that large firms had more incentive to innovate in order to remain competitive before they were swept away by

---

[96] For a review of the literature on this question, see Menell (n 68) and see MJ Meurer, 'Inventors, Entrepreneurs, and Intellectual Property Law' (2008) 45(4) Houston Law Review 1201; Note that there is little evidence specific to the software industry and the question should be industry specific to have value. See JR Allison and RJ Mann, 'The Disputed Quality of Software Patents', (2007) 85 Washington University Law Review 297 finding that small firms have software patents of equal or greater quality than those of large firms.
[97] See Federal Trade Commission (2003) (n 36) CH 2, 12-16

the forces of creative destruction. In his time, Schumpeter would not have had knowledge of the software industry. Likewise, he would not have been aware of the significant investment governments, angel investors and venture capitalists make in small innovative firms allowing them to engage in very lengthy and complex R&D. There are many factors today that affect the level of investment in R&D; size is not necessarily the most important consideration.[98]

In the dynamic market for software, only those who innovate will survive. There is no place for those firms that do not conduct R&D and are not responsive to shifting customer needs and desires. Borrowing from the social sciences, it is commonly understood that small innovative firms have characteristics that set them apart from their larger counterparts. Small firms in innovative markets are often started by technically competent persons who stay very close to the technology and industry trends. As management is more interested in inventing and innovating, there is little hierarchy and decisions are made very quickly. This allows the small entity to be very flexible and make strategic decisions to follow a new direction if the need arises. In contrast to larger firms with bureaucratic structures, small firms can react more quickly to new opportunities and gaps in the market. They can also adapt rapidly to changing economic conditions and new technologies. This is especially important if they have an export strategy and are addressing unproven markets.[99] The other advantage that small firms have over larger players is their innate desire to take risks. Unlike firms whose management have shareholders to consider and large bonuses to secure, the

---

[98] In fact, the empirical literature does not support a conclusion that large firms promote innovation because they provide stable cash flows and economies of scale. For a review of the literature, see R Gilbert, 'Looking for Mr. Schumpeter: Where Are We in the Competition-Innovation Debate?' (August 2006) 6 Innovation Policy and the Economy < www.nber.org/chapters/c0208> accessed 4 May 2012

[99] J Francis and C Collins-Dodd, 'The Impact of Firms' Export Orientation on the Export Performance of High-Tech Small and Medium-Sized Enterprises' (2000) 8(3) Journal of International Marketing 84; G Knight, 'Entrepreneurship and Marketing Strategy: The SME Under Globalization' (2000) 8(2) Journal of International Marketing 12

small innovative firm is not adverse to taking a gamble. They have an "everything to gain and nothing to lose" attitude towards the development of state-of-the-art technologies. The small team is under no illusions that they will achieve success by copying the technology of a large firm or by making incremental improvements to a competitor's technology. Instead, small firms focus on niche product markets that separate them from large firms. Given their limited resources, they focus on one or two specific products in order to maintain continuous investment in innovation.[100]

What do these characteristics translate into with respect to the role of the small software firm in today's software industry? First, it provides support for the position that small firms are essential to opposing the market power created by the market forces unique to the software industry. Posner argued that the "feasibility of challenging an existing network monopolist is critical" to the advancement of the software industry.[101] If the monopolists cannot be contested, the consumer becomes a victim of the strength of network effects and standardization. The market leader would have many tools which could be used to keep new entrants out of the market. Therefore, the ability of flexible, risk-taking firms to create new ideas are essential for ensuring that such monopolies are only temporary. Entrepreneurial firms are capable of exploiting price, quality and functionality, thus keeping market forces in motion.[102] Monopolists must be replaced to ensure the continued success of the industry. Small firms play a major role in the process of transforming industries. They provide that

---

[100] Meurer (n 96); See also JM Barnett, 'Private Protection of Patentable Goods' (2004) 25 Cardozo Law Review 1251.
[101] Posner (n 58) 250
[102] M Glader, *Innovation Markets and Competitive Analysis: EU Competition Law and US Antitrust Law* (Edward Elgar Publishing Limited 2006) 29

source of creative destruction which has become the cornerstone of innovative progress in software.[103]

Because of their unique characteristics, small software firms are more likely to engage in the development of those types of technologies that would have the effect of widening the market. They expand markets by the introduction of new and exciting products and stimulate the continuous development of competition. In contrast, large, monopolist firms are more likely to introduce technologies that deepen existing product offerings. This is similar to cumulative development and incremental improvements to innovations already present in the market.[104] Small firms have historically been known to introduce new products that larger firms would not take on. It is well established that new entrants without a commitment to accepted technologies have been responsible for a substantial share of revolutionary new products and processes.[105] Small firms do not often compete directly with larger market leaders. They find specific technologies as a means of differentiating themselves from these larger incumbents. This is likely one reason they are able to survive in the current environment. They chose projects that large firms do not want. It is not until the small firm shows success or starts encroaching on the markets of the large firms that issues arise.

Large firms and small firms have a symbiotic relationship in which the consumer is the beneficiary. First, small firms push large firms to pursue innovation aggressively. In

---

[103] Referring to the software marketplace, Posner (n 58) 249 states that "The gale of creative destruction that Schumpeter described, in which a sequence of temporary monopolies operate to maximize innovation that confers social benefits far in excess of social costs of the short-lived monopoly prices that the process also gives rise to, may be the reality of the new economy."

[104] This idea of widening and deepening is consistent the Schumpeter's views of relationship between entrepreneurship and large, incumbent firms. See, for example, S Breschi, F Malerba and L Orsenigo, 'Technological Regimes and Schumperterian Patterns of Innovation' (April 2000) 110 The Economic Journal 388.

[105] See Scherer and Ross (n 17) 653 for a complete list that includes such significant innovations as the turbojet, microwave oven, microprocessor chip and the microcomputer.

the software industry, there is always an opportunity for new entrants to displace incumbents because competition is based mainly on functionality. Second, small firms fill gaps in the market that large firms either do not wish to fill because of their aversion to risk or that large firms are unable to capitalize on due to their inflexibility and sluggish ability to initiate change. Third, large firms often rely on the innovative technologies of small firms. This may occur especially in times of economic hardship or in particularly risky industries.[106] Industry leaders, especially in software, are constantly looking for new, ground breaking technologies to add to their portfolios. Small firms are often the source of such innovations.[107] By way of illustration, Microsoft purchased the technology for PowerPoint, a very popular office presentation tool, from a company that was just four years old. What is known today as Hotmail was purchased from a small software firm that operated for just one year. Another model used by these entities to cooperate in the marketplace is the formation of strategic alliances. These partnerships allow large firms to gain access to the specialized technologies of small firms and provide the small firm with a conduit to commercialization which may otherwise be impeded due to their scarce resources.[108]

There is also mounting support for the notion that small firms will play a more significant role in the software industry as markets become more saturated and

---

[106] Julien (n 80)

[107] See, for example, A Hesseldahl, 'What to Do with Apple's Cash' *BusinessWeek (1 March 2007)* <http://www.businessweek.com/print/technology/content/mar2007/tc20070301_402290.htm> accessed 18 October 2011 stating, "When Apple makes acquisitions, they tend to be focused on small companies that can be integrated into projects that are already developed internally."

[108] See, for example, JW Lu and PW Beamish, 'The Internationalization and Performance of SMEs' (2001) 22 Strategic Management Journal 565; CHI Research, Inc., ' Small Firms and Technology: Acquisitions, Inventor Movement, and Technology Transfer' (January 2004) Prepared for SBA Office of Advocacy US Government ed., Contract Number SBAHQ-02-M-0491 <www.sba.gov/advo/research/rs233tot.pdf> accessed 3 February 2008; CHI Research, Inc., 'Small Serial Innovators: The Small Firm Contribution to Technical Change' (February 2003) Prepared for SBA Office of Advocacy US Government, Contract Number SBAHQ-01-C-0149 <www.sba.gov/advo/research/rs225tot.pdf> accessed 3 February 2008

competition for new technology becomes more intense.[109] Technological change, globalization, deregulation and higher levels of uncertainty continue to shift industry structures to become more decentralized.[110] Success in high technology industries, in general, is unlikely to be judged in terms of the number of large firms. In the knowledge economy, it is suggested that small, specialized and innovative firms will play a more dominant role[111] in the economy and that technology itself may result in the reduction of firm size and scope.[112] In fast changing economies such as software, there may be a greater need to reduce risk aversion behavior. To increase competition, large firms may need to develop more robust ties with small firms to establish what Schumpeter calls "creative synergy."[113]

Given the above analysis of the importance and role of small software firms in the future of the software industry, it is problematic that good inventions and good companies are being weeded out of the market due to the intellectual property regime. It is not only the inefficient firms that are not surviving, but also firms with exciting and valuable new technologies that cannot compete in the existing market conditions. The "next greatest" technologies are being shelved. Consumer welfare is at stake; small firms are losing their position as generators of valuable innovations; large firm monopolies continue to dominate; jobs are lost; and economies are at risk of

---

[109] The success of the software industry may be providing a false sense of security. It is possible that the software industry has seen such growth and success because the industry was still maturing. There may actually come a time when innovative outputs will level off as the needs of consumers become satiated. Sources of innovation should not be taken for granted.

[110] MA Carree and AR Thurik, 'The Impact of Entrepreneurship on Economic Growth' in Z.J.Acs and D.B. Audretsch (eds) *Handbook of Entrepreneurship Research* (Kluwer Academic Publishers 2003)

[111] A Arora and RP Merger, 'Specialized Supply Firms, Property Rights and Firm Boundaries' (2004) 13 (3) Industrial and Corporate Change 451; ibid

[112] PL Robertson and G Verona, 'Post-Chandlerian Firms: Technological Change and Firm Boundaries' (March 2006) 46 (1) Australian Economic History Review 70

[113] Julien (n 80) 162

stagnation. It is time to open the dialogue for the future sustainability of the small software firm.

PURPOSE OF THE RESEARCH

The literature review presented in this chapter demonstrates that there is ample literature on the subject matter of the interplay between intellectual property law and competition policy. The issues raised by both legal regimes as they relate to the software industry have also been discussed in detail from various perspectives, including the most appropriate type of intellectual property regime for software protection and exploitation. The constantly changing nature of the software industry and the desire of policy makers to keep laws current and relevant in the face of technological developments and fluctuating societal needs have resulted in a vibrant and contemporary body of literature and commentary. The debate is not a new one, but it is ongoing.

Unfortunately, there is one voice that continues to be stifled and ignored – the voice of the small software firm.[114] This is likely because small firms either lack a consensus on the most important issues to address or lack an understanding of how the laws affect them. It is also evident that they lack a strong, cohesive movement necessary to lobby governments and have their position heard.[115] The story has always been told from the viewpoint of large, incumbent firms as if they were the only interested players. The experience of the large firm and those that take for granted their access to the intellectual property system and all it has to offer is completely different from that of

---

[114] S Graham and TM Sichelman, 'Why Do Start-Ups Patent?' (September 2008) 23 Berkeley Technology Law Journal 1063, 1092 call for more research in the role of patents in the competitiveness of small firms; Cockburn and MacGarvie (n 12) 35 call for further research on the dynamics of the software industry, patents, entry and exit ; Allison, Dunn and Mann (n 12) 1626 warn policy makers to ensure that all interest groups are considered in IP reform and that no preference should be taken for one over the other; Meurer (n 96) 1205 stated he is surprised how little attention IP law pays to small innovative firms.
[115] The political strength of the small software firm is discussed further in Chapter 4 in the section entitled "US and US Legal Systems and the Possibility of Reform."

the small firm. This thesis attempts to raise the voice of these small entities and approach the already existing subject matter from the perspective of small software firms. The small body of literature available on the small software firm will be introduced throughout this thesis and put in perspective of the overall issue of competitiveness.

Consideration has been given in the literature as to whether small firms should be given special attention through legislation designed specifically for their survival.[116] This thesis does not address specially crafted legislation that is intended to give small firms an advantage. It is argued that proper intellectual property protection addressing the nuances of software and the software industry would allow small firms to be more competitive and make a greater contribution to society from their innovations. Tailoring laws to suit the small firm is not the answer as it will disadvantage other interested parties (i.e. large firms) and that is counter to the arguments made in this chapter. Firms of all sizes are critical for the success of innovative markets, especially in the software industry. Large firms will always have a natural advantage given their resources, but they should not be provided artificially with additional tools to the detriment of others. Intellectual property laws have been too strongly skewed in their favour and this will have an overall detrimental effect on consumer welfare. Given the recent explosion of interest in entrepreneurship and small business by policy makers and academics, this thesis is very practical, timely and helpful in advancing the debate from their perspective.

---

[116] See, for example, Meurer (n 96) 1208 stating that special attention should only be given to small firms if they are "naturally" better at inventing or innovative and would dominate these activities but for the frictions with large firms.

RESEARCH QUESTIONS

The research problem as identified in the literature review suggests that, although

small software firms are instrumental and integral players in the economic success of

the software industry, they are largely ignored in research, discussions and resulting

policies and laws relating to intellectual property and competition. It is argued that

significant changes to the laws responsible for the ownership, protection and

exploitation of software have resulted in market failure. Small software firms are

unnecessarily and unfairly discriminated against by the current intellectual property

laws and such artificial barriers to entry result in a lack of competitiveness in the

software industry. The role of competition law is to correct market failure caused by

the improper and harmful use of intellectual property rights, but it is not currently

addressing this problem.

The overarching research question directing this thesis is whether the intellectual

property system (both procedural and substantive) designed for the ownership,

protection and exploitation of software is hindering the competitiveness of the small

software firm. As a derivative of this research question come five related sub-

questions: would the small software firm be more competitive today if the US and/or

the EU had enacted *sui generis* law specifically designed for software; is *sui generis* law

still possible given the current political, social and legal environments in which the

small firm operates; how can the current intellectual property laws designed for the

ownership, protection and exploitation of software be reformed to correct the current

market conditions such that the small software firm is able to be competitive; is either

the US or the EU in a position to set the stage right with respect to the small software

firm; and what role, if any, does competition policy play in the problem of the anti-competiveness of small software firms and, more importantly, in the solution?

METHODOLOGY

Posner argues there are three types of legal scholarship: doctrinal analysis, positive analysis of the law using methods of social science, and normative analysis of the law based sometimes on social sciences and sometimes on moral and political philosophy.[117] This study will emphasize the use of the positive analysis methodology, but will exhibit elements of doctrinal analysis as well as normative analysis. Positive analysis with the use of social science methods is considered to be a variant of doctrinal analysis in the sense that it uses traditional methods of looking at cases and common law, but uses social science theories and concepts to discuss and analyze them.[118] It is considered to be positive analysis in that it attempts to understand legal phenomenon while taking the broader and deeper social, economic and political context into account. This study will also perform normative analysis based on social sciences in the sense that it will attempt to prescribe and reform the area of intellectual property law as it relates to the ownership, protection and exploitation of software.[119] The economic analysis of the law has both positive and normative elements,[120] and both are necessary in order to consider issues of public policy.

To this end, the arguments, theories and observations proposed in this thesis are positioned in the theoretical framework known as socioeconomic theory. Economics has long been a social science discipline that has been used to examine and analyze

---

[117] RA Posner, 'The Present Situation in Legal Scholarship' (April 1981) 90(5) The Yale Law Journal 1113
[118] ibid
[119] Some argue that what sets legal scholarship apart from descriptive legal writing is its prescriptive nature. See E Rubin, 'Law and Society and Law and Economics: Common Ground, Irreconcilable Differences, New Directions: Law and the Methodology of Law' [1997] University of Wisconsin Law Review 521, 523
[120] Posner (n 117) 1120

legal constructs. The economic analysis of the law includes components of competition law, corporation law and intellectual property law, with competition being the most "fundamental and pervasive" concept.[121] Economics provides a rich and all-encompassing field from which to discuss the perspective of the small software firm as it attempts to create and maintain competiveness within the software industry. Given the overriding presence and influence that economists have had on both intellectual property and competition regimes since the 1970s, it would be impossible to conduct such an analysis without borrowing heavily from the field of economics. Legislative reform or a refocusing of policy objectives requires a coherent approach that integrates the economics, legal, business and technical standpoints regarding software and the marketplace.[122] This thesis uses this comprehensive approach.

Theoretical legal scholarship, as opposed to pure doctrinal analysis,[123] is the focus of this thesis. Theoretical legal scholarship is the "study of law from the outside."[124] Thus, there is a need to understand the economic, social and political implications of judicial findings and legislative decision making. The law must be placed in a proper context and existing doctrine must be accompanied by "an understanding of why it takes the form it does by reference to those forces which determine its current form and its ongoing development."[125] The United States and the European Union have each developed their legal regimes based their own traditions, norms, values, and pressures. In the current study, an examination of the historical, political, economic

---

[121] PJ McNulty, 'Economic Theory and the Meaning of Competition' (November 1968) 82(4) The Quarterly Journal of Economics 639

[122] E Harison, *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* (Edward Elgar Publishing, Inc. 2008) 168

[123] This is not to suggest that doctrinal legal scholarship is not an important area of study. It is simply to suggest that doctrinal analysis alone will not capture the nuances of the social, political, and economic environment in which the small software firm operates.

[124] B Cheffins, 'Using Theory to Study Law: A Company Law Perspective' (March 1999) 58(1) The Cambridge Law Journal 197

[125] CA Riley, 'Review: Gower, Still a Blueprint for Curriculum Reform in Company Law?' (Summer 1993) 13(2) Oxford Journal of Legal Studies 271

and social forces that helped determine the current state of intellectual property law for software in these jurisdictions is provided. The effects of the current doctrine are analyzed and a prospective look at the future development of the law and the software industry is also discussed.

As this study relates directly to the competitiveness and operations of the small firm, aspects of social science scholarship is included in the analysis. In order to talk about how intellectual property law affects small businesses, it must take into account how the small business operates using theories from social sciences, business in particular.[126] Therefore, an interdisciplinary approach is appropriate. A proper analysis that results in recommendations for reform cannot be made without an understanding and characterization of the external events and realities that affect the small software firm. A reliance on other disciplines is necessary and prudent.

Although legal scholarship from an interdisciplinary perspective tends to focus more on making a contribution to specific debates about law and its relationship to society, it is often criticized as having no immediate connection to actual law practice.[127] Such writings are often not considered useful to the practicing legal community. However, legal scholars practicing in the interdisciplinary field argue that such research should have a practical component and deal with contemporary legal issues.[128] Such scholarship must pass the test of relevance and have a practical impact[129] and engage in debate of current developments, thus linking academia to the real world.[130] This thesis examines issues related to the competitiveness of small software firms. The

---

[126] Cheffin (n 124) 216
[127] ibid 199
[128] ibid 213
[129] RA Posner, 'Legal Scholarship Today' (March 2002) 115(5) Harvard Law Review 1314
[130] BR Cheffins, 'The Trajectory of (Corporate Law) Scholarship' (November 2003) Inaugural Lecture, Law Faculty, University of Cambridge and European Corporate Governance Institute 49 <http://ssrn.com/abstract=429624> accessed 4 January 2011

topic is practical and the recommendations can provide some foundation for meaningful and much needed debate from the perspective of small software firms.

Research Methods

In order to adequately address the research questions, a multi–dimensional approach to the research method is required. Theoretical legal scholarship relies heavily on research methods from other disciplines, particularly the social sciences.[131] This thesis uses a pluralistic approach to research techniques in order to fully describe and examine the history, social, political, and economic aspects of the environment of the small software firm.

In order to describe the established area of intellectual property law, primary sources such as case law,[132] previous legislation, current legislation and proposed changes to legislation are examined as needed. As well, secondary sources such as books, journals, media, web material, and unpublished works are used in the analysis. A review of existing empirical research in the area of software protection and the impact of intellectual property laws on the industry provide a significant contribution to the arguments being made in this thesis. The use of empirical research by theoretical legal scholars, especially in the field of corporate law, has become increasingly common and allows such research to "carry more weight" within the corporate law discipline.[133] While an empirical study is beyond the scope of this thesis, it is important not to ignore existing empirical research that adds rich data to the arguments being brought

---

[131] Rubin (n 119) 521

[132] Case law will be discussed for purposes of identification of the principles and trends they represent. Cases will not be analyzed for substantive findings.

[133] RS Thomas, 'The Increasing Role of Empirical Research in Corporate Law Scholarship' (2004) 92 The Georgetown Law Journal 981

forward herein.[134]   Although they have limitations of reliability and validity, these studies provide for a more accurate and tested view of the topic and the analysis would not be complete without such a discussion. This thesis attempts to use existing empirical and doctrinal analysis to summarize and highlight the precarious position of the small software firm. This type of comprehensive analysis has not been conducted, although the data is available.

Finally, the analysis includes elements of comparative law techniques. Both the United States and the European Union legal regimes are highlighted throughout this thesis. These two jurisdictions have among the strongest intellectual property laws in the world. As well, they are two of the leading authorities on competition policy. Other countries look to the United States and the European Union for guidance and understanding in developing or amending their own laws. Legal scholars recognize that the US and the EU tackle very similar issues with respect to the software industry, but they address them differently based on their own jurisprudence and public policy. While the focus of the study will not be a comparative analysis of the United States and the European Union, the study will attempt to explain how the two jurisdictions differ in their approach to competition policy and its interface with intellectual property law and the protection of software. The variations in policy are looked at through the lens of the small software firm. This tool provides a means of examination of two perspectives that have shaped the current economic conditions for small software firms and allows for future discussion about the likelihood and impact of software reform in these two regimes and internationally.

---

[134] The US engages in far more empirical research, borrowing heavily from the social sciences. The European Union is largely a tradition of doctrinal analysis. This thesis will attempt to incorporate both.

The remainder of this thesis is organized based on a legal and economic analysis from a firm, industry and national perspective. The problem being discussed is multifaceted and a comprehensive view is required to address the complexity of the issues. Chapter 2 examines the legal and competitive environment of the small software firm. This chapter considers firm characteristics and issues derived within and between firms in the industry. The small firm's inability to fully participate in the current intellectual property system and the industry is emphasized. Chapter 3 focuses on the overall software industry and the dynamics that have been created due to existing intellectual property laws. It showcases the imbalance of power that large firms have been allowed to accumulate. Chapter 4 discusses whether *sui generis* law would have improved the competitive plight of the small software firm. It also considers whether *sui generis* law is still possible in the EU or the US or if another type of legislative reform is more plausible. If there is any chance of reform, it will likely have to originate from one or both of these jurisdictions. Chapter 5 will focus on the role that competition policy plays in correcting the market conditions that have been created by asymmetrical allocation of intellectual property rights to software firms depending on their size. Chapter 6 concludes and provides direction for future research.

CONCLUSION

The software industry is one of the most fascinating, turbulent, and competitive fields in the high technology sector. It is also a field that generates significant revenue, provides a large percentage of jobs in technology, and is responsible for transforming industries by making them more economically efficient and productive. Yet, it is argued here that policy makers should not rest on the perceived success of the software industry. As quickly as it shows signs of progress and strength, it can become

burdened by regulatory issues that may cause the industry to become unstable and stagnant. A strong and effective intellectual property system is critical for continued growth in innovation. There are weaknesses in the current intellectual property system that must be overcome. Market conditions (including the regulatory environment) that provide incentives to invest in R&D and to innovate today will determine the software products and services of tomorrow.

Small firms have a major role to play in the ability of the software industry to continue producing state-of-the-art technologies. Small firms and large firms may be competitors, or they may be partners. Either way, they are both important sources of innovation. Intellectual property laws have a significant effect on their relationships and how they interact with each other through the excluding, sharing or transferring of technologies. Research suggests that smaller firms may play an even greater role as competition in innovative markets becomes more intense and uncertain. The flexibility and risk-taking behavior of the small firm will prove instrumental in ensuring that such industries continue to flourish. The time has come for the small firm to be front and center in considerations for public policy and legislative reform.

Current laws are affecting the ability of the small software firm to survive and prosper in the marketplace. Software is a technology that exhibits a combination of unique characteristics that can result in significant market pressures under existing legal regimes. The barriers to entry are substantial and are creating unusual challenges for small software firms when it comes to commercialization and exploitation of their inventions. It is the role of competition law to intervene when intellectual property

laws are used by firms to exert undue harm to others. Competition law is not providing this support to the small software firm.

The purpose of this research is to highlight the struggles that small firms face in the software industry due to the lack of legislation that addresses the nuances of software. Current intellectual property laws have been skewed in favour of large firms to such an extent that the vast majority of small firms no longer have a competitive position. The voice of the small software firm must be heard in order to avoid irreparable damage to the software industry. To date, they have not had a collective, organized position on the effects of intellectual property protection. Instead, they were paid lip service by policy makers and academics during the critical stage of development of laws for the protection of software. Thirty years later, their issues are still not addressed. As more time passes, the path to success narrows and barriers to entry strengthen. It is no longer acceptable to ignore the state of the software market. The competitive plight of the small software firm must be recognized.

CHAPTER 2: THE LEGAL AND COMPETITIVE ENVIRONMENT OF THE SMALL SOFTWARE FIRM

INTRODUCTION

This chapter builds upon the premise that small software firms are very important for

the future success of the software industry. Given the relevance that software has in

the everyday lives of businesses and individuals, there are larger societal issues to

consider than simply small business survival rates. Maintaining a competitive

marketplace where innovative companies of all sizes have the opportunity to rise and

fall is beneficial not only to those directly involved in the software space, but to

consumers of the software products and services. As was discussed in Chapter 1, small

high-technology firms engage in flexibility and risk taking in their research and

development activities, thus expanding the boundaries of radical technologies and

thinking outside the box. Consumers are the ultimate beneficiary of this process as

they are assured of the latest technologies. This is particularly salient in software

markets given the ubiquitous nature of this technology. The role of policy makers and

regulators is to create a balanced legal regime that encourages innovation and

economic efficiency, but also remains predictable and functional as the state of

technology advances. Unfortunately, the laws governing the software industry are

anything but balanced, and it is argued here that consumers will be deprived when the

software markets become stagnant due to the inability of small software firms to

compete in domestic and global markets.

In this chapter and the next, the main research question of this thesis will be

addressed. Is the current intellectual property system designed for the ownership,

protection and exploitation of software hindering the competitiveness of small

software firms? To answer this question, the overarching principles of intellectual property and competition policy, namely innovation, consumer welfare and economic efficiency will form the basis for the analysis. To foster and protect these three basic objectives, the following market characteristics are considered the most relevant to prevent market failure in the software industry:[1] minimization of barriers to entry; minimization of transaction costs; predictability in scope and duration; responsiveness to the nature of software; encouragement for disclosure and dissemination of knowhow; fostering economic efficiency through mediums such as licensing and mechanisms to avoid duplication of efforts; provision of reasonable lead time; and incentives to avoid litigation.

This chapter will provide insight into the current competitive challenges experienced by the small software firm in what, for them, is a hostile regulatory environment. A firm level analysis is both necessary and illuminating as it is important to understand the characteristics of the small software firm as any recommendations for policy initiatives in the form of statutory change must be derived from those factors that operate to make the small company successful.[2] By looking at the issues only from the macro perspective of the entire industry, the fundamental distinctions that make these entities industrious, yet vulnerable, are lost. Understanding their standpoint on the role that intellectual property plays in their success provides insight as to how the system is working for or against them. A detailed investigation into their peculiar business surroundings is warranted. Therefore, this chapter acts to set the stage for

---

[1] P Samuelson and others, 'A Manifesto Concerning the Legal Protection of Computer Programs' (1994) 94 Columbia Law Review 2308, 2406-2412 (hereinafter referred to as the "Manifesto") argue, after an extensive overview of the unique nature of software technology, that these characteristics will be essential for the software industry to thrive and be competitive.

2 M Freel, 'The Characteristics of Innovation-Intensive Small Firms: Evidence from "Northern Britain"' (2005) 9(4) International Journal of Innovation Management 401; N Hewitt-Dundas, 'Resource and Capacity Constraints to Innovation in Small and Large Plants' (2006) 26(3) Small Business Economics 257

many of the arguments that follow in the next chapter as the complex question of competitiveness is examined from the industry perspective.

Promoting consumer welfare, fostering an environment of innovation, and encouraging economic efficiency, all while being responsive to the nature of software, will be the overriding themes of the next two chapters. Specifically, the market characteristics identified above will be highlighted from the perspective of the small software firm to illustrate how these firms operate within the context of today's legal regimes. This chapter is organized as follows: the first section highlights the problematic trends regarding how small software firms perceive and participate in the intellectual property system; the second section discusses why software technologies and the software industry are incompatible with the traditional patent system and what effect this has on small firms; the third section looks at why, under the current system, patent protection is critical if small firms wish to be sustainable; and the fourth and fifth sections address two prevalent issues in the software industry that affect the competitiveness of the small software firm, licensing and interoperability.

SMALL SOFTWARE FIRMS AND THE "OPTION" OF USING INTELLECTUAL PROPERTY

A small business is not a little big business.[3] A small software firm is not a little big software firm. It is important to understand that small software firms have unique characteristics that set them apart from other small firms and which must be considered independent of their larger counterparts. Such characteristics raise different regulatory issues that require consideration. The purpose here is to show that small software firms should be very interested in what a properly designed

---

[3] This phrase is borrowed from JA Welsh and JF White, 'A Small Business is Not a Little Big Business' (July-August 1981) Harvard Business Review 1.

intellectual property system offers them in terms of ownership, protection and exploitation of their valuable intangible assets. It is not intended to suggest that such a system should be tailored to favour the unique needs of small firms to the detriment of large firms, but it is to suggest that the law should not be written so as to knowingly harm them. The current mismatch between software and patent law is resulting in significant market hazards for small firms, thus creating disincentives to innovate and minimizing the contribution that these small entities make to the industry. These obstacles are greater than those expected to flow naturally by the very nature of their smallness.

While there is limited evidence available, the most current empirical studies suggest that small software firms face serious challenges with the current intellectual property system.[4] There are three trends that deserve highlighting and further discussion. First, although patents are, in theory, the most effective means of protection for software inventions under the current system, small firms do not file software patents.[5] Second, small software firms are not getting the same benefit from the patent system as are small firms in other high-technology industries such as biotechnology and

---

[4] The most recent study addressing the use by small firms of copyright, trade secrets and patent protection to assist with the appropriation of software is the 2008 Berkeley Patent Survey. SJH Graham and others, 'High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey' (2009) 24(4) Berkeley Technology Law Journal 24(4) 1255 (hereinafter referred to as the "Berkeley Survey"). While there have been other studies relating to entrepreneurial firms and the intellectual property system, they either do not address software specifically, the studies are too old for such a dynamic environment, or their sample sizes are too small in make meaningful observations. See, for example, R Mann, 'Do Patents Facilitate Financing in the Software Industry?' (March 2005) 83 (4) Texas Law Review 961 (interviews 60 participants including lawyers, investors and entrepreneurs); L Davis, 'How Do Small, High-Tech Firms Manage the Patenting Process?' (June 2006) DRUID Summer Conference on Knowledge, Innovation and Competitiveness, Working Paper No. 164, retrieved at http://www2.druid.dk/conferences/viewabstract.php?id=164&cf=8 on February 2, 2011 surveys 34 firms of which only 9 were software specific.); RJ Mann and TW Sager, 'Patents, Venture Capitalists, and Software Start-ups' (2007) 36 Research Policy 193 report findings of research undertaken in the 1990s; and see T Sichelman and SJH Graham, 'Patenting by Entrepreneurs: An Empirical Study' (Fall 2010) 17 Michigan Telecommunication and Technology Law Review 111, 140 for a review of existing empirical studies on high–tech entrepreneurial patenting behaviour. Despite their limitations, these studies generally support the trends that are found in the Berkeley Survey and are discussed in this chapter.

[5] Berkeley Survey (n 4) 1277 reports that only 24% of small software firms (not backed by venture capitalists) have ever filed one patent. Of those that do file patents, the average number of patent applications is 1.7.

medical devices.[6] Third, small software firms consider copyrights and trade secrets to be more important than patents, but neither form of protection is as important to them as an appropriation strategy as are first mover advantage and complementary assets.[7] These three findings have very significant consequences for the competitiveness of small software firms.

Unfortunately, the fact that small software firms do not participate in the intellectual property system and rank first mover advantage and complementary assets over formal legal protection results in the dismissal of the importance of a fair and inclusive legal regime. Because small software firms do not use the existing intellectual property system, it is often concluded that is not necessary for them to have legal protection for their innovative products and services.[8] This deduction is precisely the line of thinking adopted by European lawmakers during the debate as to whether to extend patent protection to computer implemented inventions. The 2001 Final Report to the European Commission on Patent Protection for Computer Programs[9] included studies undertaken to understand the position of small companies, as did the report commissioned by the European Parliament in 2002 entitled The Patentability of Computer Programs.[10] The Report to the European Commission and the Report to the European Parliament cite similar reasons why small firms would not benefit from the

---

[6]ibid; The Berkeley Survey finds that 75% of small biotechnology firms file an average of 9.7 patents and 76% of small medical device firms file an average of 15 patents.

[7] ibid 1290

[8] For an example of when legal scholars make assumptions that discredit the value of intellectual property for small software firms see P Samuelson, 'The Uneasy Case for Software Copyright Revisited' (September 2011) 79(6) The George Washington Law Review 1746, 1780 refers to the Berkeley Survey and states "there is also some evidence that legal protections are actually less important to software developers than intellectual property professionals may think."

[9] P Tang, J Adams and D Pare, 'Patent Protection of Computer Programmes: Final Report Submitted to the European Commission, Directorate-General Enterprise' (Contract No. INNO-99-04 2001) <http://eupat.ffii.org/papri/tangadpa00/tangadpa00.pdf> accessed 20 September 2010

[10] R Bakels, 'The Patentability of Computer Programs: Discussion of European-level Legislation in the Field of Patents for Software: A Study Commissioned at the Request of the Committee on Legal Affairs and the Internal Market of the European Parliament' (2002)Working Paper, Legal Affairs Series <www.europarl.europa.eu/meetdocs/.../juri/.../SoftwarePatent.pub.pdf> accessed 20 September 2010.

patenting of software. For example, both conclude that because of the nature of software, incremental changes do not allow for patenting. If small firms were to use the patent system, it would be very costly to patent these modifications and even more costly to defend them. Such reasoning should send red flags to policy makers that the small firm is disproportionately disadvantaged vis-à-vis large firms. The reports conclude that software patenting is not good for small firms because small firms rely on copyright protection and small firms will not own patent portfolios. Based on these studies, the authors concluded that small firms consider the patent system to be "irrelevant" and that small firms are "indifferent" to the use of patents to protect their software inventions.[11] Instead of resigning themselves to the fact that patents are not valuable to small firms and concluding they will not be disadvantaged without them, these findings should be disturbing to decision makers. These results should have called them to action to solve the problem while it was still possible to solve.

Small firms use copyright and trade secrets for protection because they have no other options. Copyright protection is limited to the literary component of the software. It does not protect the very component on which the small firm competes, the functionality. They are unlikely to file patents or build patent portfolios, but they could benefit greatly from having them.[12] Large firms will continue to increase their patent portfolios while small firms turn away from a system that has discouraged them and confused them. This has significant competitive repercussions for small entities. All of the reasons cited in the two EU reports as to why small companies would not benefit

---

[11] ibid 23

[12] Cross-licensing and its effects on small firms is discussed in Chapter 3, in the section entitled "Patent Boom."

from patenting software are derived from the problems that have been created with the system in the first place. The small software firm is not "choosing" to avoid relying on the intellectual property system for its success; the legislators have chosen to create a system that works against the small software firm.

Patents are not irrelevant or unimportant to small software firms.[13] On the contrary, they are prevented from using the intellectual property system because current laws do not take into account the nuances of software as a technology and as an industry. Instead of providing them with private value, the current system has created many of the elements leading to market failure in the software industry; increased transaction costs, unpredictability in scope, lack of dissemination, reduced lead time and inefficient licensing. Without patents, the small firm must enter the market without the shield of a temporary monopoly and the ability to enforce its proprietary rights and seek remedies against infringers and free-riders. These negative consequences are making it extremely difficult for small firms to be innovative and to contribute to the economic efficiency of the industry.

INCOMPATIBILITY BETWEEN SOFTWARE TECHNOLOGIES AND PATENT LAWS

It is argued that small software firm technology is different from large firm technology.[14] Small firms focus on being specialists in a core technology and search for superior methods of product creation. As such, small firms often concentrate on a small number of products in very specific markets. They commercialize and spend their time constantly improving on their core technologies. Given their limited financial and human resources, focusing on specific products allows them to maintain

---

[13] Note that in the Berkeley Survey (n 4) 1313 only 1 in 5 small software firms said their inventions did not require protection.

[14] See D Hicks and D Hedge, 'Highly Innovative Small firms in the Markets for Technology' (2005) 34 Research Policy 703, arguing that small firm (including software) technology is a higher quality and concentrated in new generations of technology.

a continuous investment in innovation.[15] This focus and specialization ensures that the innovations have extremely high impact and are likely to be commercially important.[16] It is this streamlined focus on high impact innovations that makes small firm technology beneficial to consumers and promotes economic efficiency in the market. It is often the speed of improvements, effectiveness, userability and unique functionality of their products that provide the small firm with its competitive advantage. However, this competitive advantage will quickly be lost if incumbent firms are able to gain access to the core technology and reproduce a competing product.

Having only a few products based on a valuable core technology weakens the viability of the small software firm in the event the technology is imitated. As well, because of the incremental nature of software development, there may be numerous innovations flowing from one product. Cumulative improvements build directly from the core invention and require the small firm to retain ownership rights in all building blocks so as not to be prevented from engaging in their specialized work through follow-on innovation. Remaining state-of-the art is also a competitive necessity of small software firms as they often compete in very niche markets. Obsolete technology is not marketable in a fast-paced, dynamic industry. These vulnerabilities suggest that it would be wise to avail of an intellectual property system that rewards innovation and provides a mechanism to assist it in appropriating its valuable assets. In order for the system to have even minimal benefit to small software firms, it would require

---

[15]MJ Meurer, 'Inventors, Entrepreneurs, and Intellectual Property Law' (2008) 45(4) Houston Law Review 1201; JM Barnett, 'Private Protection of Patentable Goods' (2004) 25 Cardozo Law Review 1251
[16] Hicks and Hedge (n 14) 709

protection that is efficient, predictable, cost-effective and allows for follow-on innovation.

The research suggests that small firms rely on copyright and trade secret more so than patents. This is an obvious default position for small firms, but not one that promotes their growth and success in the industry. Copyright and trade secret protection is free, immediate and relatively uncomplicated compared to patents. Such features are enticing to small firms that require timely protection of numerous inventions in a short time frame. Unfortunately, copyrights and trade secrets are inadequate for the protection of software technologies.[17] Relying on copyright and trade secret protection leads to inconsistent and unpredictable protection, exposes the functionality component of the invention to imitation and reverse engineering, and weakens the small firm's position when collaborating with larger counterparts.[18] If copyright and trade secrets provided sufficient protection for software, software patents would not be filed by large firms at rates that surpass all other industries.[19]

An obvious counterargument to the wish list presented above is that all innovative small firms require a patent system that is efficient, predictable and cost-effective. By virtue of their smallness, they are disadvantaged by time, money and resources. There is no serious debate about this and the current patent system is not inviting to small firms in general. However, the arguments herein suggest that small software firms are disadvantaged to a greater extent than other small firms. This is evident from the fact

---

[17] Copyright was first referred to by the US courts as a "thin" form of protection for the utilitarian nature of software in *Computer Associates International, Inc v Altai, Inc* 982 F 2d 693, 704 (2d Cir 1992). Copyright does, however, serve a legitimate role in protecting software from piracy and outright copying. Trade secrets are valuable only as long as the asset is considered a secret. This is problematic in the context of software innovations as the primary components are released with the product.
[18] This argument will be discussed below in the section entitled "Licensing – Cooperation or Competition."
[19] Patenting behaviour by large firms is discussed in Chapter 3 in the section entitled "Cross-licensing."

that their filing rates are extremely low in comparison to other small entities.[20] Very

few small firms file software patents despite the following: that they often develop

commercially significant innovations; they are continuously inventing and improving

upon their product offerings; software patent filing rates are higher than all other

technologies;[21] and larger competitors file patents on a routine basis. While it is well

known that patent propensity varies greatly depending on the technology, it is

impossible to reconcile the contradictory evidence that suggests that small software

firms should file more patents than other small firms.

There are three aspects of software technologies that make them irreconcilable with

the current patent system and, as a result, make software patents ineffective for small

firms. Software development is sequential and cumulative; software technology is

abstract; and the effective life cycle of the innovation is relatively short. Although

other technologies may also contain one of these components, it is the combination of

all three elements that create incompatibilities between software and patent law.

Cumulative and Sequential Development

As stated above, software development is a series of incremental improvements on an

existing core technology. Most software firms release new versions of the same

product by adding features and functionality. Building on previous work is both

efficient for the development company and cost-effective to consumers as they do not

have to buy a new "product" each time a new version is commercially available. From

a protection point-of-view, several patentable inventions may flow from the same

---

[20] See (n 5) and (n 6) and accompanying text.
[21] See Chapter 1 (n 35).

product over a short period of time.[22]   Therefore, in order to truly protect its valuable technology under the current patent system, the small firm must be able to file multiple patents within a short period of time and be able to build upon those inventions unimpeded by rivals.

The most obvious problem with this is cost.   The existing patent system is cost prohibitive and, arguably, the most significant factor in explaining why small firms do not file software patents.[23]   As the current patent system is unable to accommodate cumulative and sequential innovation, filing one or two software patent applications per product is practically worthless.   Yet, the cost of filing just one patent is problematic.   In the US, the cost to file one software patent ranges from $20,000 to $30,000.[24]   In the EU, this cost is significantly more given the fragmentation of the patent system, and the requirement to file translation costs and maintenance costs in various jurisdictions.[25] Although the US has implemented a fee reduction program for fees payable to the US Patent and Trademark Office ("USPTO"), the filing and maintenance costs are only a small portion of the overall costs paid to the patent bar.[26]

---

[22] For example, it is reported that Microsoft has 14 patents on the positioning and movement of a cursor. See MH Webbink, 'A New Paradigm for Intellectual Property Rights in Software' [2005] Duke Law and Technology Review 12, par 5.

[23] In the Berkeley Survey, 64% of small firms cited cost of filing as a reason why they do not use the patent system. Berkeley Survey (n 4) 1313; The other main issue of cost relates to the cost of enforcement. This is addressed in Chapter 3 in the section entitled "Protection and Litigation."

[24] Berkeley Survey (n 4) 1311 finds that this figure may be closer to USD 40,000.

[25] B Van Pottelsberghe, 'Lost Property: The European Patent System and Why It Doesn't Work' (2009) Bruegel Blueprint Series 12 <http://www.bruegel.org/publications/publication-detail/publication/312-lost-property-the-european-patent-system-and-why-it-doesnt-work> accessed 13 May 2012 finds that with translation and procedural costs, a European patent is the most expensive patent in the world; But see Chapter 4, in the section entitled "EU Patent System" for a discussion of the future EU unitary patent system which is estimated to reduce the cost of filing a patent in the EU by 80%; I Kazi, 'Will We Ever See a Single Patent System Covering the EU, Let Alone Spanning the Atlantic or Pacific?' [2011] European Intellectual Property Review 538, 540

[26] The cost of the patent agent fees is significantly more than the cost of filing and maintaining the patent. The filing fees and maintenance fees for small firms (less than 500 employees) equal approximately $3000. In the recent US patent reform, a new micro entity classification allows for a 75% reduction in fees paid to the USPTO.   See the USPTO Fee Schedule at <www.uspto.gov/web/offices/ac/qs/ope/fee092611.htm> accessed 27 August 2012. Approximately 70-90% of the total costs are paid to the patent bar. As well, see Berkeley Survey (n 4) 1311 for a discussion of why patent costs are higher for small firms as compared to large firms due to the complexity of the patents they file; their use of outside counsel; and their lack of knowledge about the patent process.

In addition to the legal fees and patent filing fees, there are other significant "costs" to the company. Very few small firms have in-house expertise to assist with drafting patent claims, reviewing prior art, and understanding the complexities of the system. The more complex the patent system becomes to accommodate a dynamic technology for which it is ill-suited, the higher the transaction costs for the small firm. The fact that small firms in other sectors are able to find the money to file multiple patents suggests that there are other factors at play. The fact that fewer venture-backed software firms file patents compared to other sectors leads to a reasonable conclusion that there are factors other than money involved with the decision to patent.[27] If the patent system provided predictable, efficient and reliable protection, then perhaps the sizable investment to protect multiple inventions would be worthwhile.

Abstract Nature of Technology
Despite thirty years to sort out the issues with pigeon-holing software technologies under the existing patent system, neither the scope of patentable rights nor subject matter patentability have been settled to any acceptable degree in either the US or the EU.[28] This is because the abstract nature of software is mismatched with the traditional test for patentability. For example, determining novelty is problematic because it is difficult to determine prior art for abstract technologies that do not have defined boundaries.[29] It takes more time to determine originality and this creates a

---

[27] Berkeley Survey (n 4) 1277 finds that patent filing rates for small software firms are very low even among those small firms backed by venture capital money.

[28] These elements are common in both the US and EU system. For a comparative analysis of the software patenting in both jurisdictions, see J Park, 'Has Patentable Subject Matter Been Expanded? A Comparative Study on Software Patent Practices in the European Patent Office, the United States Patent and Trademark Office and the Japanese Patent Office' (November 2005) 13 International Journal of Law and Information Technology 336. The main difference between the US and EU is the 'technical nature' of the patentable subject matter. Issues regarding subject matter patentability are discussed in Chapter 4.

[29] For an overview of the prior art issues in software, see J Park, 'Evolution of Industry Knowledge in the Public Domain: Prior Art Searching for Software Patents' (March 2005) 2(1) Scripted 47. Early issues with respect to finding and analyzing prior art have resulted in increased hires in the USPTO and steps to train examiners. See MJ Pinkerton, 'Considering the Next Generation of Innovators: Incorporating the Needs of Start-Ups Into the United States Patent and Trademark Office's Intellectual Property Strategy' (2011) 23 Pacific McGeorge Global Business & Development Law Journal 313, 323; See JR Allison and RJ Mann, 'The Disputed Quality of Software Patents' (March 2007) 85 Washington University Law Review 297 finding that software patents have

slower response rate from the patent office. Without defined boundaries, it is more likely that broad claims are going to be acceptable. This is problematic because of the need to develop cumulative technologies. The abstract nature of software leads to patents being allowed on trivial inventions.[30] Broad claims and a high threshold for obviousness result in patents being awarded for inventions not even invented and prevent effective protection for follow-on innovation.[31] A predictable and efficient system that promotes cumulative software development is not possible given the current state of affairs.

From the perspective of the small firm, several issues arise from the uncertainty created by the current system. These resource-strapped entities have to incur more expenses trying to understand and operate in this confusing situation. They lack the resources necessary to challenge patents they do not consider valid and they have to spend extra time and effort working around patents that perhaps should not have been allowed. They have to determine, to the best of their ability, if they are infringing on another's patent based on broad claims. It is possible that a broadly worded patent claim owned by rivals can block the small firm from building on its existing technologies. In addition, they are forced to contend with judicial decisions to relax the threshold for disclosure for software patents and spend significant dollars

more prior art references, claims and forward citations than other patent classifications; These improvements have done little to solve the issues with software patents. See J Bessen, 'A Generation of Software Patents' (June 2011) Working Paper No. 11-31 Boston University School of Law 15 <http://www.bu.edu/law/faculty/scholarship/workingpapers/2011.html> accessed 20 August 2012.

[30] J Bessen and MJ Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators At Risk* (Princeton University Press 2008) 194

[31] A Devlin, 'Improving Patent Notice and Remedies: A Critique of the FTC's 2011 Report' (2012) 18 Michigan Telecommunications and Technology Law Review 539, 566; DL Burk and MA Lemley, 'Policy Levers in Patent Law' (November 2003) 89(7) Virginia Law Review 1575, 1687-1688; D Harhoff and others, 'The Strategic Use of Patents and its Implications for Enterprise and Competition Policies' (July 2007) <https://ueaeprints.uea.ac.uk/37550/1/study-202852-2008_en_2475.pdf> accessed 3 July 2012 find that EU patent applications have increased, the number of claims per patent have increased, and there is a reduced quality of patents in the EU ICT sector (including software); the overall quality of patents granted by the EPO are declining and cover very marginal technological improvements. RM Ballardini, 'The Software Patent Thicket: A Matter of Disclosure' (August 2009) 6(2) Scripted 207, 208-209 argues that EU software patents are too broad in scope.

attempting to decipher exactly what inventions have, in fact, been patented.[32]

Furthermore, they have to address whether they have anything patentable based on a set of convoluted patent laws. While these challenges may be doable for a large firm with a team of patent lawyers, these are daunting tasks for a small firm.

Risk of Obsolescence

In addition to reasonable costs and predictability in scope and subject matter, small firms require the patent system to be efficient. Software is a very fast-paced environment and inventions enjoy only a short product life cycle.[33] Technology in this industry evolves quickly and the intellectual property system designed to protect the technology must be able to evolve with it. The USPTO receives an enormous number of patent applications each year. The current backlog is 700,000 applications.[34] Applications take two to three years to be heard and three to four years to be issued.[35] Such delays in software patent grants make protection futile. The product is obsolete before the grant is official. Moreover, the patent applications become "laid open" 18 months after they are filed,[36] thus exposing the small firm to imitation before the patent has even been reviewed by a patent examiner. The small firm is correct to fear disclosure of its technologies to incumbent firms before it is granted official protection.

---

[32] For example, both the US and the EU have relaxed the disclosure required in patent applications by weakening the enablement and best mode aspects. In the US, a series of court decisions have determined that there is no requirement to file source or object code, flowcharts or detailed descriptions of the invention. High level functionality is sufficient to meet the test. *Fonar Corp v General Electric Co* 107 F3d 1543, 1549 (Fed Cir 1997) and *Northern Telecom Inc. v Datapoint* Corp 908 F2d 931 (Fed Cir), cert. denied, 11 S Ct 296 (1990) In fact, the words computer or software do not need to be present in the specifications. *Robotic Vision Sys Inc v View Eng'g Inc.* 42 USP 2d 1619 (Fed Cir 1997) and *In re* Dossel 42 USP 2d 1881 (Fed Cir 1997)   The EU has a higher threshold of disclosure, but still does not require the filing of source code or design documents. See Ballardini (n 31) 218; But see, RE Thomas, 'Debugging Software Patents: Increasing Innovation and Reducing Uncertainty in the Judicial Design of Optimal Software Patent Law' (2008-2009) 25 Santa Clara Computer & High Technology Law Journal 191 arguing that a higher threshold for disclosure would dramatically increase litigation and reduce value of software; and see Unknown, 'Everlasting Software' (2012) 125 Harvard Law Review 1454 arguing that the current disclosure threshold is important to protect software technology.

[33] The effective life of a software patent is estimated to be between three and ten years, with the average time being five years. M Campbell-Kelly and P Valduriez, 'A Technical Critique of Fifty Software Patents' (January 2005) 26 <http://ssrn.com/abstract=650921> accessed 19 June 2010

[34] LJ Ackerman, 'Prioritization: Addressing the Patent Application Backlog at the United States Patent and Trademark Office' (2011) 26 Berkeley Technology Law Journal 67

[35] ibid

[36] Unlike the EU, the US has an exception to the 18 month rule. Applicants who do not file their applications internationally do not have to adhere to the 18 month disclosure requirement.

The one-size-fits-all patent system, in particular, is working against the small software firm. The system is too costly, and many of the cost issues are outside the control of regulators. If small software firms only required a finite set of patents to protect their inventions (as they do in other sectors without cumulative technologies and constant innovation), the isolating effects of the patent system may not be so prominent. Patent grants on trivial patents and broad patent claims have made serial patenting easier for large firms with deep pockets,[37] but has had the reverse effect on small firms. It has created a maze of ill-defined and nebulous rights that small firms are expected to invent around in order to be innovative. The imprecise nature of patent scope and the lowering of the threshold for patent disclosure have made it more difficult for small firms to participate in markets for technology.[38] The fact that it is still unclear as to what types of inventions will meet the subject matter requirements makes the whole system seem unstable and untrustworthy.[39] And finally, it is difficult to justify the cost of filing patent applications when the technology is under continuous development and improvement and it takes years to find out if the invention is protected. If small firms are not convinced that the patent system is going to protect their interests, there is little likelihood that they will risk disclosure under the patent rules.[40] Overall, the patent system is not offering them more value than protection under trade secrets and copyright.

---

[37] See Chapter 3 in the section entitled "Patent Portfolios."

[38] See section below entitled "Licensing – Cooperation or Competition."

[39] Note that 42% of small firms in the Berkeley Survey (n 4) 1313 report that they do not believe their inventions are patentable. This is likely more problematic in the EU as the patentability of software is still somewhat unofficial. A Grosche, 'Software Patents – Boon or Bane for Europe?' (September 2006) 14 International Journal of Law & Information Technology 257, 272 argues that software patenting has gone unnoticed by all but the largest multinational corporations, while most software firms in the EU have between one to five people. The EU takes steps to educate inventors on the software patent eligibility, but there is no official position on the matter from the EPO. See, for example, the EPO website < www.epo.org/news-issues/issues/computers/software.html> accessed 24 August 2012 and the EPO publication posted therein entitled 'Patents for Software? Law and Practice at the European Patent Office.'

[40] Note that 25% of small firms in the Berkeley Survey (n 4) 1313 report they do not want to disclose their inventions.

PATENTS AND INCREASED COMPETITIVENESS

Small firms in many sectors patent to improve their competitive advantage. The inability of the small software firm to use the patent system makes trade secret and copyright protection their default choice. As neither of these two formal rights are effective in their quest for growth and sustainability, the small firm relies mainly on first mover advantage and complementary assets. In the remainder of this chapter, the flaws in this strategy will be examined. If the small software firm wishes to grow and prosper in the current environment, patenting is a necessity. The following sections will also consider the broader implications for innovation, consumer welfare and the economic efficiency of the industry due to the lack of participation by the small firm in software patenting.

Financing

A software product has a long development cycle, especially for a firm with limited human capital. It is expensive and labour intensive. Small software firms spend months and even years in pre-commercialization mode. Without a marketable product, the company must endure a significant period of its early life without generating revenue. The capital required to become a software firm is minimal, and companies in this industry remain lean during the beginning years. Young companies run out of private resources long before their technologies are ready for market. Thus, they are forced to rely on external funding sources such as angel investors and/or venture capitalists. [41]

---

[41] MA Cusumano, *The Business of Software: What Every Manager, Programmer, and Entrepreneur Must Know to Thrive and Survive in Good Times and Bad* (Simon and Schuster 2004) 198 reports that VCs generally own about 60% of the equity in software start-ups by the time they go public. Angel investment is very common in the United States and gaining more attention in the European Union as a necessary tool for the promotion of innovation in small high-tech firms. In 2009, the EU angel investment market contributed 3-5 billion euros compared to 20 billion dollars in the US. C Munck, 'Facts and Figures on the European Angel Market' European Trade Association for Business Angels, Seed Funds and Other Early Stage Market Players, 18 May 2009 <www.slideshare.net/burtonlee/claire-munck-eban-stanford-may1809> accessed 3 September 2010; In the US, venture capital

Third party investors also play many non-financial roles that allow small firms to be competitive. Venture capitalists, and angels to a lesser extent, are useful to the small innovative company due to their contacts and relationships with other firms.[42] They provide advice and management expertise that assist the inexperienced firms in bringing their products to market.[43] Any money raised will be useful to commercialize the technology and take it to market quickly before larger competitors are able to counter. Small firms that are able to attract the attention and funding of venture capitalists often have a major advantage over other small firms.[44] Those software companies with VC funding tend to be more recognized as players in the market.[45]

Patents, and not copyright, have been shown to be very beneficial in assisting small software firms in obtaining third party financing.[46] Small firms that have a higher number of patents and patent applications pending are more likely to receive funding from investors.[47] Small firm patenting in the software industry is positively related to the number of rounds of investments from venture capitalists, total dollars invested, receipt of later stage financing, and the longevity of the firm.[48] In addition to being a potential asset which can be used as security or in liquidation to generate value for the

---

has played an important role in the success of software firms in recent years. See Mann and Sager (n 4); As with angel investment, the EU VC community invests about 25% of the total seed investment in the US. In 2005 a Working Group on Venture Capital consisting of the US Department of Commerce and European Commission Directorate General for Enterprise and Industry offered explanations for the large discrepancy suggesting that a US entrepreneurial culture allows venture capital funding to be well known and acceptable as a means of alternate financing. See the US Department of Commerce International Trade Administration, 'Working Group on Venture Capital. Final Report' (European Commission, October 2005) <http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id=1201&userservice_id=1> accessed 3 September 2010

[42] DH Hsu, 'Venture Capitalists and Cooperative Start-Up Commercialization Strategy' (February 2006) 52(2) Management Science 204

[43] D Rumball, 'Case Studies of Collaborative Innovations in Canadian Small Firms' (May 2007) Small Business Policy Branch, Industry Canada <www.ic.gc.ca/.../CaseStudies_Innovation.../CaseStudies_Innovation> accessed 3 February 2008

[44] It is important to keep in mind that small VC backed firms are not representative of all small software firms. Cusumano (n 41) 198 reports that only six out of every one thousand business plans are financed by venture capitalists in the United States.

[45] Berkeley Survey (n 4) 1269

[46] Because copyright does not protect functionality, investors do not see copyright as part of a small firm's sustainable competitive advantage; Mann (n 4)

[47] IM Cockburn and MJ MacGarvie, 'Entry, Exit and Patenting in the Software Industry' (October 2006) National Bureau of Economic Research Working Paper Number 12563 <http://www.nber.org/papers/w12563> accessed 10 February 2008 ; Mann and Sager (n 4)

[48] Mann and Sager (n 4)

investors, patents act as a signal that the management of the firm can show initiative, discipline and knowledge of its technology relevant to the industry.[49] Financing is obviously very important to the competiveness of the small software firm[50] and firms that do not use the patent system will be disadvantaged. Third party financing can help improve the competitiveness of small firms, but it seems patents greatly assist in the securing of such invaluable assistance.

Globalization

As producers of niche products, the local market place is insufficient to allow the small firm to flourish.[51] The latest industry trends suggest that software is becoming increasingly borderless. The concept of open innovation is gaining support in the software industry.[52] The idea is that firms cooperate and share ideas, allowing the use of technologies whenever it is economically efficient so as to create a more competitive market for all players.[53] Technology transfer is a very important component in this process and the patent system will be very important. Small software firms will be the source of many ideas and must be equipped with the necessary tools to contribute to a new collaborative global approach to innovation.[54]

---

[49] SJH Graham and T Sichelman, 'Why Do Start-Ups Patent' (2008) 23 (3) Berkeley Technology Law Journal 1063, 1078; C Long, 'Patent Signals' (2002) 69(2) University of Chicago Law Review 625

[50] In the Berkeley Survey (n 4) 1277, 67% of venture backed software firms held an average of 5.9 patents while only 24% of non-venture backed firms held an average of 1.7 patents. Greater use of the patent system may be beneficial to small software firms to obtain financial assistance from third party investors, but it also appears that venture capitalists believe that patents are important given the significantly greater number of patents that are presumably filed using VC funding. This trend appears to be increasingly relevant to small software firms. J Bessen (n 29) finds recent evidence that more venture backed software start-ups obtain patents than they did a decade ago.

[51] D Crick and MV Jones, 'Small High-Technology Firms and International High-Technology Markets' (2000) 8(2) Journal of International Marketing 63; N Nummela, S Saarenketo and K Puumalainen, 'A Global Mindset - A Prerequisite for Successful Internationalization?' (2004) 21(1) Canadian Journal of Administrative Sciences 51

[52] Open innovation is not the same as open source. Companies that engage in open innovation practices license technologies for a fee.

[53] E Shinneman, 'Owning Global Knowledge: The Rise of Open Innovation and the Future of Patent Law' (2010) 35 Brooklyn Journal of International Law 935, 936

[54] Federal Trade Commission, 'The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition' (March 2011) <www.ftc.gov/os/2011/03/110307patentreport.pdf> accessed 10 August 2012, 7 states that many ideas in "open innovation" will originate from start-up and small companies.

The other major trend in software is the growing use of web services to sell software products, including internet platforms and network computing.[55] Web based software applications will mean that having patent protection in one jurisdiction will not be sufficient to protect against the infringement of a technology abroad.[56] Again, international patent protection will be a very important component of these new business models.[57] Without access to global protection, small firms will fall behind even further on the competitiveness scale.

Globalization strategies are important to facilitate growth and competiveness of small software firms. As a result, global patent protection for software is more than a large firm issue. Unfortunately, intellectual property laws for the protection of software have limited global recognition and lack harmonization. TRIPS is the current international authority on intellectual property protection for software technologies.[58] It has been strongly criticized as not providing certainty for the creation of domestic laws with respect to software and for its lack of understanding of the key elements of software technologies.[59] Overall, TRIPS has not been an effective tool for the harmonization of software laws, particularly patent laws.[60] There is no positive duty

---

[55] ET Joseph, 'Apocalypse Soon: How the Implementation of Web Services Changes the Game for Extraterritoriality' (Fall 2010) 36 Iowa Journal of Corporation Law 239, 246 argues that the future of software is web services, replacing packaged software; For a good overview of the future of the software industry and the Internet, see Report of an Industry Expert Group on a European Software Strategy, 'Playing to Win in the New Software Market' (June 2009) 19-32 <ftp://ftp.cordis.europa.eu/pub/fp7/.../European_Software_Strategy.pdf> accessed 3 November 2011.

[56] Joseph (n 55) 249 discusses how large firms can infringe patent rights abroad using the Internet without liability and how important it is for small software firms to file international patents.

[57] Samuelson (n 8) 1778-1780 ponders whether there is a role for copyright in the evolution of the software industry, citing network computing, internet platforms and cloud services.

[58] Agreement of Trade-Related Aspects of Intellectual Property Rights ("TRIPS"), Dec. 15, 1993, para. 1, 33 I.L.M. 81, 87 (1994); The TRIPS Agreement incorporates the essential requirements of the Berne Convention for copyright and the Paris Convention for Patents.

[59] SK Sell, *Private Power, Public Law: The Globalization of Intellectual Property Rights* (Cambridge University Press 2003) argues that TRIPS is the result of the lobbying efforts of twelve CEOs of US-based multinational corporations (including software) whose goal was to protect their markets internationally. JH Reichman, 'The Know-How Gap in the TRIPS Agreement: Why Software Fared Badly, and What Are the Solutions' (1995) 17 Hastings Communications and Entertainment Law Journal 763, 767 argues that TRIPS did not clarify the scope of international protection and has limited the effectiveness of protection for software in domestic laws.

[60] PE King, RM Roberts and AV Moshirnia, 'The Confluence of European Activism and American Minimalism: "Patentable Subject Matter" after Bilski' (2010-2011) 27 Santa Clara Computer & High Technology Law Journal 247, 251 argue that TRIPS has only had a slight impact on bringing uniformity to patent laws in EU.

under TRIPS to protect software under domestic patent systems. Thus, each jurisdiction is free to determine if and how it will incorporate software protection into its existing patent regime. This results in very fragmented, complex and expensive global protection and enforcement for software technologies. It is, therefore, not surprising that small software firms do not avail of foreign patent systems regardless of the importance of such protection.[61] Global protection is unrealistic for the small firm under the current legal system. Their inability to operate effectively in a global setting will eventually act as a disincentive for such firms to innovate and further isolate them as real players in software markets.

Complementary Assets and Lead Time

Given the insurmountable barriers to using the patent system and the lack of proper protection under copyright and trade secret law, it is not surprising that small software firms report using first mover advantage and complementary assets as their means of appropriating their software technologies. The concept of complementary assets was first articulated in a seminal article by David J. Teece in 1986.[62] Complementary assets include, but are not limited to, specialized manufacturing, marketing capabilities, distribution channels, complementary technologies, core technological knowhow, competitive service levels and access to affordable credit. The theory of complementary assets suggests that firms with great ideas are not always successful at

---

[61] US Patent and Trademark Office and US Small Business Administration, 'International Patent Protections for Small Businesses' (January 2012) Report to Congress <www.uspto.gov/aia_implementation/20120113-ippr_report.pdf> accessed 29 August 2012 finds that small firms do not avail of international patent protection. The report notes the lack of detailed empirical studies into what characteristics determine the importance of patent protection in different technology fields, but it does not undertake to conduct such a study. A 2003 study found that only 38% of small companies (not software specific) that applied for a US patent also applied for foreign patent protection. These small firms also file in fewer markets than their larger counterparts. See T Dutra, 'Should Small Companies Seek Non-US Patent Protection?' (May 2006) 25 Magazine of Intellectual Property and Technology 1. See also United States General Accounting Office, 'Experts' Advice for Small Businesses Seeking Foreign Patents: Report to the Senate Committee on Small Business and Entrepreneurship' (June 2003) No. GAO-03-9102003 <www.gao.gov/new.items/d03910.pdf> accessed 18 January 2008 stating reasons cited for the lack of foreign patent filings include high costs, limited resources and limited knowledge about foreign patents laws.
[62] DJ Teece, 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy' (1986) 16 Research Policy 285

appropriating their innovations. When products are easily imitated and legal protection is weak, markets do not function well. Market failure occurs when the owners of complementary assets, rather than the developers of the intellectual property, are more likely to profit from the innovation. This may be an unfortunate consequence in software markets due to the weak legal protection available to small software firms.

Complementary assets are important for any firm relying on a first mover advantage as a key strategy to profit from a new software product. To be even marginally effective with the first-to-market approach, firms must focus on creating a strong marketing campaign, building a loyal customer base, and utilizing strong distribution channels. Small firms that rely on the first mover advantage will find it difficult to make a statement in the marketplace with limited funds, limited experiences, and limited internal human resources on which to rely. Small firms are less likely to build the relevant complementary assets within the boundaries of the time available to them in a dynamic marketplace.[63] For this reason, small software firms would benefit greatly from the lead time which should be available to them through patent protection. First mover advantage and intellectual property protection are not mutually exclusive strategies. In fact, they are complementary to each other. Without these complementary strategies, there is a greater risk of a larger firm imitating the entrant and taking over the market.[64] Relying on first mover advantage without significant complementary assets is a weak business strategy and will not assist the small firm in its quest for sustainability.

---

[63] ibid
[64] See Meurer (n 15) 1234 for a discussion of the "fast second" strategy used by large firms.

LICENSING - COOPERATION OR COMPETITION

Legal arrangements between players in the software industry promote competition, which in turn promotes consumer welfare, economic efficiency and innovation. Although such relationships have the ability to result in anti-competitive behavior such as tying, sales restrictions and non-competition requirements, competition authorities in both the US and the EU acknowledge the benefits of technology transfer and the licensing of intellectual property.[65] The pro-competitive effects of licensing include the dissemination of technologies, integration of complementary assets and the removal of obstacles to commercialization. An efficient exploitation of intellectual property benefits consumers through the introduction of new products, higher quality products and potential price reductions. Small firms use licensing arrangements with other industry players to overcome market challenges and to take advantage of these pro-competitive effects.

The software industry is a system of interrelated and interdependent components. Network effects force companies to develop products that communicate seamlessly with existing technology. Integration and interoperability of products in horizontal and vertical markets are critical for the proper functioning of the industry overall. Technology transfer between players in the industry is an essential component of consumer welfare as legal relationships between parties overcome market failures which are naturally occurring in the software industry. Viewed in this way, it is obvious why the software industry embraces and supports the concept of sharing ideas and technologies between industry players.

---

[65] In the US, see US Department of Justice and the Federal Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property (April 1995) available at <www.justice.gov/atr/public/guidelines/0558.htm> accessed 5 January 2010; in the EU, see Guidelines on the Applications of Article 81 of the EC Treaty to Technology Transfer Agreements [2004] OJ C101/2 available at <http://ec.europa.eu/competition/antitrust/legislation/transfer.html> accessed 5 January 2010.

The complexity of the software industry requires firms of all sizes to engage in complicated legal arrangements. The simple exchange of technology for money is insufficient and firms must engage in various hybrid relationships[66] that often require intense cooperation.[67] As a result, licensing is very common in the software industry[68] and merger and acquisition activity has intensified.[69] Many software firms engage in strategic alliances to gain access to skills and knowledge not otherwise available.[70] There are two markets into which firms in high-tech sectors sell in order to profit from their innovations – product markets and markets for technology.[71] Within product markets, firms sell their products and services to end users either directly or through intermediaries such as value-added resellers. Direct sales to end users require small firms to invest in complementary assets such as marketing, sales, technical support services, and distribution channels. Selling through intermediaries provides some relief from these investments, but results in a reduction of the profits available to the small software firm. Within the market for technology, firms sell (or exchange) technology to other firms in competing or complementary industries. The market for technology allows small firms to choose an alternative method to exploit their innovations without having to incur the costs of complementary assets that would be

---

[66] TM Jorde and DJ Teece, 'Innovation, Cooperation, and Antitrust' in TM Jorde and DJ Teece (eds), *Antitrust, Innovation, and Competitiveness* (Oxford University Press 1992) 51

[67] JM Arndt and others, 'The Emergence of Partnership Networks in the Enterprise Application Software Industry - An SME Perspective' in A Heinzl and others (eds), *Primium – Process Innovation for Enterprise Software* (Lecture Notes in Informatics: - Proceedings 2009) <http://subs.emis.de/LNI/Proceedings/Proceedings151/gi-proc-151-011.pdf> accessed 15 January 2011

[68] BN Anand and T Khanna, 'The Structure of Licensing Contracts' (March 2000) 48(1) The Journal of Industrial Economics 103

[69] PM Leger and L Quach, 'Post-merger Performance in the Software Industry: The Impact of Characteristics of the Software Product Portfolio' (2009) 29 Technovation 704

[70] LS Gao and B Iyer, 'Partnerships Between Software Firms: Is There Value From Complementaries?' (January 2008) Conference Proceedings from the 41st Annial Hawaii International Conference on System Sciences <http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4439091&tag=1> accessed 10 December 2011. The authors argue that the value of mergers depends on how easy it is to integrate the products of both firms, while strategic alliances allow firms to cooperate and experiment without commitment.

[71] See, for example, J Gans and S Stern, 'Incumbency and R&D Incentives: Licensing the Gale of Creative Destruction' (Winter 2000) 9(4) Journal of Economics & Management Strategy 485; J Gans and S Stern, 'The Product Market and the Market for Ideas: Commercialization Strategies for Technology Entrepreneurs'(2003) 32 Research Policy 333; A Arora, A Fosfuri and A Gambardella, 'Markets for Technology and Their Implications for Corporate Strategy' (2001) 10(2) Industrial and Corporate Change <http://ssrn.com/abstract=204848> accessed 9 December 2011; and A Arora and A Fosfuri, 'Licensing the Market for Technology' (2003) 52 Journal of Economic Behaviour & Organization 277.

required to reach out to end users in the product market. From a consumer welfare perspective, the market for technology allows more small software firms to enter the market place by lowering barriers to entry. Commercialization is an obstacle that prevents many small firms with limited resources from ever realizing a profit on their technologies. The market for technology is an efficient means to ensure that important technological contributions are released into the market as opposed to left unexplored when the small firm perishes.

As well, the market for technology provides a greater opportunity for innovations to be disseminated by larger firms, decreases the development cycle of products for large firms and increases competition in the marketplace.[72] Large firms often acquire smaller firms to gain access to knowhow and technology.[73] Small software firms in high growth markets attract venture capitalist funding due to the potential for early acquisition and a significant return on investment. This results in more entrepreneurs taking risks and entering the market with new innovations.[74] Large firms that may be better equipped at bringing technologies to market ensure that innovations that might otherwise be shelved are disseminated into the marketplace. Thus, ensuring that small firms are equipped to engage in the market for technology is necessary for overall consumer welfare and economic efficiencies.

Large firms have the advantage of organizational capacity, industry power, management capabilities, and financial resources. However, large firms are often too structured and hierarchical, thus preventing them from being flexible and responsive

---

[72] Arora, Fosfuri and Gambardella (n 71); Examples of this trend can be found in Chapter 1 in the section entitled "Innovation and Economic Efficiencies."

[73] Merger activity can result in anti-competitive behaviour and is closely scrutinized by competition authorities. A detailed analysis of mergers and acquisitions is outside the scope of this thesis.

[74] Hicks and Hedge (n 14) 715

to changing market needs. Small firms, on the other hand, have dynamic capabilities and help the large firm lower its inherent risk of new technology development.[75] Partnering allows small software firms to reach new markets and obtain a level of sophistication that they otherwise would not be able to reach. They benefit from the marketing strategies of larger firms, thus reducing customer uncertainty.

The obvious inequality of bargaining power between the two firms requires the small software firm to be vigilant in its negotiations and disclosure. Large firms that control key complementary assets are those most likely to be effective market imitators.[76] As it is often the knowhow and technology that the large firm is seeking, gaining access to that asset gives it significant power in the market and reduces its dependency on the small software firm.   Under the current intellectual property system, neither trade secret[77] nor copyright law provides sufficient protection to the small software firm to prevent a potential licensee from imitating knowhow and technology obtained through the negotiation process or through the fulfillment of the contract. Without a prior history, the small firm has no credibility and is unable to establish itself as a specialist in the relevant software market. The larger player will require evidence of the small firm's technical competency which is often in the form of premature disclosure of the technology. This dilemma is commonly referred to as the disclosure paradox.[78]   A patented product would improve the small entity's bargaining power against its potential partners. In addition to offering credibility and sophistication to

---

[75] K Blomqvist, P Hurmelinna and R. Seppanen, 'Playing the Collaboration Game Right - Balancing Trust and Contracting' (2005) 25 Technovation 497

[76] Gans and Stern 2003 (n 71)

[77] Trade secrets are difficult to protect through licensing arrangements. Imitation is difficult to prove and large firms often refuse to sign non-disclosure agreements. See Sichelman and Graham (n 4) 130.

[78] This concept was first discussed by economist Kenneth Arrow. See KJ Arrow, 'Economic Welfare and the Allocation of Resources for Invention' in Universities-National Bureau (ed) *The Rate and Direction of Inventive Activity: Economic and Social Factors* (National Bureau of Economic Research 1962) <http://www.nber.org/chapters/c2144> accessed 10 November 2010.

negotiations, the small firm would be able to discuss business and technical issues more freely with less suspicion and fear that the large firm is seeking to clone the technology.[79] Patent law is currently the best means the innovating small firm will have to obtain economic returns from its innovation when it is dependent on large firms for their complementary assets.[80] Thus, the small firm is caught in a situation in which it requires patents in order to obtain profits from its R&D efforts, but the system acts as a deterrent to patent protection. If the small firm is unable to realize profits from its efforts, there will be no incentive to invest in R&D. If small software firms are not using the intellectual property system as a means of licensing their technologies, then it is likely that innovation is not being dispersed into the marketplace at an optimal rate. Small firms are not engaging in the market for technologies to the extent that they should. Small firm state-of-the-art technology is not being integrated with incumbents' products. Furthermore, without the sharing of technical information, all firms are more likely to re-invent existing technology, resulting in an inefficient marketplace. The market for technologies could be larger if small firms could make use of the intellectual property system.

---

[79] In the Berkeley Survey (n 4) 1301, enhancing its reputation was the number one reason small software firms cited for seeking patent protection.
[80] Berkeley Survey (n 4) 1301 reports that small software firms in the United States do not consider patents significant in allowing them to generate licensing revenue; Studies examining drivers to entry and growth in the early days of the encryption software industry showed the value of patents in licensing. Not only were the companies able to protect their innovations and generate revenue from licensing contracts, but they were able to license the rights to use patented mathematical procedures from others. Using data from 1993-1999, firms that were start-ups in the encryption industry in the late 1980's were dominating both markets, product sales and licensing of technology. The author also collected data on the number of strategic alliances that were formed in the industry during the period from 1993-1999. The fastest growing startups in the industry were more likely to use strategic technological alliances. Furthermore, the top firms in encryption software set up partnerships with small firms specialized in other niches within the same industry and with large firms. The successful firms in this industry were able to make use of complementary assets from other firms to increase their non-core firm competences. The data shows that 54% of the technological alliances were formed by firms that owned a patent specific to the industry. See MS Giarratana, 'The Birth of a New Industry: Entry by Start-ups and the Drivers of Firm Growth. The Case of Encryption Software' (July 2004) 33(5) Research Policy 787; and MS Giarratana, 'Entry, Survival and Growth in a New Market. The Case of the Encryption Software Industry' (March 2002) LEM Working Paper Series No. 2002/01 < http://ideas.repec.org/p/ssa/lemwps/2002-01.html> accessed 6 July 2008.

Formal protection increases the efficiency of contracting, thus making it more likely that small firms will contract.[81] If the small firm has difficulty explaining or proving what it owns, this could lead to unnecessary disclosure. Contract negotiations are more ambiguous if it is impossible to articulate what is being licensed.[82] These inefficiencies lead to increased transaction costs and decrease the likelihood that a strong relationship will be created between the parties. Thus, effective intellectual property protection levels the playing field by reducing the threat of expropriation and allows the small software firm to threaten competition against the large firm if a mutually advantageous legal arrangement cannot be solidified.[83]

Given their default strategy to compete in the product market, small software firms must struggle to obtain a competitive position without the benefit of complementary assets and without the protection from the intellectual property system. Thus, they are often required to enter the market under the radar of any potential imitators. This "stealth" movement in the marketplace may be their best chance of survival.[84] Unfortunately, a covert operation is paradoxical to an effective first mover advantage strategy. Covert necessarily means that small firms should refrain from using strong marketing and public relation tools to assist them in making a huge impact within the time they have to penetrate the relevant market. Patent protection and first mover advantage are the preferred means for entering the software market.

---

[81] Arora and Fosfuri (n 71)
[82] Anand and Khanna (n 68)
[83] J Gans, DH Hsu and S Stern, 'When Does Start-Up Innovation Spur the Gale of Creative Destruction?' (Winter 2002) 33 (4) The Rand Journal of Economics 571 find that when intellectual property is weak the ideas market is foreclosed and start-ups are more likely to compete.
[84] Gans and Stern 2003 (n 71) 342

INTEROPERABILITY AND STANDARDIZATION

Interoperability promotes innovation and market efficiency in an industry characterized by dynamic, sequential innovation and strong network effects. This unique combination sets the stage for a market driven by the consumer demand for predictability and compatibility. The ability of small firm technology to connect to large platforms is critical for its success. The degree of connectivity will affect its profits as consumers seek seamless products.[85] Large, incumbent players become market leaders in defining platform technologies, structures and processes. Given the time and resources required to write and maintain an operating system and the volume of sales required to achieve network effects, large firms are more likely to be the creators of operating systems. Small software firms are more likely to be the developers of application software that must interoperate with various operating systems.[86] In fact, small firms often release application software compatible with several different platforms at the same time to get the greatest traction in the market. Due to network effects and the need to write software for platforms that have the greatest reach of end users, the interoperability of operating systems is a very significant issue for small software firms.

The Importance of Interoperability

Interoperability is achieved largely by parts of a computer program known as interfaces. The interfaces provide the precise specification that one computer program must contain in order to communicate effectively with the other. This "plug and socket" approach to software development has led to more rapid innovation

---

[85] DS Karjala, 'Copyright Protection of Operating Software, Copyright Misuse, and Antitrust' [1999] 9 Cornell Journal of Law and Public Policy 161, 163

[86] Operating systems have been distinguished from application software in the academic literature as creating the greatest need of regulation to facilitate interoperability. Much of the discussion about the powerful effects intellectual property can have on operating systems stems from the *Microsoft* cases in the EU and the US. These decisions are discussed in detail in Chapter 5.

through more experimentation of functionalities and the increase in available applications.[87] This unique aspect of software creates efficiencies in the market as it allows software developers to use functionality already developed by the host program instead of recreating common functionality.[88] The serial nature of software development means that firms reuse and reorganize component parts for the creation of new innovations.[89]

Software interfaces are a valuable proprietary tool as they allow the developer of the technology to permit or exclude others from interoperating with its technology. Innovation and creativity in interfaces is important for the advancement of the software industry. Without the ability to protect new and improved software interfaces through intellectual property laws, incentives to innovate may be lessened.[90] Interfaces are often protected by trade secrets and technical measures designed to preclude disclosure. Interfaces are not protectable by copyright law in either the US or the EU.[91] There is nothing precluding the protection of interfaces under patents laws in either jurisdiction so long as they meet the criteria for patentability. Patents issued on interfaces have the potential to impede interoperability due to the temporary monopoly created by this form of protection. As well, because US patent law has evolved to allow software patent applications to

---

[87] P Samuelson, 'Are Patents on Interfaces Impeding Interoperability?' (2009) 93 Minnesota Law Review 1943, 1947

[88] ibid 1948

[89] JE Cohen and MA Lemley, 'Patent Scope and Innovation in the Software Industry' (2001) 89(1) California Law Review 1, 5

[90] For example, in the famous *Microsoft* competition cases in the US and EU, Microsoft argued that disclosing its proprietary information on how to connect with its work group server operating system created a disincentive to innovate as Microsoft would effectively be inviting its competition to lawfully copy components of its IP so they could compete more successfully.

[91] In the US, landmark decisions *Computer Associates International, Inc v Altai, Inc* 775 F Supp 544 (EDNY 1991), affirmed 982 F 2d 693 (2d Circuit 1992) and *Sega Entertainment Ltd v Accolade, Inc* 977 F 2d 1510 (9th Circuit 1992) have resolved any issues. In the EU, Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111 (codified version) (referred to herein as the "Computer Directive") has specifically denied copyright protection for interfaces (see paragraph 11 of the preamble). This issue of substantive law was recently confirmed in the EU in Court of Justice of the European Union, Judgment in Case C-406/10 *SAS Institute Inc. v Word Programming Ltd* 2 May 2012. See P Samuelson, 'The Strange Odyssey of Software Interfaces and Intellectual Property Law' (December 2008) UC Berkeley Public Law Research Paper No. 1323818 <http://ssrn.com/abstract=1323818> accessed 10 January 2011 for a detailed account of the evolution of the laws protecting interfaces.

disclose less information of the enablement of the interface invention, it is even more difficult to invent around a software interface.[92] For the small software firm, this creates significant inefficiencies and hampers its ability to innovate.

Because software is a networked industry, it is often in the best interest of the firm holding the intellectual property rights to the interface to waive such rights and share the specifications with others in the industry. However, some firms see the advantage of controlling access to this interface information, especially if they are industry leaders in that particular market. Large, established firms are more likely to file patents over interfaces.[93] Because patents on interfaces create barriers to entry in certain markets, cross-licensing arrangements are very common in the industry and lessen the impact that patents have on the non-disclosure of interfaces on interoperability.[94] The strategic practice of trading interface patents between large firms may work to resolve some of the interoperability issues within the software industry. However, they operate to exclude small firms from the market and undermine their competitiveness. As small software firms either hold no patents or possess a limited patent portfolio, they are not capable of partaking in the trade of patents. Thus, small software firms have a greater likelihood of being precluded from valuable interface information while large incumbent firms enjoy the benefits of interoperability. In order to compete, small firms will be forced to engage in the costly and time-consuming practice of inventing around interfaces or reverse engineering,

---

[92] Samuelson (n 87) 1946; E Harison, *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* (Edward Elgar Publishing, Inc. 2008) 171
[93] Samuelson (n 87) 1964; Samuelson (91) 12 argues that interface patents are among the most valuable patents that software firms can own.
[94] Samuelson (n 91) 13

providing further delays in entering the market and increasing their costs to commercialize.

Standardization and Bargaining Power

The software industry is more technically advanced today because of standards. Without standards, software developers would be constantly competing against each other to capture a major install base while the development of new products would be secondary. Consumers would be confused and frustrated with the lack of predictability and continuity in the software market and there would be less widespread adoption of important technological advances. Development of new programs would not be efficient as firms would be forced to rewrite and reinvent interfaces, protocols and data formats. Standards are necessary in an industry that is driven by the consumer desire for ease of usability, familiarity, and connectivity.

Standardization is a valuable aspect of the software industry from the viewpoint of the small software firm. Small developers can focus on innovating on top of existing standards that have been adopted without the added burden of competing for user adaptability. This lowers the cost of market entry and encourages growth and innovation by small software firms. In many ways, standards help level the playing field for small firms in niche markets that compete mainly on application software. Their success and competitiveness often depends on their ability to access the information they require to connect to the standards. As such, a small firm's inability to connect to standards becomes an additional barrier to entry into the market. As

small, specialized firms are unlikely to independently set standards in network industries,[95] their access often depends on cooperation with large industry players.

Membership in standard setting organizations is almost exclusively available to large players in the industry.[96] The large players form committees in an attempt to set a standard based on the best technologies available. It is often in the best interest of all players to form a consensus on a standard in order to move a particular segment of the market forward at a more rapid pace. Of course, each large firm has a stake in ensuring that its technology is adopted as the standard. For this reason, standard setting organizations often become self-serving and the resulting standard is based more often on the bargaining power of the participants than the best technology.[97] Because one firm is unlikely to have all of the necessary elements to create a standard, the large firms form alliances and cooperate to set the standard. Such cooperation is necessary as many of these large firms have patent protection on the technology that is now being considered for use in the standard. The outcomes of the standard are based on the licensing terms that the incumbent firms negotiate.[98] Small firms lacking patent protection have no role to play in setting standards and lack the bargaining power necessary to negotiate licensing terms to receive access to this important technical information.

Components of standards that are intended to become common and customary in the software industry are often protected by patents. Although this seems ironic given that all firms in the industry are expected to adhere to and embrace the standard in

---

[95] G Lea and P Hall, 'Standards and Intellectual Property Rights: An Economic and Legal Perspective' (2004) 16 Information Economics and Policy 67, 75 state that to set standards, firms would need to have scale sufficient to tip the market in their favour.
[96] Ibid 81 suggest that small firms can enter into collaborative arrangements if they have some specialized knowledge to offer.
[97] P Treacy and S Lawrance, 'FRANDLY Fire: Are Industry Standards Doing More Harm Than Good?' [2008] 3(1) Journal of Intellectual Property & Practice 22
[98] Lea and Hall (n 95)

order for it to be effective, there are many that argue that intellectual property protection has a role to play in standard setting. [99] Thus, small software firms wishing to write software code to existing standards have to step carefully through a minefield of patent rights and policies set by standard boards for transactions involving protected elements of the standard. To overcome the possibility of incumbent firms holding up the adoption of a standard by the use of patents, many standards organizations require the patent holders to negotiate licenses with any party wanting to use the standard. Such licenses are expected to be based on fair, reasonable and non-discriminatory terms (FRAND).[100] Licensing terms are privately considered between the parties and are not subject to public scrutiny. Thus, competing firms are left to negotiate the terms of the licensing arrangement and access to the standards is based more on the bargaining power of the licensee.[101] Small software firms are excluded from reasonable negotiations unless they have tradable intellectual property or have the resources to incur what may be excessive royalty fees. These increased transaction costs serve as an additional barrier to entry by the small software firm into segments of the software industry in which standards are directing future product development. The unfortunate result is that unique small firm innovations are not being included in new products that are entering the market.

---

[99] MA Lemley, 'Ten Things to Do About Patent Holdup of Standards (and One *Not* to)' (2007) 48 Boston College Law Review 149; J Lerner and M Schankerman, *The Comingled Code: Open Source and Economic Development* (MIT Press 2010) 196; and RJ Mann, 'The Commercialization of Open Source Software: Do Property Rights Still Matter?' (Fall 2006) 20(1) Harvard Journal of Law & Technology 1, 9 argues that the industry has not settled on the proper relationship between patents and standards.

[100] In the United States, the term RAND is used, without the fairness component. For a discussion of the issues with patent law and standardization, see for example, J Farrell and others, 'Standard Setting, Patents, and Hold-Up' (2007) 74(3) Antitrust Law Journal 603; and see Lemley (n 99)

[101] Treacy and Lawrance (n 97); In recognition of the anti-competitive effects standardization issues can create, the EU recently released guidelines to assist competing companies in addressing FRAND issues and provide guidance to standard setting organizations. Guidelines on the Applicability of Article 101 of the Treaty on the Functionality of the European Union to Horizontal Co-operation Agreements [2011] OJ C11/01 available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:011:0001:0072:EN:PDF> accessed 12 July 2012

The Limitations of Reverse Engineering

Although a very complex process, reverse engineering can be described simply as working backward from a finished product to discover how it was made.[102] With respect to software, reverse engineering involves working backward from the object code to determine the source code. Given the above discussion regarding the necessity of interoperability, the challenge of network effects and gaining access to standards, and the non-disclosure of source code, it is not surprising that reverse engineering is a naturally occurring event in software.[103]

From an economic perspective, reverse engineering of software has positive and negative aspects. While the concept of purposely decompiling a competitor's proprietary information seems to deviate fundamentally from the purpose of intellectual property protection, current intellectual property laws have made such acts a necessity in order for the industry to achieve economic efficiency and to promote technological advancement. Reverse engineering is important for the preservation of compatibility between products and the facilitation of competition within network industries.[104] Reverse engineering lowers barriers to entry created when firms are unable to gain access to standards or interfaces required to achieve interoperability. If monopolists refuse to share information necessary to connect to existing products, reverse engineering may be the only option. From this viewpoint, reverse engineering actually promotes innovation and provides incentives to engage in follow-on innovation. Finally, from an efficiency perspective, reverse engineering helps prevent the reinventing of information already available in the market and

---

[102] Cohen and Lemley (n 89) 6

[103] P Samuelson and S Scotchmer, 'The Law and Economics of Reverse Engineering' (2002) 111 Yale Law Journal 1575, 1614; In this seminal article on the subject of reverse engineering, the authors distinguish software from other manufactured goods as most of the knowhow in software is actually contained in the product that goes out into the market. They report that reverse engineering is standard industry practice for bug fixes, customizing programs, detecting infringement and learning from others.

[104] Cohen and Lemley (n 89) 22

allows companies to tap into a large amount of usable information that is not protected by intellectual property laws.

Despite its frequent usage in the software industry, reverse engineering is not without controversy. The debate that preceded the coming into force of the Computer Directive[105] illustrates the clash between large and small software firms. Large firms argued against the legalization of reverse engineering, stating that it would discourage companies from investing in research and development if competitors could legally determine proprietary knowhow and functionality.[106] They argued that it was in the best interests of the large firm to provide access to relevant portions of its programs for interoperability purposes and that licensing agreements would adequately deal with any issues.[107] In contrast, small firms lobbied for greater rights to reverse engineering, stating that prohibitions on reverse engineering would insulate large firms from competition from small software companies.[108] The small firms argued for rights to reverse engineer to develop competing products.[109] In the end, the Computer Directive sought to strike a compromise between the interests of large and small firms. Reverse engineering of computer programs is permitted in the EU for the sole purpose of achieving interoperability and not to develop substantially similar programs.[110] Information can be obtained through reverse engineering only if it is not otherwise readily available.[111]

---

[105] Computer Directive (n 90)
[106] MA Ehrlich, 'Fair Use or Foul Play? The EC Directive on the Legal Protection of Computer Programs and Its Impact on Reverse Engineering' (Winter 1994) 13(3) Pace Law Review 1003
[107] ibid
[108] ibid
[109] P Gannon, 'Piracy Battles Stir Up Brussels' *Computer Weekly* (19 July 1990) 14
[110] Computer Directive (n 90) Article 6(2) point (c)
[111] Computer Directive (n 90) Article 6 (1) point (b)

In the US, the parameters of legal reverse engineering have been determined by a series of cases. Reverse engineering, on its face, is considered a violation of copyright law as the process involves the copying of the computer program. Using mainly the doctrine of fair use under copyright law,[112] courts have found reverse engineering lawful for purposes of gaining access to components of software not protected by copyright if it is the only means of obtaining such information;[113] for the purposes of independently developing compatible products;[114] and even for developing a competing platform.[115] Issues arise, however, when firms attempt to reverse engineer elements of a computer program that are protected by patent law. Because reverse engineering is considered a "use" of the patented program, it is prohibited under US patent laws. As a case in point, Sony unsuccessfully sued a small firm, Bleem, for copyright violation when Bleem reverse engineered Sony's proprietary software for the purposes of developing an emulator to the Sony PlayStation.[116] Bleem was successful in defending its actions using the fair use defense. Sony sued them again for patent infringement for the same act of reverse engineering. Bleem went out of business before the lawsuit was decided.[117] This case illustrates how inconsistent and ineffective intellectual property laws allow a small firm to be subject to two separate law suits for the same issue. It also suggests that large firms are able to manipulate the system to intimidate small firms and force them to withdraw from the market.[118]

Given the current state of intellectual property laws, a limited right to reverse engineer is a welcome contribution to the competitive challenges faced by small software firms.

---

[112] The EU does not have a similar fair use doctrine.
[113] *Bateman v Mnemonics, Inc* 79 F 3d 1532, 1539-40 n 18 (11th Circuit 1996)
[114] *Sega Enters, Ltd. v Accolade, Inc* 977 F 2d 255 (5th Circuit 1988)
[115] *Sony Computer Entertainment Inc v Connectix Corp* 203 F 3d 596 (9th Circuit 2000)
[116] *Sony Computer Entertainment Inc v Bleem!* 214 F 3d 1002 (9th Circuit 2000)
[117] Harison (n 92) 172 states that the law suit was the likely reason for Bleem's demise.
[118] This issue is discussed in Chapter 3 in the section entitled "Protection and Litigation."

Unfortunately, the reality of reverse engineering suggests that small firms do not consider this an unconditional benefit. First, reverse engineering is a very complex process that requires considerable skill and expertise. It is a costly exercise for a small software firm as it is time consuming and resource intensive. This makes reverse engineering a very inefficient solution to overcoming the weaknesses inherent in a poorly implemented intellectual property system. Secondly, there are no clear guidelines as to how to reverse engineer without offending the Computer Directive in the European Union or copyright laws in the United States. Small software firms would be advised to seek legal advice before partaking in such activities. Because small software firms seldom have in-house expertise to provide counsel on these issues, the lack of clarity creates additional barriers to entry for the small software firm. Third, although the Computer Directive does not allow private contracting between parties to override a firm's right to reverse engineer,[119] the law in the US is undecided on this issue.[120] As it is very common for large firms to place restrictions on reverse engineering in their contractual language, it is likely that the option of reverse engineering is foreclosed to the small firm in many circumstances. Fourth, reverse engineering is only an option if information is not available through other means. This implies that the small software firm is expected to discuss the possibility of obtaining the required information from the software developer, thus revealing its position and taking it out of "stealth" mode which is often necessary for a small software company without adequate legal protection for its intellectual property. In some circumstances, licensing may be an option. Without tradable intellectual property, the small firm will be forced to pay excessive royalty fees or attempt the daunting process of reverse

---

[119] Computer Directive (n 90) Article 8
[120] Samuelson and Scotchmer (n 103) 1626

engineering. Once again, the small software firm is being forced to maneuver through a system that is designed to see it fail.

CONCLUSION

In this chapter, a firm level analysis was conducted to illustrate how current intellectual property laws are contributing to the lack of competitiveness of the small software firm. The additional burdens placed on the small software firm are resulting in economic inefficiencies and reduced consumer benefits. Because of existing intellectual property laws, licensing, interoperability, standardization, reverse engineering are big player moves in the software game. The price of admission for the small software firm is intellectual property protection, usually patents. For a number of reasons cited in this chapter, small firms are unable to participate in the competitive games of the industry, mainly due to their inability to find value in the intellectual property regime. Based on a firm level analysis, it is possible that small software firms will survive in the existing software market simply due to the ease of entry into the market. However, small software firms are unlikely to prosper in numbers significant enough to really have a positive influence on innovation and consumer welfare. This is an unfortunate consequence of a defective intellectual property system.

The current mix of trade secrets, copyright and patents appear to allow large firms to create significant monopolies; control access to information valuable for interoperability; manipulate collaborative arrangements with small firms; and provide roadblocks that prevent small firms from being competitive. Intellectual property laws help large firms dominate the software space to the detriment of those producing valuable and innovative technology. The small firm lack of participation in the

intellectual property system and its reliance on first mover advantage is problematic as an effective strategy in an industry shaped by the power of large firms.

A small player with no intellectual property protection is a very weak player in the market. While the potential effects on the industry can be highlighted, there is no empirical research to prove that the industry is suffering or that consumer welfare is being compromised because of the issues discussed in this chapter. Nonetheless, the inefficiencies and barriers addressed in this chapter suggest that small firm technology is not being utilized to its fullest extent to provide economic benefits to the software industry. In the next chapter, a broader scope will be used to further investigate the issue of small firm competitiveness. Further evidence of the broken intellectual property system will be exposed. The role of the larger industry players will be examined in more detail, including how they use the patent system for strategic purposes that result in even greater discrimination against smaller firms. As well, the effects of the open source movement on the position of small software firms will be examined.

CHAPTER 3: LARGE FIRM DOMINATION OF THE SOFTWARE INDUSTRY

INTRODUCTION

Small firms are naturally disadvantaged due to their human and financial resource constraints and their lack of management expertise required to be competitive. These challenges are very difficult to overcome and only the most promising small firms with the best products and management team will remain active in the marketplace.[1] This weeding out process of underperforming firms ensures that only the fittest of the entrants into a marketplace will survive. Economists consider this natural elimination process to be the workings of a healthy, efficient marketplace and have argued that competition policy should not interfere by providing artificial means of keeping the weak alive.[2] Unfortunately, the existing intellectual property regime is providing artificial means of keeping the vast majority of small software firms from ever realizing their full potential.

It has been argued throughout this thesis that software is a unique, economically significant technology.[3] In Chapter 2, the characteristics of the small software firm and the effectiveness of current intellectual property laws to help achieve growth and sustainability were examined. The current legal regime is overburdening small firms and hampering their ability to compete fairly with other industry players. However, Chapter 2 did not provide the bigger picture of the competitive dynamics of the

---

[1] For example, see T Luo and A Mann, 'Survival and Growth of Silicon Valley High-Tech Businesses Born in 2000' [September 2011] Monthly Labor Review 16 find only 18% of Silicon Valley start-ups born in 2000 surviving to 2009, with employment falling by 66%.

[2] See discussion in Chapter 1 in the section entitled "The Objectives of Competition Law and Intellectual Property."

[3] *In Re Bilski* 545 F 3d 943, 88 USPQ 2d 1385 9, 30-31 (Federal Circuit 2008) on the issue of whether the court should exclude software from patentability, the Court of Appeals states "it is not debatable that these fields of endeavour have become primary contributors to today's economy and culture, as well as offering an untold potential for future advances." The Court of Appeals also states that software inventions have put the US in a "position of technological and commercial pre-eminence" and that software sectors were the fourth largest in the US economy and have significantly faster growth than the economy overall. In the EPO Enlarged Board of Appeals decision G 003/08 [2010] OJ EPO 1/2011 6, the Board states "Given the economic significance of such inventions in many technical fields….the fundamental importance of the general subject addressed by the questions referred to is not open to serious doubt."

software industry. This chapter will provide a more in-depth industry level analysis and highlight the behavioral patterns of larger firm players in the sector. The small firm's external environment and the challenges specific to the software industry are critical to understanding the constraints on consumer welfare and economic growth.

As with the firm level analysis, the most controversial subject that garners the most debate in the industry is the software patent.[4] It is argued here that patents have also had the most profound effect on the competitiveness of the small software firm. For this reason, it will be the focus of the industry level analysis provided in this chapter. Normal issues arising due to smallness and newness are not the subject of this discussion. This thesis is not about protecting the weak from the strong. It is about protecting viable, efficient firms who have the capabilities to contribute to the economy but are prevented from doing so because of intellectual property laws. It is expected that large firms will file more patents than small firms. Larger firms have access to more financial resources to file patents and are likely to have more inventions which could be patented. Small software firms are more likely to have challenges with bringing their inventions to the market as commercialization is risky and costly. For this reason, it will be more difficult for small firms to find private value in software patents. However, something beyond the realm of "normal" is transpiring in the software market from the small firm perspective. Current patent laws are providing large firms with greater than normal rights that are referred to herein as "superpowers." Such super rights are diminishing the importance of small software

---

[4] See BL Smith and SO Mann, 'Innovation and Intellectual Property Protection in the Software Industry: An Emerging Role for Patents?' (Winter 2004) 71(1) The University of Chicago Law Review 241 arguing that the industry is now in the third phase of software protection, with patents playing a key role. Patents have certainly played a greater role in software protection since US courts decided that copyright would not protect functionality. See J Lerner and F Zhu, 'What is the Impact of the Software Patent Shifts?: Evidence from *Lotus v. Borland*' (June 2007) 25 (3) International Journal of Industrial Organization 511.

firms in the software sector and are raising significant barriers to their success. It will be shown in this chapter that while small software firms may have adapted to the current regulatory environment, their means of coping with the legal system are not necessarily serving the greater goal of consumer welfare and economic efficiency.

Building on the firm level analysis in Chapter 2, this chapter attempts to provide further examination of the main research question of this thesis: is the current intellectual property system designed for the ownership, protection and exploitation of software hindering the competitiveness of small software firms? As with Chapter 2, the overriding themes of this chapter include promoting consumer welfare, fostering an environment of innovation, and encouraging economic efficiency. The industry level analysis will evaluate these same principles through a wider lens looking at the dynamics of the software industry, but always with a keen view of the uniqueness of software. Whether small software firms can compete and prosper under the current intellectual property will also be considered using many of the market characteristics identified in Chapter 2: minimization of barriers to entry; minimization of transaction costs, predictability in scope and duration; encouragement of disclosure and dissemination of knowhow; and incentives to avoid litigation.

This chapter is organized as follows: the first section considers the difficult question of what really constitutes the software industry and whether such a definition is helpful or harmful to understanding the needs of small software firms; the second section details the effects of the software patent boom on the ability of small software firms to compete while paying particular attention to the challenges of patent portfolios, cross-licensing and the perils of protection and litigation in the software industry; the

third section looks at the open source movement as a significant development in the software industry, but also as an alternative model of operation for the small software firm.

THE SOFTWARE INDUSTRY

Prior to performing an industry analysis, it is important to understand the boundaries of the software industry and determine exactly what components of the industry are under investigation. Defining the software industry is, in fact, a very difficult task and an unsettled issue in the academic literature. There are many different ways to describe the software industry. For example, some differentiate between firms that develop and sell products, those that provide services, and those that perform both product development and services.[5] This distinction can be important when discussing patents as those firms in the product sectors are more likely to hold patents than firms in the service sector.[6] Others separate the firms between those that generate a significant percentage of their revenue from sales of software (sometimes known as pure software firms) and those that produce software as a secondary product or for internal purposes.[7] Software is comprised of many technologies, with each technology driven by the nature of the applications that are produced. There are many niche sectors within the software arena and, as a result, there are few mass markets.[8]

---

[5] JR Allison, A Dunn and RJ Mann 'Software Patents, Incumbents, and Entry' (2007) 85(7) Texas Law Review 1579 at 1580; MA Cusumano, *The Business of Software: What Every Manager, Programmer, and Entrepreneur Must Know to Thrive and Survive in Good Times and Bad* (Simon and Schuster 2004) 33

[6] Allison, Dunn and Mann (n 5) 1602; RJ Mann and TW Sager, 'Patents, Venture Capitalists, and Software Start-ups' (2007) 36 Research Policy 193, 205

[7] See for example, BH Hall and M MacGarvie, 'The Private Value of Software Patents' (May 2006) National Bureau of Economic Research Working Paper No. 12195 <www.nber.org/papers/w12195> accessed 3 May 2010; and see JR Allison and RJ Mann, 'The Disputed Quality of Software Patents' (2007) 85 Washington University Law Review 297.

[8] Cusumano (n 5) 47; See IM Cockburn and MJ MacGarvie, 'Patents, Thickets and the Financing of Early-Stage Firms: Evidence from the Software Industry' (Fall 2009) 18(3) Journal of Economics & Management Strategy 729 in which the authors used 27 different software markets in their research study; In Allison, Dunn and Mann (n 5) 1605 the authors identify more than 100 different sectors for software; IM Cockburn and MJ MacGarvie, 'Entry, Exit and Patenting in the Software Industry' (October 2006) National Bureau of Economic Research Working Paper 12563 10 <www.nber.org/papers/w12563> accessed 2 October 2009 state that the number of differentiated products make the set of potential entrants difficult to identify; and see RJ Mann, 'Do Patents Facilitate Financing in the Software Industry?' (March 2005) 83(4) Texas Law Review 961, 1007 stating that the many sectors of the software industry means that no single patent or group of patents control a major part of the whole industry.

Software companies are a very diverse group with a broad spectrum of potential customers. Software firms sell to consumers, enterprises, and/or other technology firms as well as provide services such as installation, support and maintenance, installation, customization and training for their customers. Perhaps the most commonly used definition separates the software industry into three categories: packaged software providers or independent software vendors (the software may still require some configuration, but otherwise sold as is); customized software developers; and embedded software writers (often in-house software developers in various manufacturing sectors such as automobiles and electronics).[9] Much of the academic literature focuses on the packaged software industry even though this sub-sector represents only fifty percent of the global market for software.[10] Fewer regulatory issues may arise with respect to customized and embedded software development as they are not usually products that are commercialized for sale in competitive markets. However, as will be seen below, large manufacturing companies hold more patents than any other type of company, thus making them an important interest group in this thesis.

Software is a general purpose technology and firms from many different sectors develop software for a variety of end users. Software is applicable to a broad array of products and many industries rely on software.[11] This creates significant opportunities for small software firms to operate in niche markets where software is needed. Because small firms often focus on niche areas, software vendors and producers from

[9] Report of an Industry Expert Group on the European Software Strategy, 'Playing to Win in the New Software Market' (June 2009) 3 <ftp://ftp.cordis.europa.eu/pub/fp7/.../European_Software_Strategy.pdf> accessed 3 November 2011
[10] S Graham and DC Mowery, 'Software Patents: Good News or Bad News?' (May 2004) TI:GER Faculty Working Papers 15 <www.tiger.gatech.edu/files/gt_tiger_software.pdf> accessed 9 March 2010
[11] The abstract nature of software and its various uses makes classifying and searching software patents very problematic. See below section "Patent Portfolios."

all sectors and all industries are relevant for the current analysis. For example, small firms produce automotive software that is sold to large automotive manufacturers. Large companies in many industries rely on small firms to undertake development projects in outsourcing arrangements. As well, large firms that hold software patents, regardless of the sector, pose issues for small software firms. The more software patents held by large manufacturing firms, the more difficult it will be for the small firm to profit from its inventions. Infringement claims and litigation can just as easily occur between firms in different sectors with or without competing technologies, especially if the large firm is experienced in this activity. The small software firm cannot therefore ignore patents filed by those in non-software specific sectors.

PATENT BOOM

The software patent boom in the US and, to a lesser extent, the EU has been well documented.[12] The growth in the number of software patents granted since the mid-90s is unprecedented and outperforms all other industries.[13] A commonly held reason software patents have been granted in such large numbers is because of a series of court decisions that have largely relaxed requirements required to file patents while at

---

[12] See, for example, J Bessen and RM Hunt, 'The Software Patent Experiment' (March 2004) 3 Federal Reserve Bank of Philadelphia Business Review Journal 22 < www.phil.frb/files/br/br304rh.pdf > finding that software patents as a share of all patents in the US grew from 2% in the early 1980s to 15% by 2002; Cockburn and MacGarvie (2006) (n 8) finding that the number of software patents grew by 600% from 1994 to 2004; JE Cohen and MA Lemley, 'Patent Scope and Innovation in the Software Industry' (2001) 89(1) California Law Review 1, 11 state that there were over 100,000 software patents in force in the US by 2001 and thousands more being issued each year; Allison, Dunn and Mann (n 5) 1590 examine software patenting practices from 1990 to 2001 and find that prepackaged software firms and system design firms experienced an increase in software patenting between 300% and 500%. But see Graham and Mowery (n 10) 15 finding that the rate of growth of prepackaged software patenting has slowed in the US since 2000. Similar studies have not been conducted to determine the extent of software patenting in the EU, but there are indications of increased software patent rates in the EU. See, for example, RM Ballardini, 'The Software Patent Thicket: A Matter of Disclosure' (August 2009) 6(2) Scripted 207, 211 citing the European Patent Office Annual Report 2007 and the World Intellectual Property Office World Patent Report 2008 as evidence of increases in software patenting in the EU.

[13] MH Webbink, 'A New Paradigm for Intellectual Property Rights in Software' (2005) 12 Duke Law & Technology Review par 5 showing how software patent rates are disproportionate to those in the economically significant pharmaceutical industry; J Bessen and MJ Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovation at* Risk (Princeton University Press 2008) 285 show that software patents accounts for a much larger share of all patents than did other general purpose technologies; Bessen and Hunt (n 12) 26 show trends in propensity for software patents granted increased roughly 2.5-4 times larger than trends for patents in general in the 1980's and 90's; E Harison, *Intellectual Property Rights, Innovation and Software Technologies* (Edward Elgar Publishing Limited 2008) 145 states that software patent growth rates are "striking" when compared to other technologies. But see M Campbell-Kelly, 'Not All Bad: An Historical Perspective on Software Patents' (Spring 2005) 11 Michigan Telecommunications and Technology Law Review 191, 243 arguing that the number of software grants are not that different from other major classifications.

the same time affording software patents stronger protection than other types of intellectual property.[14] Such changes in the law have made software patents less costly to obtain, easier to enforce and have generally increased the private value of software patents.[15] All such nuances in patent law applicable solely to software are indicative of the issues courts faced in trying to find a way for software to fit within the established norms of the existing patent system. Software simply did not fit the structural mold of patent law.

 If the changes to patent laws are the sole and most predominant reason for the increased activity in filing software patents, then it would stand to reason that the small firm would be equally likely to file more patents. The laws apply to large and small firms equally. Stronger protection, more cost-effective, greater private value and greater economic return sound like perfect incentives for small software firms to file more patents. This is especially so given the information provided in Chapter 2 regarding the lack of resources and the challenges with appropriability faced by the small firm. However, the evidence does not support such a logical conclusion. On the contrary, the evidence suggests that the changes to the laws only made software patents more economical and effective for large firms.

---

[14] See, for example, Harison (n 13) 146 discussing how court decisions have expanded the opportunities to protect software and algorithms by patents and legislation has reshaped strategies of patenting behaviour; Lerner and Zhu (n 4) show that less copyright protection afforded to software by courts resulted in accelerated patent applications; Bessen and Hunt (n 12) 31 argue that much of the increase in software patents can be explained by changes in legal treatment; RM Ballardini, 'Software Patents in Europe: the Technical Requirement Dilemma' (2008) 3 (9) Journal of Intellectual Property Law & Practice 563, 571 argues that a more liberal interpretation of "technical requirement" in EU has brought an increase in the number of software patents granted; and Ballardini (n 12) 230 argues that an increase in number of software patents filed in EU over last 10 years is a direct result of trends by courts to relax requirements for filing software parents.
[15] The result is that patent applications are less costly to file, easier to enforce and lend to a greater assumption of validity. See Bessen and Hunt (n 12) 27.

Large firms file the vast majority of software patents in the US and the EU.[16] As stated above, it is expected that large firms would have more patent filings based solely on their resources, experiences and R&D activity.   However, it is expected that small software firms would take advantage of stronger protection, greater appropriability and the increase in private value provided by software patents. There should be some evidence that small firms increased their rate of software patenting as the laws became more favourable. Instead, recent evidence shows that small software firms file patents at alarmingly low rates, and more importantly, the gap between the filing propensity for large and small firms continues to widen.[17]   This trend suggests that as large firms find greater private value in filing patents, they are simultaneously making it more futile for small firms to reap the benefits of patent protection. A similar argument could be made that the relaxing of patent laws in favour of software would, at a minimum, result in small software firms showing greater patent filing activity than their other small counterparts in other sectors such as biotech and electronics. Again, the evidence suggests the opposite effect. Small software firms do not file software patents at a similar rate to other small firms in other industries, but file significantly

---

[16] J Bessen and RM Hunt,'An Empirical Look at Software Patents' (Spring 2007) 16(1) Journal of Economics & Management Strategy 157 find that only 5% of software patents are owned by software publishers; Hall and MacGarvie (n 7) 32 state that 90% of software patents acquired during the past 20 years have been acquired by non-software firms in the information and communications technology sector and that the growth of patents is driven to a great extent by large hardware firms in need of large patent portfolios rather than by the need of software firms to protect their inventions; Bessen and Hunt (n 12) find that software patents are not closely related to the creation of computer programs and that 3 out of 4 software patents are owned by large manufacturers (machinery, electronics and instruments) outside software.

[17] J Bessen, 'A Generation of Software Patents' (June 2011) Boston University School of Law Working Paper No. 11-31 <www.bu.edu/law/faculty/scholarship/workingpapers/2011.html> accessed 25 August 2012 finds that, over the past decade, fewer small firms are filing software patents whereas more large firms are filing software patents. See also, K Blind, 'Intellectual Property In Software Development: Trends, Strategies and Problems' (2007) 4(1) Review of Economic Research on Copyright Issues 15, 21 finding that the size bias in Germany software patent holders increased from 2000-2004, with only 5% of small companies compared to 30% large companies holding patents in 2004. The author blames the debate over patentability of software in EU for the increase in the imbalance; Cockburn and MacGarvie 2009 (n 8) 769 show that patenting is very important for small software firms but finding it "striking" that only 20% ever filed a patent; Bessen and Hunt (n 12) 20 find that new software firms (observing them during the first 5 years of their operations) obtained significantly fewer software patents than established firm; S Graham and DC Mowery, 'Intellectual Property Protection in the U.S. Software Industry' in WM Cohen and S A Merrill (eds), *Patents in the Knowledge-Based Economy* (National Academies Press, National Research Council 2003) 233 report that software patent propensities of established software firms rose in the 1990s but there was no similar trend found for new entrants; Bessen and Hunt (n 12) 8 show that new firms (five years or less) have a significantly lower patent propensity than older firms in the software industry; and see Mann and Sager (n 6) 205 showing that low patenting rates among small software firms cannot be explained by the fact that firms are at an early stage of their life cycle.

fewer.[18] Even those small software firms that do file patents only file a small number of patents as compared to other sectors.[19] So the issue it not about smallness; it is about software. It appears that small software firms have been largely shut out of the patent system while large firms enjoy the enormous advantage derived from favourable court rulings.

The question that remains to be answered, in general terms, is whether this phenomenon has improved benefits for consumers and results in greater economic efficiencies for the software industry. More specifically, what effect has the software patent explosion and the resulting disparity in software patent holdings between large and small firms had on the ability of small firms to compete in this market. This kind of impressive growth in patenting skewed in the direction of a specific and powerful segment of the software market cannot exist without repercussions in the industry. Concern for the future of the software industry requires a careful examination of the effects of this imbalance on innovation, competition and the survival of the other players in the industry. How the big players chose to use their patents (and how the law allows them to use their patents) will have a profound effect on how small firms participate in the system and how they perceive the intellectual property system as being useful to their growth and security. As will be shown below, large firm patent holders have the ability to manipulate the power they obtain to ensure that small software firms do not pose a competitive threat.

---

[18] See Chapter 2 (n 5) and accompanying text; see also Mann and Sager (n 6) 205 stating that only 24% of the 877 start-up software firms had patents and that this rate was much lower than for biotech firms.
[19] See Chapter 2 (n 6) and accompanying text; and Mann and Sager (n 6) 206 finding that startup software firms have an average of 3 patents compared to biotech who hold an average of 10 patents.

Patent Portfolios

It is now well established that large firms amass significant numbers of software patents, while the majority of small firms do not hold software patents. Of the firms that do hold patents, they hold a very small number. In fact, many large firms chose to be routine filers of software patents, regardless of the significance of the technology to their business.[20] Studies have been unable to link the proliferation of patenting with size, R&D activity and/or productivity level.[21] Patenting for reasons unrelated to R&D and productivity is generally known as strategic patenting. Today there is significant evidence available to conclude that strategic patenting is a common and expected activity among large firms in software sectors.

The patent portfolio theory states that the value of patents does not lie in their individual significance, but in the aggregation, and that, when combined, they confer an array of important advantages.[22] If this theory is true, the regulation of patents so that all players in the industry have equal access to the patent system is a very relevant competitive concern. Not surprising given the high volumes of patents that are filed in this area, patent portfolios are very common in the software industry. The term patent portfolio is used to describe a set of distinct, but related, strategically chosen patents by a single holder.[23] Patent portfolios are held by large firms having greater economies of scale for patenting, legal departments and deep pockets. Such portfolios allow these large firms to use bulk patenting for offensive, defensive, strategic and tactical benefits that are not available to anyone not having ownership of a patent

---

[20] Allison, Dunn and Mann (n 5) 1593 argue that in the 1980s firms patented their most fundamental and crucial technologies, whereas the modern software firm with a patent portfolio is likely to patent as a matter of routine.

[21] See for example, Bessen and Hunt (n 12) 41 arguing that growth in software patenting rates cannot be explained by research inputs or productivity growth and cannot reconcile the increased filings with traditional incentive theory; and see RP Polka and G Parchomovsky, 'Patent Portfolios' (November 2005) 154(1) University of Pennsylvania Law Review 1, 5 arguing that the average expected value of a patent is extremely small, yet large firms file patents in unprecedented numbers.

[22] Polka and Parchomovsky (n 21) 27

[23] ibid 31; The authors argue that the choice of patents is not random and have to be related and strategic to have true power.

portfolio.[24]   These benefits will be described below as providing large firms with

"superpowers" over small software firms.[25]   These superpowers have a detrimental

effect on the small firm's ability to innovate, commercialize, create efficiencies and, as

a result, grow and prosper in the software market.

The patent portfolio theory suggests that firms holding large numbers of patents have

the following cumulative benefits: greater ability to create subsequent innovation

because of a broader scope of patent protection; increased opportunities to expand

R&D into related areas as well as address future uncertainties related to technology

and their competitors; enhanced power to exclude others from the market; improved

bargaining position against competitors; improved ability to avoid and threaten costly

litigation; and a more convincing voice in the politics of industry.[26]   Taken together,

these superpowers represent a challenging environment for the small software firm to

create any significant competitive advantages.

Software is a complex technology and computer programs continue to be more

complex as the industry matures.[27]   Software is known to be cumulative in that

innovation most often involves building on interrelated component parts. Software

technology is also considered complementary in that different innovators utilize

various approaches to enhancing and improving quality and functionality of the

software product. The greatest benefactor of this, of course, is the consumer. The

consumer is able to access new and improved products (or upgrades on existing

---

[24] ibid 27; In this chapter, the general theory of patent portfolios introduced by Polka and Parchomovsky will be analyzed in relation to the software industry.

[25] ibid 7; The authors refer to the aggregation of patents in the patent portfolio as "superpatents."

[26] ibid

[27] For example, see DS Evans and A Layne-Farrar, 'Software Patents and Open Source: The Battle Over Intellectual Property Rights' (Summer 2004) 9(10) Virginia Journal of Law and Technology 1, 33 arguing that the software industry is very different today than in its infancy and that computer programs are far more complex today than in earlier years.

products) on a consistent basis. These characteristics make the industry dynamic and ever-changing.   If a large company has the power to build a fence around its technology to prevent others from improving upon its products, that large firm will be able to prevent follow-on innovation. This, in turn, prevents other companies from entering into its market and creates powerful barriers to entry for small firms.[28] Further, holders of large patent portfolios can use methods to block competitors and potential competitors from entering their market space or from further developing an existing product.[29] The only means the small firm would have to enter sectors which include "patent thickets"[30] would be to pay royalty fees to the owners of the patents or to invent around the patent claims. This raises the transaction costs incurred by small firms and acts as a disincentive to innovate. The ability to control follow-on innovation in a software market is precious. It provides the superpatent holder with the power to control and dominate the sector.

Chapter 2 highlighted the importance of interoperability and standardization in the software sector due to network effects. Such features create efficiencies for software producers and predictability to software users that otherwise would result in chaos in the software world. It is argued therein that small software firms are particularly vulnerable if they are unable to connect to operating systems and have access to

---

[28] Allison, Dunn and Mann (n 5) 1606 find that sectors with higher patenting propensity have fewer entrance and conclude that portfolios deter entry; Cockburn and MacGarvie 2009 (n 8) finding that patent thickets make it more difficult for early stage firms to obtain initial funding as they are perceived by lenders to be taking on greater risk and require higher transaction costs than investors are willing to support; Cockburn and MacGarvie 2006 (n 8) finding that software firms are less likely to enter product markets in which there are more patents and that patents have a deterring effect on entry.

[29] See SJH Graham and T Sichelman, 'Why Do Start-Ups Patent?' (2008) 23(3) Berkeley Technology Law Journal 1063, 1081 for a detailed discussion of blocking and preemptive patenting.

[30] A patent thicket is defined as an "assembling of large patent portfolios in order to extract royalties from competitors and to defend themselves from similar behavior by their rivals"; Bessen and Hunt (n 12) 14. For evidence that software patent thickets exist, see C Shapiro, 'Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting' in AB Jaffe, J Lerner and S Stern (eds), *Innovation Policy and the Economy* (MIT Press 2001) 119 arguing patent laws are the reason for thickets; Ballardini (n 12) 210 argues the major reason for thickets in EU and US is the lack of prior art and the abstract nature of software patent claims; M Noel and M Schankerman, 'Strategic Patenting and Software Innovations' (May 2006) Centre for Economic Policy Research Discussion Paper No. 57012006 <http://ssrn.com/abstract=922111> accessed 3 June 2009 argue that patent thickets provide incentive for defensive patenting.

standards that become commonplace within the software sectors. The software industry, then, is highly interconnected and firms often rely on other competitors for access to critical technology. If that technology is patented, as it often is, connectivity is only possible with permission and the payment of license fees and/or royalties. It is easy to understand why a firm would want to hold a large patent portfolio in such an environment. Patents translate into bargaining power and certainty in an otherwise chaotic and volatile market. It also puts the holder of a well-planned diverse portfolio in a comfortable position should it desire to expand into a related, but slightly different, path with its product development.[31] This could prove very important given how quickly software technology changes. Small firms do not have these highly desirable advantages due to the current patent system. This is a major setback to their competitiveness and puts them at the mercy of incumbent firms.

Cross-licensing

Perhaps the most disconcerting practice among large software firms that act to hamper the innovative potential and the economic efficiency of the small software firm is cross-licensing.[32] Cross-licensing is a means by which holders of patent portfolios license each other's technology using complex and all-encompassing licensing arrangements. This tool has been credited as solving the patent thicket problem in the software industry.[33] Patent thickets in software sectors make it very

---

[31] Polka and Parchomovsky (n 21) 31

[32] J Bessen and E Maskin, 'Sequential Innovation, Patents, and Imitation' (January 2000) Department of Economics, MIT Working Paper 00-01 < www.researchoninnovation.org/patent.pdf> accessed 15 June 2010 find a distinct pattern of cross-licensing in the software industry; RJ Mann, 'Commercializing Open Source Software: Do Property Rights Still Matter?' (Fall 2006) 20(1) Harvard Journal of Law & Technology 1, 10 argues that cross-licensing is a key feature of a mature proprietary software development model and that it is now really important for all major firms to have access to IP belonging to other major firms; Mann (n 8) 992 states that cross-licensing is particularly important in software because of the large number of players with wide and varying patent portfolios.

[33] For example, see Evans and Layne-Farrar (n 27) 42 arguing that software patent thickets have not grown in the software industry because of cross-licensing and pools; Noel and Schankerman (n 30) 2 argue that cross-licensing and patent pools are most important tools in complex technology industries like software where innovation is cumulative; Allison, Dunn and Mann (n 5) 1594 argue that patent-based power is not a factor in software markets because of the "web of explicit and implicit cross-licensing agreements"; US Department of Justice and the Federal Trade Commission, 'Antitrust Enforcement and Intellectual Property

difficult to "clear" an invention for commercialization. The potential to infringe on another's intellectual property is very high because of the high volumes of patents. Equally as daunting is the fact that several different patent holders may have exclusive rights to technology that a developer may want to include as a component part in a product ready for commercialization. The practice of cross-licensing helps firms deal with both the volume of patent rights and the fragmentation of these rights. Large firms will sign blanket licenses for many, if not all, of the patents in the other's portfolio.

Cross-licensing has allowed the large firm to adjust well to the patent explosion. The incumbent is able to use the law to its advantage to both create the issues and then solve the issues. For players with large portfolios, cross-licensing addresses many of the principles of competition policy; consumer welfare, economic efficiency and encouraging innovation. This exercise allows the larger players to produce state-of-the-art technology efficiently and with reduced transaction costs. Having these broad licensing rights, there is no longer a requirement for the large firms to "clear" their technology before proceeding to commercialization. Further, there is no requirement to license on a patent-by-patent basis. These costs will not be passed down to the consumer. The customer can enjoy cheaper prices from large firms. In addition, the consumer will benefit from the fact that large firms have access to each other's proprietary know-how. In networked economies with fragmented property rights, knowledge and availability of know-how leading to greater connectivity is immensely valuable. In many ways, this practice takes patents out of the competitive equation

---

Rights: Promoting Innovation and Competition' (April 2007) 57 <www.ftc.gov/reports/index.shtm> accessed on 19 July 2011 discuss how cross-licensing and patent pools solve many problems of efficiencies and transaction costs.

and levels the playing field for large firms, and firms compete on quality and functionality.[34] As well, the cross-licensing practice encourages disclosure and dissemination of knowledge between large firms which will lead to greater advancements in the technology. Finally, cross-licensing assists large firms in avoiding costly and unpredictable litigation.[35] There is no requirement to question infringement when firms share rights to each other's technology. Overall, it is an amazingly efficient setup that has been referred to as a "cross-licensing equilibrium"[36] in the software industry among large, established firms that have large patent portfolios.

Unfortunately, the potential effect on the small software firm's competitiveness is devastating. The small firm has no relief from overlapping patent rights created by the intense filing practices of larger firms. Cross-licensing is not available to the overwhelming majority of small firms as they do not own patents in sufficient numbers to be a worthy trading partner with the large firms. Faced with patent thickets, small software firms will have to first attempt to determine which patents are applicable to their inventions. This, in and of itself, is a formidable task. There may be hundreds of patents applicable to their technology. While there is the option for the small firm to conduct its own patent searches, this is a tedious, time-consuming process and requires skill and expertise.[37] Part of the reason for the difficulty associated with clearing patents through searches is the sheer number and types of patents that must be reviewed.[38] As well, clearance is made infeasible due to the acceptance by patent

---

[34] Allison, Dunn and Mann (n 5) 1594 argue that large firms create their competitive advantages through providing unique designs and expensive marketing initiatives.
[35] This will be addressed in more detail in the section below entitled "Protection and Litigation."
[36] Allison, Dunn and Mann (n 5) 1594
[37] A patent search costs approximately USD 5000 in legal fees. Several searches may be required to clear one product which may contain several different technologies. Moreover, this would have to be performed every time the small firm adds functionality to a product or wishes to introduce a new product to the market.
[38] For example, see Federal Trade Commission, 'To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy' (October 2003) 54 <www.ftc.gov/os/2003/10/innovationrpt.pdf> accessed 19 July 2011 where panelists argue that

offices of broad, vague claims and the low threshold for disclosure required in a software patent application.[39] If the boundaries of the patent claim were more easily defined and the scope of patents was more predictable, this would assist the small firm in clearing its own technology and avoiding infringement issues, but also help it in determining whether it can work around an existing patent.

As small firms will not have the benefit of access to the technologies of large firms through cross-licensing agreements, the patent database is its main source of information on other technologies. One of the main purposes of the patent system is to provide open access to inventions, thus acting as a tool for the dissemination of know-how.[40] Databases show the types of technology that a firm's competitor is using. A review of the patent database can be very useful to understanding which direction a competitor is taking a product line. This is invaluable information and could help the small firm plan strategically in securing its niche in the marketplace, especially against a larger competitor. Having knowledge of the patents filed by competitors can be advantageous to the small firm when it is accused of patent infringement. Despite these benefits, the most current information suggests that small software firms do not do regular database searching.[41] If small software firms are not conducting patent searches and not using the patent databases, the patent system is not encouraging disclosure of information for these entities. At the same time, the same system is

---

searching is too time consuming, uncertain and costly; and see Hall and MacGarvie (n 7) 13 stating that the classes of software patents are so broad that they contain software and hardware, and that software patents can be found in patents that have little to do with software.

[39] For example, see Bessen and Meurer (n 13) 184 arguing that there are no clear boundaries in software patents, making them more difficult to clear and more likely to be litigated because of uncertainty with ownership; and see Federal Trade Commission Report (n 38) 52 stating that avoiding infringement is uncertain because of the ambiguous boundaries of software patent claims. See Ballardini (n 12) for a similar argument regarding EU software patents.

[40] However, this goal has become problematic in software as courts have reduced the disclosure requirements significantly for software patents. See Chapter 2 (n 32).

[41] SJH Graham and others, 'High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey' (2009) 24(4) Berkeley Technology Law Journal 24(4) 1255, 1321 (hereinafter referred to as the "Berkeley Survey")

promoting dissemination of technical information to large firms which, in turn, provides them with an enormous advantage over small firms in a highly interconnected marketplace.

It is also quite likely that the small firm will be contacted by holders of patent portfolios and asked to enter into licensing arrangements.[42] If the small firm holds patents itself, it may be able to enter into a cross-licensing type agreement with the large firm.[43] Cross-licensing agreements are complex and very time-consuming.[44] The small firm is attempting to negotiate without the benefit of internal legal departments and patent experts. It will likely use outside counsel and pay premium rates for such services. Unfortunately, this is the better scenario as small firms without patent "chits" to trade may be forced to pay exorbitant license fees, or perhaps even be forced to provide access to their technology as part of the license deal.[45]

The increase in transaction costs and possible loss of valuable trade secrets is relevant only to the small software firm. Large firms can gain access to technology and know-how from other industry leaders that can assist it in developing the next greatest products. The small software firms will not be exposed to this same information. Despite this, the small firm is still expected to be competitive. The superpowers that large firms have obtained are not necessarily due to their expert management skills, experience or strategic direction. It is because of a patent system that allows them to

---

[42] Mann (n 8) 990; and see Graham and Sichelman (n 29) 1068 showing that large firms use patents to bully their competition by driving up their costs, gaining access to their technology, or pushing them out of market.

[43] Note that small software firm respondents to the Berkeley Survey (n 41) 1301 did not report cross-licensing as a very important aspect of their patent strategy.

[44] I Fried, 'Microsoft Opens Technology to More Licensing' (3 December 2003) CNET News.com <http://news.com.com/2100-1012-5113033.html > accessed 3 May 2012 reports that Microsoft had 100 licensing deals in 2003 (before it became an aggressive patent filer) with 15-20 being broad cross-licensing deals that took 1 to 2 years in duration to negotiate; See also US Department of Justice and Federal Trade Commission (n 33) 61 stating that negotiating portfolios is intense and lasts, on average, 18 to 24 months.

[45] Graham and Sichelman (n 29) 1077

dominate the small software firm in the marketplace. It does not matter if the small firm has superior technology that could improve consumer welfare. The forces created by these artificial means are stronger than any gale of creative destruction that small firms can create.

Some academics argue that the software industry has not been affected by the "onslaught" of patents.[46] The main arguments given to support this claim are that small firms continue to enter the market in consistent numbers and the industry continues to advance and show signs of innovation. Such measures lead to conjecture and speculation. Entry into the software industry may not be a true indication of the success of the industry.[47] The real question yet to be answered is what happens to these firms once they enter the market. There are very few studies that consider whether small firms survive and prosper and whether their technologies make it into the marketplace. Evidence of innovation is often determined by the number of R&D dollars spent by companies as well as the number of patents held. As previously discussed, firms in the software arena innovate to be competitive. The industry changes so quickly and software functionality becomes obsolete at a greater speed than most technologies. However, R&D does not always translate into marketable products that can be used by the consumer and therefore may not be the best measure of innovation.[48] Furthermore, the use of patents to measure the innovative

---

[46] See RP Merges, 'Software and Patent Scope: A Report from the Middle Innings' (2007) 85 Texas Law Review 1627, 1644 arguing that new entry remains robust, firms have adjusted to the advent of patents and the industry is thriving; see also Mann (n 32) 1 rejecting the notion that patent thickets are hindering innovation in the software industry because of the high spending on R&D and the fact that his interviewees did not feel constrained by patent thickets; but see Bessen and Meurer (n 13) 19 rebutting the above arguments and stating that calling the software industry a victory is premature.

[47] See Chapter 1, section entitled "The Software Industry and the Competitive Landscape" for a discussion on why small software producers will continue to enter the market.

[48] See, generally, H Buddelmeyer and others, 'Innovation and the Determinants of Company Survival' (2010) 62 Oxford Economic Papers 261 for a discussion on the difficulty of measuring innovation.

levels of small software firms is contradictory to what is now known about small software firms and patent rates.

Small firms continue to enter the software market. Many avail of government funding programs that provide them with necessary capital to operate, to create R&D and to commercialize technologies. The question that must be answered is whether they remain in the market at sufficient rates to be contributing to economic development and promoting competition, all of which is beneficial to consumer welfare. Given the challenges faced by small software firms, it is problematic that worthy technological developments are being abandoned unnecessarily and small software firms are unable to provide the important role of displacing monopolies. It is argued here that the market will probably survive because large firms will continue to operate and build patent empires[49] that enable them to control markets and future generations of technology. The market will survive more on incremental improvements than radical breakthroughs because of the weakening of the competitive rivalry. More large firms will enter the patent game in order to remain competitive and share their patents through cross-licensing. The industry will become more consumed with preventing litigation than innovating new products. The market will survive simply because of the essential function that software serves in every aspect of daily life, but it will do so without the maximum benefit that could be provided by small software firms.

---

[49] Note the recent proposed acquisition of Motorola by Google in August 2011. It is reported that the purpose of the acquisition was to gain 17,000 strategic patents that will allow Google to negotiate with other firms such as Apple. See B Womack and Z Tracer, 'Google to Buy Motorola Mobility for $12.5 Billion to Gain Wireless Patents' (Bloomberg, 15 August 2011) <www.bloomberg.com/news/2011-08-15/google-agrees-to-acquisition-of-motorola-mobility-for-about-12-5-billion.html> accessed 21 August 2011

Others argue that the small firm will avoid the patent system until they mature enough to effectively engage the system and become routine filers.[50] It has been argued that patent portfolios and superpatents actually encourage small firms to obtain their own patents.[51] This, too, is a problematic argument. The purpose of the patent system is to provide firms with an exclusivity period to allow them to enter the market undeterred. This is the basic incentive theory that actually suggests that small firms should be filing more patents. So, how has it become acceptable and expected that small firms do not file patents during the early stages of their development process? The small firm's greatest asset is its core technology that it then uses to build its products. It is this core component that requires protection. It will be very difficult for the small firm to keep the technology as a trade secret once it hits the market. As well, small firms require access to interfaces and standards to be competitive right out of the gate. They may also wish to enter into strategic relationships with other partners to compensate for their lack of complementary assets.[52] Instead, it is being suggested that it is acceptable for them to wait several years to "mature" before they become habitual filers. For many it will be too late. They may already be caught in the large firm's patent web. They may already be faced with litigation or licensing fees, both of which may preclude the small firm from continuing to operate. Thus, there is a great possibility that many otherwise promising firms never have the opportunity to mature.

Perhaps the biggest gap in the argument that all the problems with patent portfolios become moot as small firms mature is the fact that the evidence does not support the

---

[50] See for example, Mann and Sager (n 6) 207; Mann (n 8) 985; and Allison, Dunn and Mann (n 5) 1610
[51] See US Department of Justice and the Federal Trade Commission (n 33) 60 arguing that cross-licensing will encourage small firms to engage in more R&D in order to file their own patents; and at 62 stating that small firms will file for their own patents when they are sued once.
[52] See this discussion in Chapter 2 in the section entitled "Complementary Assets and Lead Time."

notion that small firms inevitably become patent filers as they mature![53] The evidence

suggests that very few firms actually file patents and, of those that do, the number of

patents held is quite small in comparison to the superpatent. The assumption that

small firms become patent filers as they advance is more wishful thinking than reality.

It also gives policy makers a reason to resist reform because of the mistaken belief that

the market eventually sorts itself out.

Patent laws related to software are actually increasing the divide between large firms

and small firms and making it near impossible for small software firms to find success.

If one player has a large patent portfolio that it is using to manipulate the competitive

environment, then other players will have to follow suit just to remain competitive.[54]

This trend is likely to continue.[55] It is difficult to conceive of a time when large firms

will give up their superpowers for a fair competitive environment. The current patent

system encourages large firms to continue the software patent "arms race" in order to

keep up with each other. The more patents they hold, the more bargaining power

they have. Patent portfolios and cross-licensing actually provide incentive for large

firms to continue to develop new technologies and obtain a greater share of the profit

in the software industry, all at the expense of the small firm.

Is the solution a matter of convincing small software firms to file as many patents as

they possibly can so that they can become a superpatent holder? It is true that there

are many benefits attributed to the small software firm once it becomes a patent

---

[53] See (n 17).
[54] See Graham and Sichelman (n 29) 1076 for a discussion on Microsoft's decision to become a frequent patent filer because of IBM's software patent portfolio and also at 1006 discussing how cross-licensing acts as an incentive to keep up with patent filings or risk being kicked out of the cohort and threatened with litigation.
[55] See Polka and Parchomovsky (n 21) 9 discussing why large firms will continue to have an advantage over small firms.

holder.[56] The best evidence available is that small firms do not file software patents because of the cost of filing and the cost of enforcement.[57] Clearly the small firm is not convinced that the extraordinary costs associated with filing and defending patent applications (patent fees, legal fees, time commitment, maintenance fees) are worth the benefits obtained. As well, the small firm does not believe the patent system is predictable or adequate to protect its technology. In reality, the small software firm is not a patent making machine. In order to patent as a matter of routine, a department of lawyers and patent agents is required. Skill and experience in negotiating complex licensing agreements are essential. All of these activities are distracting managers and engineers of small software firms from focusing on innovation and product development, thus decreasing the firms' market entry and discouraging innovation. Small firms develop numerous products in a short period of time, only a small portion of which will be commercialized.[58] Patenting unprofitable technologies is not a sound business strategy. The special characteristics that make the small firm essential to the market (i.e. flexibility, risk taking, nimbleness, creative) would be lost. Thus, current intellectual property laws provide a disincentive for small firms to create breakthrough technologies.

The small software firm has the option to ignore the patent system; keep out of harms' way by flying under the radar of large firms and their superpowers. It is often suggested that one way to do this is to look for niche markets in which large firms do

---

[56] There are many advantages as discussed in Chapter 2 in the section "Patents and Increased Competitiveness." Also, see Cockburn and MacGarvie (2006) (n 8) finding that those small firms that hold software patents are three times more likely to enter a market and 36% less likely to exit the market after entry; and see Cockburn and MacGarvie (2009) (n 8) finding that early stage firms that hold patents or have patents pending are more successful in obtaining financing and more likely to exit via IPO or acquisition. Also, see (n 66) below.
[57] See Chapter 2 (n 23).
[58] Graham and Sichelman (n 29) 1073

not operate and have no interest in entering.[59] Even though small firms thrive in niche markets, survival is more problematic in software markets. Small firms have been relegated to the difficult task of finding product niches that are not lucrative enough for large firms to produce; to find markets in which interoperability and standards are not as relevant; to use technology that allows them to develop cumulative component parts without interference from large firms. Thus, a very small corner of the overall software market has been carved out to allow the small firm to operate. Success for small software firms will be based more on luck than high-quality technology and sound management.

Protection and Litigation

One of the key principles of a competitive environment includes an intellectual property system that creates incentives for companies to avoid litigation. A firm's intangible assets have little private or social value if they cannot be defended, protected and enforced. A properly functioning legal system will encourage companies to settle their disputes out of court, but will provide a predictable, cost-effective and efficient service to those who require a third party to intervene and make a meaningful determination of liability and penalty. Small firms should have equal rights to avail of a fair and balanced legal system to protect their intellectual property. Unless the small firm can threaten litigation and follow through on the threat, there is no incentive to invest in intellectual property protection.

---

[59] See Polka and Parchomovsky (n 21) 10 arguing that small firms will not disappear from markets encompassed by patent portfolios because they will fill gaps and complement the portfolios of large firms.

The number of law suits involving software patents has continually outpaced other industries over the past 25 years.[60] One reason that firms fight over software patents is because of the broad claims, inadequate disclosure and uncertain boundaries that plague this patent category.[61] Another reason must be the sheer volume of software patents that have been granted in the US and the EU.[62] However, the proliferation of cross-licensing activities in software markets suggests that there is less risk that firms will end up in a courtroom. As discussed above, cross-licensing operates as a preventive mechanism against litigation and promotes settlement among large firm players in the industry. Thus, while it would be expected that large firms end up in court from time to time given the large number of patents they hold[63], it could also be predicted that small firms without patent portfolios will have no choice but to use the court system to resolve their disputes. Although empirical evidence is sparse in this area, the existing academic literature supports the fact that small firms are more vulnerable to court actions in the software arena.[64] Moreover, the evidence suggests that small software firms have protracted court cases as compared to their larger counterparts.[65]

---

[60] Bessen (n 17) 20 finds that the aggregate litigation risks from software patents has continued to grow rapidly in the last decade; See Bessen and Meurer (n 13) 192 finding the percentage of lawsuits involving software patents as compared to overall suits has risen from less than 5% in 1984 to 26% in 2002 and suggesting that this trend is continuing; CV Chien, 'Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents' (April 2009) Santa Clara University School of Law 123 Legal Studies Research Papers Series, Working Paper No. 09-13 <http://ssrn.com/abstract=1396319> accessed on 4 October 2010 studying patent litigation from 2000-2008 and finding that there were a total of 1512 lawsuits involving software patents compared to only 589 suits in the hardware category and 513 in the financial category; and see See J. R. Allison and others, 'Valuable Patents' [2004] 92 Georgetown Law Journal 435 finding that software and computer related patents are significantly more likely to be litigated than many other of the 14 categories examined and that litigation in software had risen dramatically in recent years.

[61] For example, see Bessen and Meurer (n 13) 125 arguing that uncertainty in patent boundaries and abstract software claims are the reasons for increased litigation rates and at 187 finding that software patents have high rates of claim construction on appeal.

[62] Ballardini (n 13) 214 argues that that EU has not experienced software patent litigation rates to the same extent as the US due to the fact that fewer weaker patents have been issued in the EU.

[63] Recent court actions by Apple against other cell phone providers such as Samsung are prime examples. S Lohr, 'Apple-Samsung Case Shows Smartphone as Legal Magnet' *The New York Times* (25 August 2012) A4 reports that a prominent Court of Appeals judge called the use of patents in the mobile phone industry showed a system in "chaos."

[64] Chien (n 60) finds that approximately 35% of all suits involve small firms and 24% of software patent suits are between small and large companies.

[65] See, generally (not software specific), GG Ball and JP Kesan, 'Transaction Costs and Trolls: Strategic Behaviour by Individual Inventors, Small Firms and Entrepreneurs in Patent Litigation' (2009) Illinois Public Law and Legal Theory Paper Series No. 08-21

Small software firms either have no patents or only possess the few patents it deems critical to its operations.[66] The small entity will likely be faced with one of two situations: either another player in the industry is claiming the small firm has infringed its patent; or the small entity will suspect that another player is infringing on its hard earned patents. Either way, the small software firm cannot afford to be involved in an intellectual property infringement suit whether acting as plaintiff or defendant. It is estimated that a patent suit in the US can cost between $3 and $6 million and perhaps more in the EU due to its fragmented court system.[67] In addition to the financial costs, there are real business challenges that arise from having to partake in litigation. These include the disruption in the firm's operations; the distraction of its valuable technical personnel; the possibility of scaring off its customers and potential customers; its lost advantage as a first mover; and the possibility of losing its ability to sell if faced with a preliminary injunction.[68] Resolving the claim without the use of the court system is almost always in the small firm's best interest. The possible options for "out of court" settlements for the small software firm targeted by another company include proving non-infringement; negotiating a cross-license (which translates into the small firm

<http://papers.ssrn.com/abstract=1337166> accessed 3 October 2010 showing that small parties make up 50% of cases and are most likely to seek judgment and litigate to trial. The authors conclude this is evidence that small firms are only enforcing their most valuable patents and that average cases are filtered out by contingency fee lawyers. This finding raises the question of how many more small firms forego litigation even though they have issues as either the plaintiff or the defendant. This finding is consistent with JO Lanjouw and M Schankerman, 'Protecting Intellectual Property Rights: Are Small Firms Handicapped?' (April 2004) 47 (1) Journal of Law & Economics 45 who find that court actions involving small firms are not settled as quickly as those involving large firms.

[66] Graham and Sichelman (n29) 1079 explain the benefits of having a patent (even a weak patent) to use in a counter attack if the firm is involved in patent litigation. See also Lanjouw and Schankerman (n 65) finding that for small firms, having a portfolio of patents is likely to be a key mechanism for avoiding litigation. (Note that the studied considered a small firm portfolio may contain 100 patents. This is an unattainable number for most small software firms.) But, see J Bessen and MJ Meurer, 'The Patent Litigation Explosion' (October 2005) Boston Univ. School of Law Working Paper No. 05-18 <http://ssrn.com/abstract=831685> accessed 4 October 2010 finding that while the risk of litigation falls on the small firm, they only find weak evidence for the benefit of a large patent portfolio.

[67] In 2009, a small Toronto based software firm, i4i Inc., successfully sued Microsoft for $290 million for software patent infringement. The four year dispute cost the company more than $10 million in legal expenses. See O El Akkad and I Marlow, 'The New Standard for Justice in Patent Law is i4i' *The Globe and* Mail (Toronto, 9 June 2011). For a detailed discussion of the effects of the fragmented patent system in the EU, see B Van Pottelsberghe, 'Lost Property: The European Patent System and Why It Doesn't Work' (2009) Bruegal Blueprint Series, Volume IX <http://ideas.repec.org/b/bre/bluprt/312.html> accessed 7 May 2012.

[68] See JO Lanjouw and J Lerner, 'Tilting the Table? The Use of Preliminary Injunctions' (October 2001) 44(2) Journal of Law and Economics 573 discussing why the preliminary injunction remedy could shut down capital constrained firms.

paying license fees and/or sharing its technology due to its lack of patents); or settlement of a monetary amount. If the small firm suspects another firm is infringing its patent, it has a difficult decision to make. This is true even if the small firm believes it has a strong position. Without a patent portfolio to act as a shield, the small firm risks being exposed to the larger firm. If the small firm is trying to stay in "stealth" mode, a patent infringement action is sure to bring them into the spotlight. The large firm holding the arsenal of patents could easily strike a counter claim in order to intimidate or immobilize the small plaintiff.

Small firms are not equipped to engage in a preventative patent infringement action, let alone defend a patent infringement suit. They do not have a team of in-house lawyers who may routinely monitor for infringement of intellectual property or provide advice on how to design around existing patents. Without its own legal team, the small firm will have to engage patent lawyers. This process is time consuming, expensive and most often overwhelming. This fragile predicament also makes the small firm vulnerable to anti-competitive law suits. A patent bully is "an established, usually large, company that sells products and holds a sizable portfolio of patents that it uses to suppress competition and gain market share by threatening or instituting costly patent infringement actions."[69] The patents used by the patent bully are often weak in quality, but are sufficient to cause financial problems for the small firm with limited capital. Their lack of information, capital and access to legal assistance makes them easy prey for larger firms wishing to keep them out of the market or, at the very

---

[69] T Sichelman, 'Patent Bullies, How Industry Incumbents Abuse the Patent System' (6 August 2009) Cardozo School of Law Presentation to the IP Scholars Conference, used with permission of the author.

least, hinder their progress.[70] Large firms may even succeed in using weak patent rights to threaten the small firm into submission.[71] This is not to suggest that small software firms should not have the same obligations as other firms with respect to offensive and defensive patent strategies, but the onerous requirements placed on the small software firm due to current patent laws leaves it in a very tenuous situation.

The minefield of software patent infringement claims creates additional barriers to entry into software markets and creates an extremely inefficient system for the settling of disputes. Transaction costs associated with participation in the court system are beyond reasonable and make this protective mechanism out of reach for small firms. This precarious environment affects the incentive for the small software firm to invest in R&D as every dollar spent on R&D and commercialization can increase the risk of infringement.[72] Instead of providing incentive for the small software firm to engage in R&D, the unpredictability and uncertainty surrounding patent litigation has the opposite effect on the innovativeness of the small firm. In short, the current intellectual property system perpetuates the anti-competitive nature of the software industry. Consumer welfare is not benefiting from such a complex and convoluted setting and the social value of the software patent is questionable in this context.

It is possible that the true situation surrounding the small software firm's use or inability to use the court system is largely unknown. Most small firms either settle out of court or are forced out of business. There is no research addressing these real

---

[70] See Graham and Sichelman (n 29) 1080 for a discussion of the Vontage case as an example of how established firms bully their smaller competition to keep them out of the market when they become a threat.
[71] Anti-competitive law suits may succeed because small firms often lack information to prove non infringement or invalidity and they may settle to avoid litigation costs even if plaintiff doesn't have a strong case. MJ Meurer, 'Inventors, Entrepreneurs, and Intellectual Property Law' (2008) 45(4) Houston Law Review 1201, 1227
[72] Bessen and Meurer (n 13) 121 state that the software industry has a net disincentive to invest in R&D due to litigation rates; Bessen and Meurer (n 66) find that small firms have higher rates of litigation per R&D dollars; Lanjouw and Schankerman (n 65) 4 argue that the enforcement process undermines the R&D incentives for small firms.

possibilities or the fact that cutting-edge technological developments are abandoned when the small firm cannot utilize the system in a fair and comparable way to its larger counterparts. The types of settlements the small firms enter into to preserve their existence could likely raise issues for competition authorities. Their lack of patents for trade and their lack of experience make them vulnerable to extreme licensing arrangements such as exclusivity.

OPEN SOURCE MOVEMENT AND THE SMALL SOFTWARE FIRM

Open source software development defies the traditional incentive theory of intellectual property. It involves the collaborative efforts of many developers who share source code to create and improve upon software programs. These programs are then disseminated freely to others for commercial or non-commercial usage. The open source movement has gained significant momentum over the past 10 years.[73] Once thought to be limited to operating systems, open source software is now widely used in a variety of software applications. Why is it relevant to a discussion of the competitive future of the small software firm? Some commentators believe that open source stimulates innovation and opens the markets for fair competition and collaboration because it removes the barriers created by the intellectual property system.[74] Those strong proponents of the open source movement argue that open source offers a correction to a software market that intellectual property has destroyed. In fact, the open source movement grew largely as a reaction to the

---

[73] In 2009, IDC predicted that open source market would grow by 22.4% and reach $8.1 billion by 2013. See 'Open Source Software Market Accelerated by Economy and Increased Acceptance From Enterprise Buyers, IDC Finds' *BusinessWire* (Framingham, Massachusetts, 29 July 2009) <www.businesswire.com/news/home/20090729005107/en/Open-Source-Software-Market-Accelerated-Economy-Increased> accessed 1 January 2012; J Lerner and M Schankerman, *The Comingled Code* (The MIT Press 2010) 3 stating that there is a "paucity of rigorous analysis" of open source's impact on the economy.

[74] G Olivieri and L Marchegiani, 'Open Source Software and Technological Innovation: Competitive Issues' in R Cellini and G Cozzi (eds), *Intellectual Property, Competition and Growth* (Palgrave MacMillan 2007) 47 argue that the open source community and competition law have common goals; RP Merges, 'A New Dynamism in the Public Domain' (2004) 71 The University of Chicago Law Review 1, 2 argues that open source may represent a partial self-correcting tool for the IP system; SM Maurer and S Scotchmer, 'Open Source Software: The New Intellectual Property Paradigm' (March 2006) National Bureau of Economic Research Working Paper Series, Working Paper 12148, 25 <http://www.nber.org/w12148> accessed 10 February 2012 argues that open source software will limit market power by providing healthier competition and a greater threat of entry.

control intellectual property rights granted to large firms.   If this is true, then small software firms may be better counseled to find alignment with the open source community. Small businesses operating with an open source business model would theoretically escape challenges that arise from, for example, standardization, interoperability and patent portfolios. Open source-based companies do not have the same concerns with infringement actions or drafting complex legal agreements. A closer look at this argument and what it means for the success of the small software firm and consumer welfare overall follows.

During the heated debate in the EU over whether to allow software patenting, there were three interest groups that attracted the most attention from the decision makers: large firms, small firms and the open source movement. The EU was sympathetic to the goals of the open source movement and was hopeful that the claims made by open source experts would strengthen the innovation track record of the EU Member States.[75] The open source community argued that open source would have a balancing effect by creating a strong software industry and counter monopolistic trends.[76] The software sector in the EU is heavily dominated by large US firms with the EU developing few applications of leading proprietary software.[77] With promises of new job creation, new technology start-ups and a strengthened information technology sector, the EU legislators likely saw the encouragement of

---

[75] See for example, G Ghidini and E Arezzo, 'One, None, or a Hundred Thousand: How Many Layers of Protection for Software Innovations?' in J. Drexl, *Research Handbook On Intellectual Property And Competition Law* (Edward Elgar Publishing Limited 2008) 368 arguing that copyright (as opposed to patent) protection for software is "deeply cherished" in the EU because of the fact that Europeans have a "widespread acceptance and diffusion of the open-source software licensing model"; PJ Agerfalk and others, 'Assessing the Role of Open Source Software in the European Secondary Software Sector: A Voice from Industry' in M. Scotto and G. Succi (eds) *Proceedings of the First International Conference on Open Source Systems* (Geneva, July 2005) 84 state that the current political resentment towards proprietary software will speed up the adoption process of open source and that open source is turning into a viable alternative to proprietary software in a commercial setting.
[76] S Forge, 'The Rain Forest and the Rock Garden: The Economic Impacts of Open Source Software' (2006) 8(3) The Journal of Policy, Regulation and Strategy for Telecommunications, Information, and Media 12, 30 states that Europe's future rests in creating business opportunities out of open source software without patent or proprietary IP hindrances.
[77] ibid 17

open source as an opportunity to catapult the EU as a larger player in the innovation game.[78]

The assertion that open source will, in and of itself, act as an economic driver is questionable. As software is a patentable subject matter, open source software must co-exist with proprietary software and with the superpowers that are afforded to large firms. To suggest that it can replace proprietary software as the key source of innovation is ignoring the fact that large firms have no economic incentive to forego patenting in favour of open source. Even those that do engage in open source development do so for reasons of profit. Large firms actively pursuing open source business models do so to exploit their proprietary systems and to further their control over particular software markets.[79] Incumbent firms benefit from contributing to open source development in order to encourage uptake for their standards and to enable compatibility and increased demand for their complementary products and services.[80] If they release code as open source, it strengthens network effects by allowing more software developers to create applications from the code. It also has the effect of preventing competitors from patenting follow-on technology. Large firms are not altruistic and do not engage in business strategies that do not pay dividends to their shareholders. Unfortunately for the EU hopes of advancement, the US large firms

---

[78] In 2000, the Lisbon European Council Presidency Conclusions stated that the EU wanted "to become the most competitive and dynamic knowledge-based economy in the world" through policies and laws that promote R&D, among other things. <http://www.europarl.europa.eu/summits/lis1_en.htm#b> accessed 10 August 2012; And see Lerner and Schankerman (n 73) 157 showing that in 2008, the EU had the most initiatives to support open source – 95 EU, 47 Asia, 20 Latin America, 9 in North America. See also RA Ghosh, 'Study on the Economic Impact of Open Source Software on Innovation and the Competitiveness of the Information and Communication Technologies (ICT) Sector in the EU' (November 2006) Final Report to the European Commission 94 <http://ec.europa.eu/enterprise/sectors/ict/documents/competitiveness/index_en.htm> accessed 10 January 2012 arguing that there is significant growth potential for SMEs in open source markets as custom software service providers.
[79] Mann (n 32) 4 shows that large firms are comingling open source and proprietary software and that open source is more likely to support innovation by larger and better established firms; Lerner and Schankerman (n 73) 9 show that large firms are more likely to use open source to diversify their business models.
[80] Mann (n 32) 25 explains why IBM supported the Linux open source project.

have taken the lead on the strategic use of open source code to further leverage their

arsenal of software products.[81]

In theory, the open source development model appears to be an answer to many of

the small firm challenges. Access to open source software creates easier entry into

markets by eliminating access problems to interoperability and standards. Software

license negotiations are non-existent.[82] It decreases development costs and time to

market because there is existing code to build upon to create quality products at a

faster rate. More firms of all sizes are able to compete based on the best quality of

software programming. Barriers to entry are reduced and dissemination of know how

is intensified. From this perspective, consumers may benefit from having the ability to

use high quality software at a faster pace than otherwise available with the artificial

lead times created by the patent system. Of course, large firms also have access to

free source code and have the ability to develop software more quickly and

disseminate it more efficiently. Without intellectual property protection, imitation is

not prohibited. There is no real small firm advantage to being open source software

developers.[83] Large firms still enjoy the complementary assets that can assist them to

bring open source products to market at a faster rate. The characteristics of open

source software steer small software firms to focus on the support services side of the

industry. This is often because open source products are not user friendly, lack

---

[81] Report of an Industry Expert Group on the European Software Strategy (n 9) 10 argues that although open source is often quoted as an EU success story, 90% of business derived from open source is by non-EU players. Most organizations managing open source in the EU are funded in the US by US IT companies.

[82] It is important to note that there are many different types of licenses governing open source software. Small firms wishing to embed open source software in their proprietary products or use open source for commercial reasons have to understand the terms and conditions of these licenses. For a general discussion on this issue, see P Giuri and others, 'Open Source Software: From Open Science to New Marketing Models: An Enquiry into the Economics and Management of Open Source Software' (July 2002) LEM Working Paper Series No. 2002/23 <www.lem.sssup.it/WPLem/files/2002-23.pdf> accessed 10 January 2012.

[83] There are some advantages to using open source as part of a proprietary software strategy. Small firms rely on open source for error correction, to solve problems, and to improve the quality of their proprietary software.

documentation and are written with other software developers in mind.[84] Companies without in-house expertise resist open source for this reason. Small firms with expertise in certain specialized fields generate revenue offering services such as installation, training, customization, consultation, database management and support for open source applications. A support business model allows them to avoid problems with competitive product pricing and licensing transaction costs. The ability to make money and avoid the broken intellectual property system is tempting. While it is a positive trend that small software firms are making profits operating as service firms in the open source market, it has many negative implications for the software industry.

First, small technology-based firms serve a very important role in product creation. As economic drivers, small firms develop breakthrough technologies that help spur market regeneration and product improvement. Concerned that their products may be displaced, large firms become continuous innovators partly because of the threat from small software firms. Relegating the small firm to the service industry takes away its ability and incentive to be a product innovator. Small firms are required in niche markets and those with emerging technologies. Without them, it is reasonable to assume that there will be a fundamental shift in the innovative progress of software markets. Second, service firms do not usually generate significant revenue required for growth and job creation. While a few employees may make a decent living in service roles, there is little room for growth and creating economies of scale. As a

---

[84] J Lerner and J Tirole, 'The Simple Economics of Open Source' (March 2000) National Bureau of Economic Research Working Paper No. 7600 <www.nber.org/papers/w7600> accessed 12 January 2012 argue that the greatest diffusion of open source is where the end user is sophisticated and is willing to trade the lack of documentation and user friendliness for the ability to modify the source code.

result, VC funding is highly unlikely.[85] These same talented individuals are otherwise

not engaging in product development and high-growth enterprises.

Third, large firms are pursuing a very different model that will once again widen the

competitive gap between large and small firms in the software industry. Large,

established firms are more likely to diversify between open source and proprietary

software by combining support services and product development, thus allowing them

to exploit their operation synergies.[86] Large firms have figured out how to maximize

their profit by combining open source technologies and proprietary software in their

business models. As competitors in the service markets, large firms have greater

advantages over small firms due to their complementary assets. They may be better

able to compete on customer service with more resources as they would be able to

offer 24/7 support and superior response times. Empirical evidence suggests that

companies that rely solely on open source service models will remain active only in

local markets.[87] While small firms become specialists in confined geographic areas,

large firms will continue to operate globally and gain experience and knowledge

through exporting. This is not the most economically desirable future for the small

software firm.

CONCLUSION
The modern patenting environment is adverse to small firms. It is impossible for the

small software firm not to be affected by the superpowers that have been afforded to

large firms because of the strength of patent laws. It is pure speculation to suggest

---

[85] Mann (n 32) 13 states that a very small percentage of open source firms receive VC funding because the source code is publically available and it is problematic to finance a product that will be distributed without charge.
[86] Lerner and Schankerman (n 73) 9
[87] ibid 70; The authors find that small firms that provide support services and customized software are more likely to cater to local needs and at 87 state that those firms that combine both proprietary software and open source have the highest potential for exporting.

that small software firms are unaffected by the current intellectual property system. There is very little evidence on the correlations between software patenting and the more basic indicators of firm performance such as growth and survival.[88] Until this research is available, any theories as to the state of the small firm are hypothetical. The purpose of this chapter is to outline the industry dynamics that no doubt affect the ability of the small firm to function as an innovative, revenue generative, viable business.

The limited research discussed in this chapter suggests that small firms are struggling to adapt to the current intellectual property regimes and create sustainable organizations. Without a competitive framework under which to operate, small software firms are not providing maximum benefits to the consumer. For this reason, patent laws have limited social value and are creating a "potentially dangerous situation" in the software industry.[89] It is possible to conclude that the full extent of the repercussions of this adversarial climate for small firms will not be known for years to come. As the industry continues to mature and large firms become more interconnected and interdependent, there will be no room for small software firms. They will continue to enter the market and create essential and often breakthrough technologies, but they will be stifled by patent walls and transaction costs and forced to close before they become meaningful contributors to job creation, revenue generation and overall economic development.

Large firms are taking advantage of existing intellectual property laws to fortify their dominant positioning in the market. These actions are legitimate and predictable.

---

[88] IM Cockburn and S Wagner, 'Patents and the Survival of Internet-Related IPOS' (June 2007) National Bureau of Economic Research Working Paper Series No. 13146, 5 <www.nber.org/papers/w13146> accessed 4 October 2010
[89] Shapiro (n 30) 144

These firms are not going to modify their practices for the benefit of their smaller counterparts. The removal of small firms as potential competitors assists them in creating a more stable and less risky business strategy. These same large firms insist that patent laws are benefiting small firms.[90] By ensuring that the voice of the small firm is muffled, large firms can ensure their own economic future.[91] Large firms will continue to shape the future of proprietary software technologies and open source innovations. As well, they will continue to shape legal reform for their own selfish needs unless policymakers are able to see the software market and its future from a broader lens, one that includes the crucial role of the small software firm. If it is the will of lawmakers to allow the market to function in a manner that alienates the small firm, then it should revisit its stance on small firm funding and educational programs attempting to align them with the current intellectual property regime. The next chapter explores the potential for legal reform in the US and the EU.

---

[90] See for example, Smith and Mann (n 4) 261 arguing that software patents may level the playing field between small and large firms (both authors work for Microsoft).

[91] S Macdonald, 'When Means Become Ends: Considering the Impact of Patent Strategy on Innovation' (2004) 16 Information Economics and Policy 135, 136 argues that when large firms advance the merits of the patent system on behalf of small firms, alarm bells should ring and that small firms are "largely silent, muffled by a host of other interest groups that also reap benefits from the patent system."

CHAPTER 4: *SUI GENERIS* LEGISLATION OR PATENT REFORM

INTRODUCTION

The current intellectual property system has created a significant competitive divide between large and small players in the software marketplace. Chapter 2 demonstrates how important patent protection has become to the success of the business of software, particularly with respect to licensing and interoperability. Unfortunately, the evidence presented in Chapter 2 suggests that small software firms do not make use of the patent system to assist with ownership, protection and exploitation of their most important assets. In Chapter 3, the negative impact of patent portfolios and cross-licensing arrangements that exclude the small software firms from valuable technology and know-how is discussed. The discrimination experienced by small firms resulting from the inappropriate use of copyright and patent laws to cover software is unmistakable and overwhelming. While incumbent firms dominate the future of the software industry, thousands of small software firms are left vulnerable and unable to fulfill their potential. The lack of optimal dissemination of knowledge, less intense competition, wasted resources on unrealized technology, and inferior products mean that the consumer is the biggest loser under the present market conditions.

The ability of the next generation of software innovators to operate in niche sectors, trade in technology markets, and commercialize disruptive technologies is critical for the future success of the industry. To ensure a vibrant market for all software firms, large firms have to be relieved of their superpowers[1] and small firms have to be encouraged to take advantage of a meaningful intellectual property regime. In other

---

[1] See Chapter 3 in the section entitled "Patent Portfolios".

words, the playing field must be leveled. Regardless of what has transpired in the industry to date, it is never too late to correct such an obvious market failure such as the partition in the software industry based on size and patent propensity. In order to optimize consumer welfare, ensure economic efficiency and encourage future innovation in software markets, the message from the previous chapters is clear – small firms must find value in the intellectual property system in order to be sustainable and reach their full potential. The purpose of the regulatory reform suggested in this chapter is not to allow small, inefficient firms to function in the software industry out of an obligation of fairness or to overcompensate them for their limited resources. Small firms who have the capacity to add value to the software marketplace are being precluded from this important role. The sustainability of a vibrant and dynamic software industry is at stake without legal reform.

At a high level, the intellectual property regime for software must open up the markets for technology; ensure interoperability for all sizes of firms; decrease transaction costs, reduce barriers to success, introduce certainty and predictability into the system; encourage disclosure of know-how and communication among all firms; eliminate needless litigation and threat of litigation; and provide the necessary tools to allow all firms to participate in the global marketplace. The market is not capable of correcting itself as the evidence suggests that the situation for small firms is not improving with time. Regulatory intervention is required. Thus, status quo is an unacceptable option and will not be considered further. The two options are *sui generis* legislation or radical patent reform. To help put the two possible solutions in context for further investigation, three important points from the previous two chapters should be highlighted: current laws related to software innovations are unstable and

unpredictable in both the EU and the US; experience from the past 30 years demonstrates that incremental legal reform is unlikely to result in any significant improvements; and large software firms are capitalizing on their market strength and will not willingly relinquish any superpowers provided to them under existing laws.

This chapter will consider three related research questions posed in Chapter 1. First, would the small software firms be more competitive today if the US and/or the EU had enacted *sui generis* law designed specifically for software? Second, is *sui generis* reform still possible given the current political, social and legal environment in which the small firm operates? In the alternative, it will be investigated whether current intellectual property laws can be reformed to correct market conditions such that the small firm is able to compete in the software marketplace. Third, is either the US and/or the EU in a position to set the stage right with respect to the small software firm?[2] Specifically, the chapter is organized as follows: the first section considers a hypothetical *sui generis* software law in light of the issues raised in the thesis thus far; the second section discusses the fate of *sui generis* legislation; the third section proposes a realistic patent model that deserves further research and analysis among legal scholars and law makers; and the fourth section examines the possibility of either the US or the EU taking the lead on implementing major patent reform.

COMPETITION PRINCIPLES AND *SUI GENERIS* LEGAL PROTECTION FOR SOFTWARE

The current intellectual property system precludes the small software firm from participating in the trade of patents which have become a currency for competition in the marketplace. It reduces any possible lead time that the small firm would require to

---

[2] This question is addressed from a competition policy perspective in the next chapter.

enter the market in a competitive manner. It prevents them from effectively and efficiently entering into collaborative arrangements with other firms in the industry. It limits the small firm's access to information required for interoperability and forces them to endure transaction costs that are beyond their means. It also hinders their ability to obtain critical financing and limits their potential to be global players. As a direct result, consumers are not experiencing the maximum benefits of small firm innovations. Small firm technology is not being utilized to its fullest potential if the small firm exits the market prematurely. Patent disclosure is not possible if patents are not filed and the industry is not reaping the benefits of knowledge spillover. This section will begin to explore the question of whether the small software firms would be more competitive today if the United States and the European Union had developed a *sui generis* law specifically designed for software.

Under the current system, small firms are faced with a "patent or perish" environment. Patenting has become a game of numbers; the greater the patent portfolio, the greater is the patent holder's ability to compete and control the advancement of technology in a particular market segment. The cumulative nature of software allows large firms to lock down follow-on innovations and also provides avenues for these same firms to diversify into other segments when desired. The vagueness in scope and predictability make patents difficult to search, work around and to defend against an infringement claim. A new legal regime would have to remove the incentive for large companies to choose volume over quality as a business strategy, as well as eliminate unduly harmful transaction costs so smaller firms would have the ability to protect important discoveries. The new approach would have to provide small firms with incentive to protect their valuable inventions and prevent the

powerlessness and defeated opinion they have come to hold towards the current patent system.

Whether small firms would be more competitive with *sui generis* law designed specifically for software is, of course, a theoretical question that will be answered with the benefit of 30 years of scholarly writing and actual knowledge of how the industry is unfolding. As there is no existing *sui generis* framework to offer a comparison against existing intellectual property regimes, it will be necessary to utilize a hypothetical framework based on the principles of innovation, consumer welfare and economic efficiency. The authors of the Manifesto proposed a bold and transformational framework for the legal protection of software in 1994.[3] The purpose of this section is not to critique that framework,[4] but to use it as a tool to assist in answering the research question posed above. This hypothetical model has a limited role as it was proposed almost 20 years ago without the benefit of knowledge of the industry today. The model has not been tested or proven effective and therefore only broad conclusions can be drawn from this analysis. Nonetheless, it is a well-considered framework based on market economics and provides valuable insight into the arguments presented herein.

The model as proposed is generalized to illustrate concepts of a new regime using the basic goals of competition policy in the prevention of market failure.[5] The

---

[3] P Samuelson and others, 'A Manifesto Concerning the Legal Protection of Computer Programs' (1994) 94 Columbia Law Review 2308; This article will be referred to herein as the "Manifesto."

[4] There have been several critics of the Manifesto, see for example P Goldstein, 'Comments on "A Manifesto Concerning the Legal Protection of Computer Programs"' (December 1994) 94(8) Columbia Law Review 2573; PS Menell, 'The Challenges of Reforming Intellectual Property Protection for Computer Software' (1994) 94 Columbia Law Review 2644; Z Kitagawa, 'Comments on "A Manifesto Concerning the Legal Protection of Computer Programs"' (December 1994) 94(8) Columbia Law Review 2610; and JC Ginsburg, 'Four Reasons and a Paradox: The Manifest Superiority of Copyright over *Sui Generis* Protection of Computer Software' (December 1994) 94(8) Columbia Law Review 2559.

[5] Note there were several frameworks argued in the Manifesto. In this section, the framework recommended by the authors of the Manifesto is used for the purposes of the discussion.

recommended framework provided an artificial lead time of a short, anti-cloning period with protection similar to copyright but applicable to all aspects of the product (behavior, functionality, code); a system where incremental innovative elements of the software invention could voluntarily be registered and made subject to compulsory licensing (on reasonable terms that are pre-determined by an independent body) for an additional period of protection against imitation; a registration process more akin to copyright than to patent examinations; and a process for challenging whether the subject matter qualifies for protection.[6] Although the substantive details of such a legal regime would have to be determined, this broad-based model provides insight into what a *sui generis* software protection law might entail and what it could mean for small software firms.

From a high-level analysis, the proposed model offers simplicity, predictability and user-friendliness. These characteristic reduce non-legal and procedural barriers to entry that small software firms endure when they attempt to use the existing regime. Simply having software considered under one legislative instrument would be a positive step from the small firm perspective. Given the shorter time frame for registration, the small software firm could exploit protected technology before it becomes obsolete. The minimal transaction costs involved with the automatic protection period and the simplified registration system would allow small firms to utilize the system to the full extent. As developers of niche products and state-of-the-art technologies, the small firm would be able to file as many elements as it deems necessary to ensure it can partake in continuous innovation without artificial

---

[6] Samuelson and others (n 3) 2417

procedural impediments. This is very important to its competitive advantage against incumbent firms.

Automatic lead time would provide the small software firm with the buffer it needs to get into the market either through competition or cooperation. There would be less fear that a large firm would imitate its technology with a built-in anti-cloning period covering the entire invention. This stage of protection would cover functionality in a manner that copyright could not. The scope would be broad enough to protect significant aspects of the computer program such as user interfaces and algorithms. The small firm would have time to decide if it is feasible to develop its own in-house complementary assets or rely on partnerships and collaboration. Either way, it would not have to operate in stealth mode while attempting to penetrate into a market with first mover advantage as its only appropriability mechanism. The option to extend this anti-cloning period or to seek compensation under reasonable licensing arrangements solves many of the interoperability issues addressed herein. The automatic royalty-bearing license available to everyone under reasonable terms upon the expiring of the initial anti-cloning period may be a welcome component from the small firm perspective. It would provide revenue for the small firm when another industry player wishes to license its software. In other words, it may help level the playing field for the trade of technology between large and small players.

However, the framework as proposed would likely create other challenges for the small software firm. The only way under the proposed system to extend protection of key software elements upon the expiration of the automatic protection period is through compulsory licensing. One of the greatest competitive advantages the small

software firm brings to the industry is its unique and high quality technology. It is also what makes the small firm attractive to larger firms in terms of licensing, mergers and/or acquisitions. If the large firm can access the small firm's technology through compulsory means, there would be fewer reasons to negotiate with the small firm for any greater collaborative relationships. This would likely undermine the small software firm's position in the market for technology discussed in Chapter 2 and limit its ability to become viable competitors. It would also have the effect of reducing the economic potential of small software firms to make significant profits or to financially benefit from an acquisition. This may have the negative effect of limiting the number of software entrepreneurs willing to enter the software market or cap the risk they are willing to take to develop disruptive technologies.

It is unlikely that the authors of the Manifesto could have had the foresight to predict just how complicated software technologies would become and how quickly the market would evolve. A self-registration system similar to copyright would be problematic without proper guidelines for review and approval. Proper examination would be essential to determine what subject matter qualifies for protection. Adequate staff with specialized knowledge of software would be critical to the success of this type of legal regime in the same manner as it is important in the patent system today. Even if the current practice of routine, incremental filing could have been diminished in the proposed system, there would likely be extremely high volumes of filings especially if the system became more accessible to small firms. Careful planning as to searching tools and user friendliness of the database would be important considerations. As such databases would include only software inventions, presumably an industry specific approach to designing such a system would be

possible.[7] A *sui generis* regime would require oversight from a specialized judicial body with expert knowledge of this type of law and technology. Adequate enforcement measures and remedies would have to be crafted to deal with issues of piracy, infringement and other causes of action arising from the legislation.

Policy makers would have to be very careful in considering issues of scope and duration of protection as well as the extent of disclosure. The right balance would be required to prevent small software firms from being a feeder system for large firms and to prevent large firms from scooping up small firm innovations in the market for technology. The framework as proposed in the Manifesto is silent on the issues of scope, duration and disclosure.[8] The scope of protection would have to be broad enough to prevent easy work arounds, but narrow enough to exclude from protection new innovative ideas developed by other players. The period of protection must be of significant duration to provide small firms the ability to bargain with their technology and to incentivize large firm to seek out strategic relationships with small firms as opposed to waiting for the end of the protection period to exploit the small firm's innovations. The period of protection must also be significant enough to allow the small firm the choice of cooperation or competition. Competition will require the small firm adequate lead time to develop or purchase the complementary assets required to compete. The model is also silent on the extent of disclosure of the technology. This is an important consideration for small software firms. While broad exposure would allow them access to technology required to interoperate with greater

---

[7] One of the challenges of a *sui generis* approach is to define and place boundaries around what inventions would qualify as software. S Graham and DC Mowery, 'Software Patents: Good News or Bad News?' (May 2004) TI:GER Faculty Working Papers 15, 30 <www.tiger.gatech.edu/files/gt_tiger_software.pdf> accessed 9 March 2010
[8] Note that these are three of the main issues with the current patent system as addressed in Chapters 2 and 3. A *sui generis* right could customize the proper balance to optimize innovation in the software marketplace.

ease, it would also expose their technology to easier imitation or circumvention of infringement by competitors. The use by large firms of a second mover advantage strategy would be intensified and small firms would be pushed out of the market.

Overall, this type of legislation may have been more effective in leveling the playing field between large and small firms for the several reasons. First, minimal transaction costs would provide small firms with an equal opportunity to file their core technologies and allow them to make incremental improvements over this short protection period without fear of copying, blocking or infringement. Second, cross-licensing could still exist, but conceivably on a much smaller scale and at a cost that would allow small firms to participate without undue hardship. More importantly, cross-licensing may not have become such an important strategy due to the short duration and the subsequent period of legislated licensing terms and conditions. As cross-licensing is a long and complicated process, it would no longer be an efficient means of gaining access to the technologies of other industry players. Third, it may encourage firms to only protect their key inventions instead of the current practice of filing multiple patents on non-critical components. If, for example, all technologies would be in the public domain after five years, there would be greater encouragement for firms to be more strategic in protecting major technologies and then make a greater effort to maximize profit through commercialization due to the shorter duration period. This approach makes more sense in a dynamic market. Fourth, assuming that issues of scope and disclosure that currently plague the patent system could have been addressed without restrictions of trying to fit software into an existing legal mold, a *sui generis* approach would remove the uncertainty that small firms face with not knowing if their inventions are protectable. A simplified system would make

protection seem less daunting and more attainable. While this may seem like a trivial advantage, much effort and money is spent today trying to educate small firms on the overly complex patent system in an attempt to improve their participation rates. Fifth, the ability to place definable boundaries around the limits of protection for a specific invention would make databases easier to search and technologies easier to clear prior to commercialization. This is currently a major battle for small firms. Finally, increased predictability in scope and disclosure would likely reduce litigation risks and provide more stability in the market. Although the framework did not address any specific enforcement protocols such as compulsory arbitration for dealing with infringement claims, this is an area of great importance to the small firm.[9] If protection cannot be enforced with reasonable cost and outcomes, the system will fail.

The authors of the Manifesto predicted that existing legal regimes could not evolve to provide appropriate protection for software innovations because of the mismatch between the technology and the law.[10] This is proving true for the smaller companies trying to achieve success. Much of this thesis is centered around the market destruction that has been created by the patent system and how small firms have failed to adapt to this legal mechanism. Despite all efforts, there is no (and will never be) perfect system. The most to be gained by a *sui generis* legal regime for software would be to provide a more balanced system in which all players have an opportunity to benefit from legal protection. This would have been preferred over a system that alienates small players and provides large players with extraordinary rights and opportunities.

---

[9] The challenges with implementing initiatives such as insurance schemes and compulsory arbitration are discussed below in the section "Recent US Patent Reform."
[10] Samuelson and others (n 3) 2421

FATE OF *SUI GENERIS* SOFTWARE LAW

The overarching research question in this thesis is whether current laws are hindering the competitiveness of small software firms. The analysis conducted in Chapters 2 and 3 support the argument that current laws are not conducive to a fair and welcoming environment in which all players can make the optimal contribution to the software industry. After 30 years of trying to integrate this special technology into the institution of existing intellectual property laws, it is clear that small incremental changes to legal regimes through judicial reasoning has not had a significant impact on narrowing the gap between large and small firms. In reforming laws, there is no simple solution. Yet, a strong case has been put forward suggesting that *sui generis* law governing software ownership, protection and exploitation could address many of the issues discussed herein. Major change is required, but an entirely new legal regime may not be realistic given the current legal and political environments in the US and the EU.

The arguments that *sui generis* law would be more appropriate for software were more than just passing remarks in the early days of the industry. The International Bureau of the World Intellectual Property Organization (WIPO) spent six years developing the Model Provisions for the Protection of Computer Software.[11] The calls for *sui generis* legislation were numerous in the early years, and still persist today as legal experts watch the industry unfold.[12] For those against *sui generis* law, the

---

[11] A copy of the WIPO Model Provisions on the Protection of Computer Software (1978) can be found at <http://www.wipo.int/cgi-bin/koha/opac-detail.pl?bib=17100> accessed 10 August 2012.

[12] B Abramson, 'Promoting Innovation in the Software Industry: A First Principles Approach to Intellectual Property Reform' (Winter 2002) 8 Boston University Journal of Science and Technology Law 75 argues for *sui generis* law based on the understanding of investment, incentive and technical properties of the software; MH Webbink, 'A New Paradigm for Intellectual Property Rights in Software' [2005] Duke Law & Technology Review 12 suggests a new regime that has the best elements of patents and copyrights; E Harison, *Intellectual Property Rights, Innovation and Software Technologies* (Edward Elgar 2008) argues for a new framework in software intellectual property rights; J Lerner and M Schankerman, *The Comingled Code: Open Source and Economic Development* (MIT Press 2010) 212 argue that more research is needed to assist policy makers in designing an IP regime that responds to software innovations

reasoning was mixed: some thought that an untested and inflexible law would be dangerous to the success of the industry;[13] some argued it was too soon to know exactly how software technologies would progress;[14] some thought that it would be impractical to create a new legal regime each time a new technology surfaced;[15] some thought that copyright and patent law were flexible enough to deal with any nuances;[16] and finally, some argued that US Congress would never re-open the discussion after endorsing copyright law and after just aggressively convincing the international community to approve copyright as the preferred regime under TRIPS.[17]

In the end, there was too much skepticism in the midst of an industry undergoing tremendous change. There was not enough political drive within the US to re-open domestic and international negotiations. In the EU, the greatest opportunity to enact *sui generis* law came during the protracted discussions over the proposal on the patentability of computer-implemented inventions. Arguments for *sui generis* law did not gain much traction in the EU from either legal commentators or policymakers.[18] By the early 2000's when the debate was ongoing, the EU had already accepted copyright as the proper form of protection under the Computer Directive.[19] TRIPS was entrenched as providing copyright protection for the international standard for

---

[13] JM Griem, 'Against a *Sui Generis* System of Intellectual Property for Computer Software' (Fall 1993) 22 Hofstra Law Review 145

[14] J S Ginsburg (n 4) 2560 argues it is "too soon to tell and too late to switch."

[15] RH Stern, 'The Bundle of Rights Suited to New Technology' (Summer 1986) 47 University of Pittsburgh Law Review 1229; KW Dam, 'Some Economic Considerations in the Intellectual Property Protection of Software' (June 1995) 24 The Journal of Legal Studies 321

[16] LJ Raskind, 'The Uncertain Case for Special Legislation Protecting Computer Software' (Summer 1986) 47 University of Pittsburgh Law Review 1131

[17] Agreement of Trade-Related Aspects of Intellectual Property Rights ("TRIPS"), Dec. 15, 1993, para. 1, 33 I.L.M. 81, 87 (1994); Samuelson and others (n 3) 2423 says that TRIPS was signed in 1994 after an "arduous struggle"; DL Burk and MA Lemley, 'Policy Levers in Patent Law' (November 2003) 89(7) Virginia Law Review 1575, 1634-35 argue *sui generis* law for software would likely conflict with TRIPS

[18] As with the US, there are still questions in the EU today as to whether *sui generis* law is the proper regime. In a recent report on the issues with the EU software market, the industry experts agreed that urgent and real changes need to be made to the legal system for the protection of software, but they agreed to disagree on whether *sui generis* law should be recommended. See the Report of an Industry Expert Group on the European Software Strategy, 'Playing to Win in the New Software Market' (June 2009) *3* <ftp://ftp.cordis.europa.eu/pub/fp7/.../European_Software_Strategy.pdf> accessed 3 November 2011.

[19] In 1991, The European Community Directive on the Legal Protection of Computer Programs solidified the US approach, standardizing copyright protection for software across the EU. Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111 (codified version) (referred to herein as the "Computer Directive")

software protection. The US would have, no doubt, put political pressure on the EU to ensure it did not introduce *sui generis* law. And most importantly, the EU had its own issues with the demands from the open source movement to provide as minimal protection as possible for software.[20]

Some of the arguments against *sui generis* law can be strongly refuted today. First, there is ample knowledge and experience regarding software technologies and the issues created by the existing legal regimes to enable policymakers to draft law that is much more appropriate to software and more conducive to innovation for all players in the industry. Theoretically, this is the optimal time to build a new legal regime as much of the guesswork has been replaced by solid evidence. Second, it is more apparent that existing legal regimes (copyright and patent law together) are not flexible enough to deal with software technologies. If all of the changes suggested in the legal literature were made to software patent law, it would essentially be *sui generis* law. Moreover, it is obvious that time is not helping to stabilize patent law as the primary source of protection for software. It is also important to acknowledge that software is a valuable technology and some form of protection for functionality is required. Suggestions that copyright provides adequate protection are not well founded. Third, the continued struggle to find stability under existing intellectual property laws and the growing discrimination against small firms makes software a prime example of a technology that should have been afforded special treatment under the law. It is a valid argument that the law cannot create a new legal regime for

[20]W Cornish, D Llewelyn and T Aplin, *Intellectual Property: Patents, Copyrights, Trade Marks and Allied Rights* (7th edn Sweet & Maxwell 2010) 845 discuss how the open source movement has 'sustained, effective political campaigns against the monopolistic potential of IPRs, particularly in the computer industry.'

every new technology.[21] It would be too expensive to administer and too confusing to understand all the nuances of separate laws for each new technological breakthrough. It is also a valid argument that the laws should be broad and flexible to adapt to technologies as they evolve. But, to draw a line in the sand that no new technologies can be deserving of special legislative consideration is short-sighted and potentially harmful to consumers.

Despite all that is known now with the power of hindsight about the shortcomings of the intellectual property laws governing software, there is little chance that *sui generis* law will become a reality. The software industry is making a sizable contribution to the economies of the EU and the US.[22] It is difficult to predict a significant economic event that would act as a catalyst to convince policymakers to make such a drastic change to the legal regime. To dismiss copyright and patent law at this time would result in a major upheaval for large firms holding millions of dollars in patents and thousands of cross-licensing agreements. Attempting to re-classify hundreds of thousands of patents with the current indexing system would be near impossible. Identifying which patents would be defined as 'software patents' for the purposes of *sui generis* protection would be problematic. Large software firms would never accept *sui generis* software and would lobby aggressively against it.[23]   Although *sui generis* law would have been more beneficial to software firms in the beginning stages of the software industry, the turmoil and confusion that a completely new system would create at this point in time would be detrimental to their success. Even if there was some level of

---

[21] Note that there are several examples of laws tailored to particular industries. See Burk and Lemley (n 17) 1625 for examples of industry-specific patent legislation in US, including pharmaceuticals, semiconductor chips, and biotechnology.
[22] See discussion in Chapter 1 in the section entitled "The Software Industry and the Competitive Landscape."
[23] See the section below entitled "Recent US Patent Reform" for a discussion on the role large software firms are playing in determining the future direction of the software industry.

domestic interest in *sui generis* law, it would be extremely unlikely that either the US or EU would be willing to risk being offside with TRIPS. Realistically, it is too late for *sui generis* legislation. The software industry has become too dependent on patents to permit such a massive change.

The more realistic route is to make the patent system, or a version thereof, more attractive to small software firms. Patents have to provide more private value for small firms in order to allow them admission into the patent game. It will be necessary to work within the current system to effect meaningful change that may have some overall benefit to small entities. As was discussed in Chapter 3, the current laws are making it extremely beneficial for large firms to file multiple patents. As long as the approach to software innovation is patent-oriented, small firms will face insurmountable challenges to finding their proper place in the market. Therefore, it may be necessary to make changes to the patent system that reduce the private strategic value of software patents for large firms and make patents less attractive for them to obtain.

A NEW PROPOSAL – A SECOND TIER PATENT SYSTEM

There are very few aspects of patent law that are tailored specifically to attract small firms.[24] The US small entity fee is perhaps the only provision that truly discriminates between large and small firms. Although legislation enacted specifically to address small firm challenges exists in other areas, intellectual property law provides little in the way of specialized treatment for small firms.[25] Intellectual property laws are

---

[24] Among the many logistic issues of creating laws specifically for small firms is the determination of what constitutes a small firm. Defining the boundaries and preventing abuse of this model by large firms (ex. creating subsidiaries) is problematic.

[25] MJ Meurer, 'Inventors, Entrepreneurs, and Intellectual Property Law' (2008) 45(4) Houston Law Review 1201, 1205 writes that it is surprising how little attention intellectual property laws pay to small firms in general and especially small innovative firms.

intended to promote innovation from firms of all sizes. The law never intended to

disadvantage one group over another. In fact, intellectual property laws were

designed to give inventors, large and small, a temporary monopoly to encourage them

to innovate. It would be difficult to enact substantive patent law specifically for the

benefit of small firms that does not act to unduly disadvantage large firms. Allowing

small firms, for example, to dispense with disclosure requirements or forgo detailed

examination of patent applications to allow greater response time at the patent office

would not make sense in this environment. It would discredit their inventions and

make enforcement of their rights impossible. Moreover, disadvantaging large firms is

not the most effective way to promote innovation, as they, too, make significant

contributions to the industry.

It is much easier to perceive special advantages to small firms using procedural laws

and policies.[26] Reduced fees are the simplest form because it is hard to argue that

they are disadvantageous to large firms. However, as discussed in Chapter 2, patent

office fees are not the greatest cost for small firms. Time is expensive. Patent lawyer

fees are expensive. Enforcement is expensive. A number of suggestions have been

proposed that deserve more attention: insurance programs,[27] compulsory

arbitration,[28] patent defense fund,[29] assistance with international filings,[30] and pro

---

[26] The US has reduced application and maintenance fees for those qualifying as small entities. See Chapter 2 (n 26). As well, the US has a provisional application process whereby applicants can file a skeleton patent application containing minimal information at a reduced rate. Applicants have one year to file a full patent application keeping the provisional filing priority date. This is a useful tool for small firms who may wish to protect their invention and conduct market research as to the potential economic value of their invention before proceeding with the expense of a formal patent. The US grace period provides the applicant with a twelve month post-disclosure period to file its patent. This is also beneficial to small firms who may not understand disclosure rules or who may be testing the market before incurring the expense of filing.

[27] W Kingston, 'Improving Patents for Smaller Firms: Insurance, Incontestability, Arbitration' [2007] Intellectual Property Quarterly 1; D Harhoff and others, 'The Strategic Use of Patents and its Implications for Enterprise and Competition Policies' (July 2007) 14 <https://ueaeprints.uea.ac.uk/37550/1/study-202852-2008_en_2475.pdf> accessed 3 July 2012

[28] W Kingston, 'A Case for Compulsory Arbitration: Empirical Evidence' [2000] European Intellectual Property Review 154 suggests compulsory arbitration coupled with legal aid support.

[29] W Kingston, 'Enforcing Small Firms' Patent Rights' (2000) Study Contract No. EIMS 98/173 <ftp://ftp.cordis.europa.eu/pub/innovation-policy/studies/studies_enforcing_firms_patent_rights.pdf> accessed 10 December 2009

bono programs.[31] While they seem like simplistic solutions to complicated problems,

these initiatives are far from easy to implement. For example, litigation insurance

programs have been shown to be feasible only when they are mandatory for all firms,

including large firms that do not need such support.[32] The recent study on whether

small firms should be offered a loan or grant program to increase their rate of

international patent filings concluded that neither program was appropriate as

government subsidies using public monies should not interfere with efficient market

solutions.[33] Compulsory arbitration seems like a plausible idea to solve the cost and

intimidation problem in enforcement proceedings. However, this option may conflict

with the TRIPS agreement which states that all patent disputes must be heard in a

court system.[34] While these proposals may all have merit, there are serious challenges

with their implementation. From the perspective of the small software firm, these

schemes would provide only a partial solution and may do little to put the small firm

back in the software game. The costs and effort to put these programs into place may

be greater than the benefits achieved. The more appropriate response to the overall

discrimination against small software firms is not to discriminate against large firms,

nor is it to require large firms to subsidize small firms. The solution is to design a

patent system that reflects the uniqueness of software so that the system is fair to all

parties. The purpose of the law is not to overcompensate for the smallness handicap

or accommodate inefficient businesses, it is to provide a balanced and equitable

---

[30] See Chapter 2 (n 61).
[31] See (n 100) and accompanying text below.
[32] JR Fuentes, 'Patent Insurance: Towards a More Affordable, Mandatory Scheme?' (2009) 10 Columbia Science and Technology Law Review 267; and see CJA Consultants, 'Study for the European Commission on Patent Litigation Insurance' (October 2002) <http://ec.europa.eu/internal_market/indprop/docs/patent/studies/litigation_en.pdf> accessed 20 November 2011.
[33] US Patent and Trademark Office and US Small Business Administration, 'International Patent Protections for Small Businesses' (January 2012) Report to Congress <www.uspto.gov/aia_implementation/20120113-ippr_report.pdf> accessed 29 August 20
[34] Kingston (n 28)

approach to a complex problem. To change the patent system in this manner will require significant effort, but the battle may be necessary to win the war.

Second tier patent systems are currently being used in 75 countries, including many of the EU Member States.[35] The hallmarks of this lower-level intellectual property right include fewer formalities, shorter duration, shorter pendency, and an overall lower cost to use the system. Second tier regimes were designed because a conventional patent system did not meet the needs of particular industries or types of inventions.[36] While the US does not have any direct experience with a second tier system, the EU was very keen to establish an EU system for utility models in the 1990s.[37] Unfortunately, this model was replaced by the desire for a unified patent system throughout the EU. There are many reasons why a second tier patent system is the appropriate route for the US and the EU to pursue for the software industry to correct the market failure evident from the current patent system.[38]

First, there is increased support that the patent system is no longer a broad, flexible regime that can encompass all types of inventions.[39] In fact, a uniform patent system

---

[35] PA Cummings, 'From Germany to Australia: Opportunity for a Second Tier Patent System in the United States' (2010) 19 Michigan State Journal of International Law 297, 300; Second tier patents are also known as utility models, small patents, petty patents, and innovation patents.

[36] ibid 319; Countries that have a second tier patent system were troubled by an inefficient patent system that was too costly for the benefit of incremental inventions.

[37] European Union, 'Green Paper on the Protection of Utility Models in the Single Market - COM (95) 370 Final' <http://europa.eu/documents/comm/green_papers/pdf/utility_model_gp_COM_95_370.pdf> accessed 24 August 2012; Note that the proposed model excluded software as a protectable subject matter.

[38] There has not been sufficient academic discussion on the issue of a second tier patent system for software. See KL Durell, 'Intellectual Property Protection for Computer Software: How Much and What Form is Effective?' (September 2000) 8(3) International Journal of Law and Information Technology 231; and see MA Paley, 'A Model Software Petite Patent Act' (August 1996) 12 Santa Clara Computer & High Technology Law Journal 301.

[39] There is a growing body of literature on the need for the patent system to take into account the special characteristics of software technologies and to tailor patent laws to meet their uniqueness. See, for example, Burk and Lemley (n 17) talk specifically about software innovations needing policy levers to optimize patent law; DL Burk and MA Lemley, 'Is Patent Law Technology-Specific?' (Fall 2002) 17 Berkeley Technology Law Journal 1155, address software specifically in determining that patent law is technology specific. A Devlin, 'Systemic Bias in Patent Law' (Fall 2011) 61 DePaul Law Review 57 considers the differences between software, pharmaceuticals, chemicals and biotechnology and concludes that elements of patent jurisprudence lend themselves to flexible and asymmetric application and should that doctrine should be construed in light of the distinct characteristics of each case.

is leading to higher transaction costs, particularly in software.[40] The divide between

the needs of the software industry and other technology industries is growing wider

and policymakers and the judiciary are no longer able to keep up with competing

interests.[41] This is creating needless complications with respect to a very complex

subject matter and preventing true progress in responding to the specific demands of

the software industry. Software technologies require their own legislation. Second, a

second tier patent regime can take advantage of the familiar principles of the existing

patent system so the concepts can be applied without too much uncertainty. This is

one of the major flaws of an unknown *sui generis* system. Copyright law would stay

intact and would continue to complement the new patenting system.[42] This would

help ensure a smoother transition into the new regime and would alleviate many of

the concerns with facing unknown issues that could arise. Third, second tier patent

systems are very well known in many parts of the world and have been functioning for

many years. There are numerous models from which to learn and tailor to the specific

needs of software. The fact that second tier systems are popular, particularly in the

EU, may help in facilitating future global harmonization of software laws. Given the

lack of consistency between jurisdictions today, it is highly unlikely a global regime for

the protection of software via patent law is possible.[43] However, if a second tier

patent system proved successful in either the EU or the US, other countries may very

well follow suit in order to effectively trade and protect their intellectual property in

these important markets. Given the number of existing second tier systems, this

---

[40] MW Carroll, 'One for All: The Problem of Uniformity Cost in Intellectual Property Law' (2006) 55 American University Law Review 845, 848 argues that a uniform patent system is leading to uniformity costs by underprotection and overprotection and that this issue is particularly acute in software.

[41] See discussion below in the section "Recent US Patent Reform" as to how this has affected the direction of US patent reform.

[42] Copyright laws in the EU and US are discussed below.

[43] The prospects of a more global patent system have been discussed for many years, but these talks have stalled due to the different interests of global players. See, for example, WIPO's role in this endeavour and the latest progress at <http://www.wipo.int/patent-law/en/harmonization.htm> accessed 24 August 2012.

proposal should not be offside with TRIPS or other international agreements.[44] Fourth, both the US and EU systems are already strained by the existing one-size-fits-all approach to software protection. A second tier patent system may initially create more costs and resources during the transition period, but over time it should become less costly than the existing system. The current US court system and the future EU uniform patent court could handle cases arising from this new legislation with minimal disruption to existing resources. As the system is based on current patent laws, the learning curve for the judiciary should be minimal.

And finally, and perhaps most importantly, a law devoted specifically to software can be tailored to the special needs of software and would be better able to evolve with software technologies and the growing need for collaboration and interoperability.[45] As well, the unique challenges of small firms in the software industry can be considered by the legislature and the judiciary during the creation of the law and with respect to subsequent amendments. The proposed new regime would have to be less costly, more flexible, and more efficient than the existing, cumbersome patent system. Although no law can future proof issues that will arise due to the dynamic nature of software technologies and the continuous changes in software business models, a law devoted to software would at least have a more defined and focused agenda. Reform

---

[44] M Janis, 'Second Tier Patent Protection' (1999) 40 Harvard International Law Journal 151, 152 states that TRIPS is silent on second tier patent systems leaving it up to each signatory to formulate its own strategy on the issue.

[45] See RM Ballardini, 'Software Patents in Europe: The Technical Requirement Dilemma' (2008) 3(9) Journal of Intellectual Property Law & Practice 563, 563 arguing that the rapid developments in software technologies has brought the patent system in the EU to its knees; [45] S Elengold, 'An Inquiry Into Computer System Patents: Breaking Down the "Software Engineer"' (2005) 61 New York University Annual Survey of American Law 349 argues that the doctrines of obviousness, enablement and written description must be updated; Burk and Lemley (n 39) 1157 argue that obviousness and enablement requirements need to be re-examined to reflect modern advances in the software technology and the relative skill of programmers. For issues with patent law and standardization, see for example, J Farrell and others, 'Standard Setting, Patents, and Hold-Up' (2007) 74(3) Antitrust Law Journal 603; and see MA Lemley, 'Ten Things to Do About Patent Holdup of Standards (and One Not to)' (2007) 48 Boston College Law Review 149; M Campbell-Kelly and P Valduriez, 'A Technical Critique of Fifty Software Patents' (January 2005) 16 <http://ssrn.com/abstract=650921> accessed 19 June 2010 state that software is far more complex and sophisticated today than the law assumes; GR Vetter, 'Patent Law's Unpredictability Doctrine and the Software Arts' (Summer 2011) 76 Missouri Law Review 763, 764 argues that much of software patent law is based on software technology that is decades old when development of software programs did not involve risk and failure.

should be more attentive to specific needs and, thus, more effective without the competing interests from non-software companies.

The proposed two tier system would be structured so as to resolve or minimize many of the challenges identified in the two previous chapters while still providing balanced opportunities to both large and small entities. Specifically, the new regime could advance the software industry by offering significant improvements in the areas of predictability, innovation, and access to all worthy parties. The current patent system is fraught with uncertainties that act as barriers to those companies without sophisticated legal departments and deep pockets. Large companies overcome these ambiguities by purchasing as many rights as possible and readying themselves for competition with patent portfolios. Clarity in the law may go a long way to reducing the need for such patent armor. Although no trivial task, the proposed law would have to resolve the obvious shortcoming of the current system with a clear and workable definition of software.[46] This has created difficulty in classifying software within existing nomenclature.[47] Software is classified according to its field of use making searching difficult as software is used is numerous different fields.[48] As well, inventors can supply their own key words to describe the patentable invention and there is no meaningful indexing of these words for searching purposes.[49] Novelty requirements are problematic because of difficulty in verifying and searching prior art in software markets due to ill-defined inventions. From a usable definition, there could be created a new classification system for software and rules for indexing and key word

---

[46] Currently in the US there is a private member's bill attempting to define software patents. The Saving High Tech Innovators from Egregious Disputes bill the attempts to put an end to patent trolls in the software industry but also attempts to define software patents. <https://www.eff.org/sites/default/files/SHIELD_ACT_0.pdf > accessed 10 September 2012.
[47] RJ Mann, 'Do Patents Facilitate Financing in the Software Industry?' (2005) 83(4) Texas Law Review 961, 965
states that software does not fall naturally within the classification system and definitions are arbitrary.
[48] JE Cohen and MA Lemley, 'Patent Scope and Innovation in the Software Industry' (2001) 89 California Law Review 1, 13
[49] See S Lindholm, 'Marking the Software Patent Beast' (April 2005) 10(2) Stanford Journal of Law, Business & Finance 82, 105

searching[50] and a separate, special database with state-of-the–art technology for prior art and patent searching. Placing outer boundaries around what exactly is protected will provide greater ease for searching databases to ensure non-infringement and for making decisions on patentability of new inventions.

Perhaps the most disconcerting legal issue facing the software industry today is the lack of consistency and transparency as to what exactly is patentable. In the now famous 2010 US *Re Bilski* case,[51] the Supreme Court was expected to clarify the test for software patent eligibility. It refused to answer the question with any certainty and left it for the lower courts to further develop and refine the test.[52] Despite the fact that software has been patentable for over 30 years, courts are still grappling with the issue of what is patentable subject matter. This speaks volumes to current patent law's ability to deal with software technology. It illustrates how the uncertainty in the judiciary on this important topic can create turmoil in the industry as lawyers and judges struggle to find a solution.[53] It is also ironic because a decision-making board of the EPO was asked to opine on almost the exact same issue at almost the exact same time. In 2008, the President of the EPO asked the Enlarged Board of Appeal to rule on the patentability of computer programs citing inconsistencies in appellant rulings.[54] The Enlarged Board of Appeal also declined to make a ruling on the matter. Both the

---

[50] This could include mandatory marking of software products to provide greater notice. ibid
[51] *Bilski v Kappos* 130 S. Ct. 3218 (2010)
[52] JR Thomas, 'Everything Old is New Again: Statutory Subject Matter in Context: Lessons in Patent Governance from Bilski v. Kappos' [2011] 15 Lewis & Clark Law Review 133, 151 state that the Supreme Court.went out of its way not to make a decision; P Menell, 'Forty Years of Wondering in the Wilderness and No Closer to the Promised Land: Bilski's Superficial Textualism and the Missed Opportunity to Return Patent Law to its Technology Mooring' [2011] 63 Standard Law Review 1289, 1290 states that the Supreme Court was supposed to clarify one of the most critical areas of patent law at a crucial juncture in information age and bring coherence to boundaries of patentable subject matter.
[53] See, for example, B Reese, 'Judicially re(de)fining Software Patent Eligibility II: A Survey of Post-Bilski Jurisprudence' (2010/2011) 27 Santa Clara Computer & High Technology Law Journal 673; and see E Abraham, 'Bilski v. Kappos: Sideline Analysis from the First Inning of Play' (2011) 26 Berkeley Technology Law Journal 15
[54] The President wanted the Enlarged Board of Appeal to take a leading role in the harmonization of the practices of national offices on the question of the scope of the "technical character", but instead the Board left the question largely unanswered. D Wilson, D Pearce and C Sharp, 'PO: Patents – Patentability of Computer-implemented Inventions' [2010] European Intellectual Property Review N83

Supreme Court and the Enlarged Board of Appeal made it clear that it was time for their respective legislators to provide certainty in this area.[55] This lack of understand creates additional uneasiness in the system, increases patent agent fees and further excludes small firms from being able to protect their important innovations. With a regulatory instrument focusing only on software, policy makers would not be bound by generic patent language and would not feel restricted in their ability to provide proper language to solve this critical issue.

With respect to the contents of the proposed patent application, it is recommended that the new system take into consideration the nuances of software technologies and create more simplified and tailored rules to encourage filings based on important technologies that advance the state of the technology in the industry. For example, a restriction on the number of claims and breadth of claims;[56] reconsideration of obviousness with specific attention to the advanced complexity and level of risk involved with current software development; new standards for novelty and inventiveness that take into account incremental technological advances; and new standards for disclosure that suit software technologies and provide adequate notice for follow-on innovation. As discussed in Chapter 2, the abstract nature of software leads to notice problems and patents being allowed on trivial inventions.[57] Unpredictable boundaries in patents lead to higher litigation costs[58] and broad claims

---

[55] ibid, N86 The Enlarged Board of Appeals hinted that it was time for the legislator to provide certainty in this area, but did not give a full decision on the matter as the referral was deemed inadmissible; Thomas (n 52) 134 states that the Bilski decision by the Supreme Court suggests that the legislature may still be needed to provide robust solutions to software patentability subject matter.

[56] Harison (n 12) 40 argues that if applications have narrower patent claims and shorter duration, small firms would be able to compete more easily with incumbent firms by introducing new products based on advanced knowledge that is sufficiently different from already patented inventions.

[57] J Bessen and MJ Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators At Risk* (Princeton University Press 2008) 213

[58] ibid, 194

result in patents being awarded for inventions not even invented.[59] Narrow claims and a lower threshold for obviousness would allow for greater rewards for incremental improvements and prevent patent thickets.[60] Because of the nature of the technology, courts have allowed software patents to have a lower disclosure threshold.[61] Under the present system, the insufficient disclosure leads to the uncertainty and unpredictability for those attempting to invent and protect follow-on innovation. This leads to greater barriers to interoperability and connectivity in software markets. It also leads to greater patenting by large firms who fear they need a patent superwall to ward off competitors, resulting in patent thickets and excessive cross-licensing practices. The lack of disclosure and strict formalities in drafting patent applications mean that companies are encouraged and rewarded for filing patents. There is very little likelihood that it is actually leading to greater innovation and collaboration as competitors are not even aware of the boundaries of their own technologies, let alone their rivals in the market. Large companies spend time and resources attempting to resolve these inefficiencies in the system via extensive licensing agreements, needless patent applications, and lengthy court actions. The consequences are very significant to small firms unable to play in the patent game and, even worse, unable to find value in the patent system. In the long run, large firms are caught in the cyclic pattern of spending money and resources just to keep pace with each other. A more restricted and focused approach to software patenting would make the system less exhausting and more beneficial to all parties.

---

[59] RM Ballardini, 'The Software Patent Thicket: A Matter of Disclosure' (August 2009) 6(2) Scripted 207, 216; see also Burk and Lemley (n 17) 1786 argue that courts relax the enablement requirement and permit broadly defined claims, thus making narrow software patents on incremental improvements invalid for obviousness.
[60]ibid, 1787 stating that broad patents create patent thickets.
[61] See Chapter 2 (n 32).

There are some additional features that could be considered by a second tier regime that would likely never be considered under current legislation. The effective life of a software patent is short relative to other inventions given how rapidly technology changes, with an average life span of 5 years.[62] Yet, software patents last for 20 years. The proposed system would reduce the duration of patent protection to be more aligned with the nature of the technology. With a shorter duration of protection (5 to 10 years) there would be less desire for large firms to spend two to three years negotiating complex cross-licensing deals. Long term agreements that hold valuable technologies out of reach for newcomers would be eliminated. As well, the new legislation would consider some means of calculating reasonable royalty rates for interfaces and standards to open up the possibilities that small firms could avail of greater opportunities for interoperability and connectivity with existing technologies and offer new and improved applications for consumers.

A shorted and simplified registration and efficient examination system would be necessary to create greater access for smaller, less sophisticated firms, as well as reduce the fees paid to patent agents and time required for precious technical internal resources to participate in building applications. As protection will be reduced in duration, it is essential that examiners provide efficient granting of rights. Shortened pendency will result in greater certainty, less risk of obsolescence, and greater comfort to allow small firms to disclose inventions during negotiations, thus adding much needed value to the patent process. Finally, the new law would have to consider an effective means of enforcing rights and offer properly balanced damage awards for

---

[62] Campbell Kelly and Valduriez, (n 45) 26; see also KD Rowe, 'Why Pay for What's Free?: Minimizing the Patent Threat to Free and Open Source Software' [2008] 7 John Marshall Law School Review of Intellectual Property Law 595 arguing for a 7 year patent term to increase the odds that some technology may remain in the public domain when the rights expires.

infringement. Leaving software firms to solve their differences under the current court system could negate all efforts to streamline legislation for software technologies. Greater consideration to alternative dispute resolution options, insurance schemes and legal aid may make more sense under a new, separate regime.

The proposed law would have significant advantages over the current patent system. It would provide substantial benefits to allow the small software firm to be more competitive and limit the need for large firms to engage in patent wars. A cheaper and faster system would allow small firms greater participation. A straightforward application system would reduce the cost of legal fees paid to patent agents. There would be greater dissemination of know-how with more efficient and economical searching techniques. A clearer standard for drafting claims, obviousness, novelty and notice would take away the need for large firms to file numerous applications on trivial technologies. Predetermined procedures for reasonable license fees for interfaces and standards allow small firms access to critical technologies and deter large firms from excluding them. Equal access to protection would give them sufficient lead time to determine whether they would cooperate or compete with others and not be held ransom by the complementary assets of bigger players.[63] More certain and fair protection would provide potential investors with a greater level of comfort and improve much needed funding opportunities for under-resourced entities.

A specialized patent regime for software would ensure that the industry remains at the forefront of innovation. Small firms would be encouraged to engage in R&D without fear of retaliation, intimidation or free-riding. With the ability to protect their valuable

---

[63] See Chapter 2, section entitled "Complementary Assets and Lead Time" for a discussion on the importance of lead time for small firms.

assets and exploit them in the market for technology, there may be greater support from third party investors. The improved disclosure would result in widespread and non-discriminatory dissemination of key technical information required for interoperability without the inefficiencies of reverse engineering. Large firms would have equal opportunity for software protection, but it will not be strategically necessary or economically efficient to carry huge patent portfolios and engage in patent wars. The incumbent firms would still have their natural advantages of complementary assets to propel them into the marketplace. Only the most innovative and efficient small firms would survive. With properly drafted laws, the market would have a greater chance to fulfill its role of self-correction. In the end, consumer welfare is the greatest beneficiary of a modernized patent system. Entrepreneurs would be incentivized to enter the market and provide niche products to meet consumer demands. Small entities would produce radical inventions that would continue to challenge large firms to innovate to maintain their market positions. New industries would be created as well as jobs for a high-paying, well-educated workforce.

A second tier system is not without its limitations.[64] It must be reiterated, however, that there is no quick fix to the issues facing the software industry. Radical change is required, compromises are necessary, and perfection is not attainable in this environment. The main concern with two tier patent systems is ensuring that the new system offers unique value that cannot be obtained in the traditional patent system. Although some other two tier models allow the same invention to be protected under a standard patent system, such an approach would not work for software. Companies cannot have the choice to protect their inventions under either system. This would

---

[64] For a critique of second tier patent systems, see Janis (n 44).

give small firms no greater rights than they have now as large firms would continue to file under the current system and not be subject to the lesser, but more equal, rights provided under the proposed regime. In addition, the proposed regime cannot be seen as solely a domestic solution. Software technologies are internationally traded and require international protection.[65] Unless other countries join in the movement and enact similar legislation, there will be issues with transferability between countries. It may be very difficult to align a second tier patent with the Patent Cooperation Treaty application process. The transition from the current patent system to a new legal regime would be complicated and confusing for companies in the software industry, especially small firms. There would have to be a plan to allow for existing patents to be transferred to the new system or a means for the new system to be phased in over time. Even though a focused approach would have the best chance of success, there is no guarantee that the proper balance of subject-matter, scope and duration can be effectively met. Another risk is that large firms find means to manipulate the new laws in such a way that they are able to exclude small firms to an even greater degree. And finally, such an extreme redirection for software protection will require significant dedicated resources on the part of law makers. Moreover, it will require either the buy-in from large firms or the political will to see this makeover through without influence from large companies who may see this change as a way to stifle their artificially created market power.

Thus, the proposed second tier patent system is not without its complications, risks and pressures. Yet, status quo is an even more risky proposition. Because software technology was incorrectly left without a properly tailored legal regime for so long,

---

[65] See Chapter 2 in the section entitled "Globalization".

there is too much attention to the minutia of patent law, leaving little room for broader analysis. The industry has outpaced legal reform to the point where current patent doctrine is no longer credible or rational. When a system designed to promote and encourage innovation reaches this stage of disarray, surely the time is right to resurrect the discussion of reform.

US AND EU LEGAL SYSTEMS AND THE POSSIBILITY OF REFORM

In theory, a two tier patent system may be the best solution to the problems in the software industry and to ensure the inclusion of small software firms. Nonetheless, it would be a significant undertaking for either the US or the EU to implement such a major change to its current system. There would have to be a clear, convincing and pressing rationale for such reform, as well as the political will to see it through. The argument for change based on the special needs of small software firms is unlikely to garner much support in and of itself. Small firms would have to rally behind such a proposal and provide clear and convincing arguments that do not appear self-serving. Proof that a new regime would improve the economic condition of the software industry and help ensure its future viability would be necessary. Arguments in support of increased innovation and consumer welfare would carry weight, although both concepts are abstract and difficult to prove. In this last section, some of the issues relevant to the potential for a second tier patent system in the EU and US will be explored.

As discussed in Chapter 1, both the EU and the US place great emphasis on small innovative firms as contributing to their respective economies. In many ways, policies that promote the funding of small software firms and education programs to encourage R&D are disconnected from the realities of the current intellectual property

system. Both the US and EU are hoping that entrepreneurial firms will help their economies recover and become more robust. For example, the EU recently announced it was facing an "Innovation Emergency" and called for greater support for SMEs and the harmonization of patent laws.[66] A second tier patent system may be a partial solution to this crisis. Recent movement on patent harmonization and patent reform in the EU and US may provide some guidance on the question of whether either jurisdiction would entertain the proposed lower-level patent system.

Current Copyright Laws in the EU and US

Before further investigation of the current EU and US patent systems and their ability to introduce second tier regimes, it is necessary to address the current effectiveness of copyright laws in the EU and US and their role in protecting software inventions. The US has included software as a literary work within the scope of its Copyright Act.[67] The EU protects software via copyright under its Directive on the Legal Protection of Computer Programs.[68] The Computer Directive harmonizes EU law in this area and applies to all Member States. Although the US doctrine on software copyright protection evolved through its common law system, the current copyright laws in the EU and the US are remarkably similar. Copyright law governing software, for better or worse, is relatively stable.[69] In the US, issues of copyright protection relating to

---

[66] European Commission, 'Commission Report Highlights Europe's Innovation Emergency and Analyses Member States' Progress' (EUROPA Press Release, 9 June 2011) < http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/692> accessed 20 June 2012

[67] 17 U.S.C. §§101, 117

[68] Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111 (Hereinafter referred to as the "Computer Directive".)

[69] Pamela Samuelson, one of the most vocal proponents of *sui generis* software law and author of the Manifesto, argues that the copyright scope has evolved over time and has contributed to the growth of the software industry. See P Samuelson, 'The Uneasy Case for Software Copyrights Revisited' (September 2011) 79 (6) The George Washington Law Review 1746. But see, DS Karjala, 'Copyright Protection of Operating Software, Copyright Misuse, and Antitrust' (1999) 9 Cornell Journal of Law and Public Policy 161 and J Zittrain, 'The Un-Microsoft Un-Remedy: Law Can Prevent the Problem That It Can't Patch Later' (1999) 31 Connecticut Law Review 1361 arguing that the duration of copyright protection is the major reason why firms like Microsoft enjoy such strong monopoly power over operating systems.

structure, sequence, organization, interfaces and rights under reverse engineering have been settled for many years.[70]

In the EU, issues arising under copyright law have, for the most part, been definitively dealt with under the Software Directive. Yet, in August 2010, the High Court of England and Wales made a reference for a preliminary ruling to the European Court of Justice in the case of *SAS Institute v World Programming Ltd*.[71] The High Court sent a series of questions for interpretation regarding the Software Directive, asking whether functionality and programming languages of computer programs are protected by copyright. The Court of Justice ruled on May 2012 that functionality and programming languages were not protected by copyright. This case is remarkable in that it shows that copyright protection over functionality and interoperability is still controversial in the EU despite the fact that the Software Directive has been in effect for 20 years. If this is a contentious issue, it is interesting that it took this long to be debated by EU courts as it is certainly a fundamental issue in the software industry. To allow functionality to be protected under copyright law would change the entire dynamic of the software industry. It may speak to the continued confusion regarding the role of patents to protect functionality and interfaces in the EU or it may speak to the judiciary's lack of knowledge or confidence to consider software matters. The *SAS* case also illustrates some of the shortcomings of the Software Directive. Even in the early days of its enactment, the Software Directive was criticized for its ambiguous language.[72] Such vagueness would make it open to many variations of interpretations

---

[70] See Chapter 1 (n 27).
[71] *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch) (23 July 2010)
[72] MA Ehrlich, 'Fair Use or Foul Play? The EC Directive on the Legal Protection of Computer Programs and Its Impact on Reverse Engineering' (1994) 13(3) Pace Law Review 1003, 1013. Note also that a major issue in the famous EU *Microsoft* case was the proper interpretation of "interoperability" under the Software Directive. For a discussion, see P LaRouche, 'The European *Microsoft* Case at the CrossRoads of Competition Policy and Innovation' (2008) 75 Antitrust Law Journal 601, 609.

by Member States who were required to interpret, implement and enforce the Software Directive within their respective jurisdictions. As well, this form of legislation was criticized as not being flexible enough to grow and expand with changes to such a dynamic industry as software.[73] These issues would certainly increase the need for resolution of issues via litigation in various Member States. Ambiguity and expensive litigation are challenges which help to further the frustration and lack of protection for small software firms. It is possible that a second tier system for software patenting in the EU could clarify the issues that currently overlap between copyright and patent laws and provide some additional stability to the Software Directive.

EU Patent System

Patent law has not been harmonized in the EU, thus each Member State applies its own laws to patent prosecution.[74] In 1978, the European Patent Convention was established as a special agreement under the Paris Convention and the EPO was set up to administer it.[75] Patents granted under the EPO are considered to be a bundle of national rights as applicants have to determine in which Member States they will seek protection. It is the selected Member State that has jurisdiction over post grant issues of validity and infringement. Although Member States are not bound by decisions of the EPO, EPO decisions are considered a form of "persuasive authority" throughout the EU.[76] In 2002, the EU Commission presented a proposal for a directive on the

---

[73] P Samuelson, 'Comparing U.S. and EC Copyright Protection for Computer Programs: Are They More Different Than They Seem?' [1994] 13 Journal of Law and Commerce 279, 285 and 292 argues that the directive is inflexible and that this form of legislation does not provide for any overriding doctrines to help guide the changing landscape of software laws.
[74] Ballardini (n 45) 567
[75] Convention on the Grant of European Patents (1973) 13 I.L.M. 268. As a result, the EPO is not an EU body and is not governed by the Commission.
[76] PE King, RM Roberts and AV Moshirnia, 'The Confluence of European Activism and American Minimalism: "Patentable Subject Matter" After Bilski' (2010-2011) 27 Santa Clara Computer & High Technology Law Journal 247, 254

patentability of computer-implemented inventions.[77] The proposal was attempting to ensure that software programs were protected by Article 52(1) of the European Patent Convention and to obligate the Member States to protect software programs under their respective patent laws. The proposal was ultimately rejected in 2005 by the European Parliament and attempts to harmonize patent law pertaining to software inventions were quashed.

This fragmented patent system is problematic for all firms wishing to hold patents in the EU, but it is particularly troublesome for small firms. Patent are very costly as each Member State has its own fee structure and applicants pay translation costs and maintenance costs in each jurisdiction. As well, litigation is extremely expensive as the same patent may have to be litigated in several Member States. These duplications of effort result in patents in the EU being the most costly patents in the world.[78] In addition, the system is very complex, confusing and unpredictable for many reasons. The Member States have varying degrees of experience and sophistication with patent law and enforcement due to the fact that countries are in different stages of economic development. Each Member State may have a different interpretation of patent laws with respect to software. For small firms with limited knowledge, experience and resources, administering multiple patents in various Member States is problematic. These structural issues coupled with the confusion over the patentability of software in

[77] Proposal for a Directive of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions (COM(2002) 92 – 2002/0047 (COD)) <http://ec.europa.eu/internal_market/indprop/comp/index_en.htm> accessed September 10, 2012

[78] B Van Pottelsberghe, 'Lost Property: The European Patent System and Why It Doesn't Work' (2009) Bruegel Blueprint Series 12 <http://www.bruegel.org/publications/publication-detail/publication/312-lost-property-the-european-patent-system-and-why-it-doesnt-work> accessed 13 May 2012

the EU[79] make the current system an unwelcoming environment for a small firm wishing to file software patents.

The first proposal for unitary patent protection throughout the EU started 40 years ago[80] and the creation of a unified patent court has been a "preoccupation" for the EU since 1978.[81]   Both proposals seem closer to reality in the EU with significant political steps being taken in the last two years.[82]   The benefits of these two legal infrastructures in the EU are obvious.[83]   They will result in more efficient and less costly processes. Quicker and more unitary decisions will result in greater certainty and predictability in an otherwise convoluted subject matter. A specialist court to deal with patent matters will help provide continuity in the decision making, but will also be a more efficient tool for modifications to patent law in fast-paced industries. For all small firms, the benefits of any system that is less costly, less complex and more certain are a given.[84]   These are basic needs of all small firms lacking legal sophistication and resources.

However, a unified system, in and of itself, is not the answer to all of the issues addressed in this thesis. The US has, for the most part, a unified patent system, and it is still fraught with issues that make it near impossible for small software firms to operate. As was discussed in Chapter 2, patent law protection for software is very

---

[79] See Chapter 2 (n 39).

[80] CS Pehlivan, 'The Creation of a Single European Patent System: From Dream to (Almost) Reality' [2012] European Intellectual Property Review 453, 455

[81] J Pila, 'Software Patents, Separation of Powers, and Failed Syllogisms: A Cornucopia form the Enlarged Board of Appeals of the European Patent Office' (2011) 70 The Cambridge Law Journal 203, 226

[82] Pehlivan (n 80); I Kazi, 'Will We Ever See a Single Patent System Covering the EU, Let Alone Spanning the Atlantic or Pacific?' [2011] European Intellectual Property Review 538; and see the information available from the European Patent Office at <www.epo.org/law-practice/legislative-initiatives/eu-patent/news.html> accessed 2 August 2 2012.

[83] See D Harhoff, 'Economic Cost-Benefit Analysis of a Unified and Integrated European Patent Litigation System' (2009) Final Report Institute for Innovation Research, Technology Management and Entrepreneurship' <www.ec.europa.eu/internal_market/.../patent/.../litigation_system_en.pdf> accessed 10 July 2012 for cost benefit analysis of unified patent litigation system; and see Van Pottelsberghe(n 78) for a review of what is wrong with the system and how harmonization will solve many of these issues.

[84] See Report of an Industry Expert Group (n 18) for a good overview of how the fragmented EU market is affecting the ability of small software firms to compete.

uncertain in the US despite its harmonized laws and centralized appellant court.[85] US

courts are still unable to keep up with the pace of innovation in the software industry

and the EU will continue to have the same issues.   Unless and until the EU

acknowledges that software require specialized treatment under the law, the same

issues will persist in that jurisdiction post-harmonization.[86] The regulatory gaps arise

because of the mismatch between software technologies and existing legal systems

and not with harmonization itself. Like the US, the EU is reporting strategic patenting

and patent thickets in its information and communications technology sectors and this

trend is likely to increase with a harmonized system and increased software patent

filings by incumbent firms.[87] The delays in patent granting[88] may be more of a US issue

given the number of patent applications it receives, however a harmonized system in

the EU will result in an increased number of applications. In software, delays of even

one or two years are problematic given the life cycle of the technology. The overly

lengthy and unpredictable enforcement process in the US[89] to satisfy patent disputes

may be due to the US culture for litigation. However, as long as software patents have

vague and ambiguous boundaries and limited disclosure thresholds, the EU will have to

deal with increasingly complex enforcement proceedings.

---

[85] US Congress established the Court of Appeals in 1982 to act as a centralized appellant court for patent cases and to provide a mechanism to continually enhance the patent system in the US.

[86] The EPO website states that patent applications for computer-based inventions have the highest growth rate among all patent categories presented to the European Patent Office over the past few years. <http://www.epo.org/news-issues/issues/computers/software.html> accessed 23 August 2012; Ballardini (n 59) 208-209 argues that the US software patent landscape serves as a backdrop for the EU environment.

[87] Harhoff and others (n 27) conduct an EU study on strategic patenting. The EU may have more difficulty monitoring and studying the effects on harmonization in the software industry or issues with the software sector in general. The Harhoff study groups software into the ICT sector, without any particular attention to the industry itself. This is unfortunate as it is an opportunity to showcase issues in the EU software sectors. It is also interesting to note in the literature review for this study, the vast majority of works cited originate in the United States.   A Grosche, 'Software Patents – Boon or Bane for Europe?' (September 2006) 14 International Journal of Law & Information Technology 257, 265 reports that there is also a lack of statistical data on software patenting in the EU, making it more difficult to understand how the patent system is affecting small firms in the EU.

[88] See Chapter 2 in the section entitled "Risk of Obsolescence."

[89] See Chapter 3 in the section entitled "Protection and Litigation."

Therefore, despite the obvious benefits it could bring, it is argued that a harmonized patent system may not be the savior of the small software firm. A harmonized system will also be beneficial to large firms and will increase their patenting propensity at higher rates compared to small firms. The EU must take steps to make software patents more valuable to small firms and less relevant to the business strategies of large firms. It is only through significant reform that this can happen. At present, major software patent reform in the EU seems highly improbable. All efforts appear to be focused on patent harmonization and it is unlikely that any party would want to introduce more complications into this already onerous process.[90] Post-harmonization, it is highly improbable that the EU would take on a new initiative to harmonize second tier patent regimes across Member States. It will take years to transition into the new harmonized patent system. It would likely take many more years before it is fully realized how ineffective a harmonized system, in and of itself, will be in improving the EU's software economy.

The EU could reintroduce its proposal for the patentability of computer related inventions, but at this stage in the evolution of software laws, it would not likely result in much improvement in the fate of small software firm or the growth of the software industry. Such a proposal is merely confirming that software is protected under the European Patent Convention, a practice that is already well established. While it might add some clarity to the confusion as to whether patent protection is available for software in the EU, it will not solve the issues addressed in this thesis with respect to the small firm. A "directive" form of legislation would allow the Member States to

---

[90] The 2005 debate over the patentability of computer implemented inventions was one of the most contentious issues in EU patent history. See S Haunss, 'The Politicisation of Intellectual Property: IP Conflict and Social Change' [2011] WIPO Journal 129.

interpret the language under their own legal systems and not create the consistency required for the small firm to flourish. Instead, a Community right that provides for single application process under a harmonized second tier program designed specifically for software technologies is the superior means of improving the integration of software technologies throughout the Member States. Although a uniform patent law and court system are important and necessary, software reform must stay high on the list of priorities. Surely there is ample evidence today of the state of the software industry and oppression of small software firms to provide policy makers with the ammunition to fight against special interest groups. The open source community is known as a very active lobbyist group in the EU and would be particularly interested in such reform.[91] It is possible that it might endorse such an approach as it provides less stringent rights for large firms. In any case, it is doubtful that this group would have the same political strength now that it has not delivered on the economic impact it promised to the EU economy.[92] Unfortunately, it is also doubtful that the small business community would have the political strength to rally behind this proposal as it is, at present, a very fragmented group in the EU. In the absence of a political champion, the EU is unlikely to make the first move to a modernized software regime.[93]

Recent US Patent Reform
In the unified US system, the recent patent reform highlights the difficulties in bringing about major changes in the patent system that result in leveling the playing field in the

---

[91] P Leifeld and S Haunss, 'Political Discourse Networks and the Conflict Over Software Patents in Europe' (2012) 51 European Journal of Political Research 382, 400 argue that the software patentability directive debate was unusual because a weaker coalition (open source proponents) was more coherent and had better economic arguments than large firms.
[92] See Chapter 3 in the section entitled "Open Source Movement and the Small Software Firm."
[93] During the debate over software patentability, it was argued that there was no high level political advocate fighting for substantive action. See RA Atun, I Harvey and J Wild, 'Innovation, Patents and Economic Growth' (June 2007) 11(2) International Journal of Innovation Management 279, 290.

software industry. The US patent system has just recently undergone its most significant reform since 1952. On September 16, 2011, the US President signed the America Invents Act ("AIA").[94] The AIA is largely about procedural patent reform and, unfortunately, has done little to alleviate the major substantive issues plaguing the software industry.[95] From a small business perspective, there were a few interesting last minute additions to the AIA that are worthy to note and hopefully provide a glimpse of a conscious effect among US policy makers to understand small business challenges with the patent system.[96] The AIA requires the USPTO to conduct a study to determine how to help small business file more patents internationally.[97] The USPTO must establish an Ombudsman Program to provide support and services to small business.[98] As well, AIA requires the USPTO to work on the establishment of pro bono programs for small businesses throughout the US.[99] Although the details of these initiatives are vague and the value of such reports remains to be seen, these provisions suggest that small business may have finally reached the radar screen of policymakers. Section 30 of the AIA includes a "Sense of Congress", highlighting the recognition by Congress of the importance of small business.[100]

---

[94] Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011). Previous versions of the AIA were presented to Congress four times since 2005. The proposed reform was based on two reports, one from the Federal Trade Commission and the other from the National Research Council (NRC): Federal Trade Commission, 'To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy' (October 2003) <www.ftc.gov/os/2003/10/innovationrpt.pdf> accessed 19 July 2011; National Research Council, 'A Patent System for the 21st Century' (2004) < www.nap.edu/html/patentsystem/0309089107.pdf> accessed 10 August 2012. Both reports included small businesses in the consultation process.

[95] In the same year that the AIA was signed, the Federal Trade Commission issued another report recommending extensive patent reform for the software industry. Federal Trade Commission, 'The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition' (March 2011) <www.ftc.gov/os/2011/03/110307patentreport.pdf> accessed 10 August 2012

[96] J Matal, 'A Guide to the Legislative History of the America Invents Act: Part I of II' (2011-2012) 21 The Federal Circuit Bar Journal 435 provides background history regarding the addition of provisions of the AIA. The small business clauses discussed below were added in March – June 2011, just months before the AIA was signed into law. These additions are likely in response to the independent inventors' lobbying efforts as this interest group was sure to lose their fight to protect the first to invent system.

[97] AIA (n 94) Section 31; This report is discussed in Chapter 2 in the section entitled "Globalization."

[98] AIA (n 94) Section 28; There is a new USPTO Program for Small Business Concerns that will assist small firms through all steps of the patent process. See < www.uspto.gov/aia.../120910-aia-ombudsman-white-paper.pdf> accessed 13 September 2012.

[99] AIA (n 94) Section 32; Information on the pro bono system can be found at <http://www.uspto.gov/inventors/proseprobono/index.jsp> accessed 13 September 2012.

[100]AIA (n 94) Section 30 states "It is the sense of Congress that the patent system should promote industries to continue to develop new technologies that spur growth and create jobs across the country which includes protecting the rights of small

These initiatives show that Congress is recognizing that small firms have special challenges with the patent system. As well, education and assistance programs are welcome as awareness is a huge barrier to the complex patent system. The pro bono program, in particular, gets to the heart of one of the cost issues that small firms face with respect to patent agent fees. However, it is unlikely that such programs will be enough to solve the cost problem for small firms who need to file multiple patents in order to be a player in the industry. Unless small software firms start filing a much higher volume of patents, procedural changes will do nothing to minimize the superpowers the system has afforded to large firms. They do not remove barriers to competition such as patent portfolios and cross-licensing. They do little to deal with interoperability issues and ensure that small firms have access to critical industry technology. They do not improve dissemination of knowledge and ensure that state-of-the-art products are available to consumers. The main problems with software patents are not procedural, they are substantive.

The AIA patent reform process was controlled by large firms with very little input from small players.[101] Lobbying efforts cost time and money and only those with the most influence, financially and economically, will be heard. The AIA process is particularly illuminating as it shows the major divide between large firms in the software arena and

---

businesses and inventors from predatory behavior that could result in the cutting off of innovation." This may signify a change in priorities for Congress, but this remains to be seen.

[101] C Shapiro, 'Patent System Reform: Economic Analysis and Critique' (2004) 19 Berkeley Technology Law Journal 1017, 1018 states that the most powerful complaints about patent system are coming from companies that rely on patents to protect their inventions. These are incumbent firms that say the patent system is hindering their ability to innovate and compete. P Michel, 'Key Note Address by the Former Chief Judge for the US Court of Appeals to the Princeton University, Centre for Information Technology Policy Conference, "Patent Success or Failure? The American Invents Act and Beyond"' <https://citp.princeton.edu/event/patent-success-or-failure/> accessed 23 August 2012 states that the AIA negotiations were dominated by large firm interest groups with big public relations departments and huge budgets; JR Allison, A Dunn and RJ Mann, 'Software Patents, Incumbents, and Entry' (2007) 85 Texas Law Review 1579, 1580 provides examples of how incumbent firms are leading the charge on software patent reform.

those in other major economic areas such as pharmaceuticals and biotechnology.[102]

These two interest groups have different issues with the patent system and patents provide each group with different private value.[103] In contrast, small business gets grouped together as one homogenous group. Therefore, small firms from industries such as software, medical devices, biotechnology and pharmaceuticals are all presumed to be fighting for the same cause. Yet, these sectors all have different needs and concerns.[104] An interest group with divided interests is not powerful or effective in bringing about reform. Thus, the voice of the small firm was not heard during the recent patent reform process.[105]

From the recent positioning by relevant stakeholders in the US software industry through the AIA negotiations and important case law such as *Re Bilski*, several conclusions can be drawn. It is clear that large firms are, for the most part, comfortable with the substantive law relating to software patents as most of the improvements to the law concerned procedural issues. Small software firms are not united in their efforts to bring about substantial change. Despite the apparent issues with software technology and patent law and regardless of the countless suggestions by legal experts on the issue of software patent reform, the judiciary does not seem overly engaged in bringing about radical change[106] and perhaps feel there are limitations to their roles in interpreting legislation and following previous case law.

---

[102] RE Thomas, 'Vanquishing Copyright Pirates and Patent Trolls: The Divergent Evolution of Copyright and Patent Laws' (Winter 2006) 43(4) American Business Law Journal 689, 693 argues that because large biotechnology and pharmaceutical firms do not face the same threats as those large firms in information technology, necessary patent reform is delayed or prevented; K Hart, 'Tech Industry Splinters Over Patent Reform Proposal' (*The Hill*, 3 September 2010) <http://thehill.com/blogs/hillicon-valley/technology/85515-tech-industry-splinters-over-patent-reform-proposal> accessed 11 August 2012 states that "New patent-reform legislation is dividing the technology industry, with biotech, tech giants and small companies all taking different stances."
[103] Devlin (n 39) argues that the patent premium for software is insignificant or negative and the patent system works differently for biotechnology and pharmaceutical companies.
[104] See Chapter 2 (n 6) and accompanying text.
[105] Michel (n 101) says that small business was left out of Capital Hill during the AIA discussions and that there was not enough involvement from small entities in the consultation process. He argues that small firms have "special needs" and that the patent system cannot be reformed properly without hearing from all interested parties.
[106] Cohen and Lemley (n 48) 6 state that courts have "assiduously avoided" addressing software patents for over 25 years.

Finally, law makers do not have an interest in taking on the problems in the software industry through amendments to the existing patent act as it would put them in disfavour with many large, powerful software firms.

Suggestions that time will correct the issues rampant with software patent law have not proven to be accurate.[107] The recent patent reform in the US did not get to the heart of the issues with software firms let alone the matter of small firm participation in the patent system. Likewise, incremental changes to patent laws by the judiciary are not providing any incentive to encourage small software firms to engage in the IP system or to provide them private value by holding patents. Markets cannot police themselves with a patent system that increasingly favours one interest group and effectively excludes another from competition. The current system has reached the end of its shelf life. This may be the right time to resurrect the discussion of how to solve the problems in the software industry.

Although the intellectual property system should be designed in the best interests of the public, the public will not be the deciding factor. The US will be subject to immense pressure from large firms and the patent bar to maintain the status quo. Although there is a glimpse of hope that the US government recognizes the need for reform to support small business, it will not be an easy transformation. Small software firms in the US are more homogeneous than they may be aware, and there is certainly a critical mass needed for lobbying efforts. Perhaps these business people are too disgruntled with the system to care and too busy trying to earn revenue to fight for change, but the group could potentially become mobilized with the right industry

---

[107] M Campbell-Kelly, 'Not All Bad: An Historical Perspective on Software Patents' (2005) 11 Michigan Telecommunications and Technology Law Review 191, 193-195 argues that the solution to the problems in the software industry will simply require adjustments to the patent system and that time will mitigate many of the concerns in the software industry.

leader. Small software firms need to become their own champions. They must be key stakeholders in the fight for reform and play a major role in the drafting and monitoring of any new legislation. Most people in the US are sympathetic to the cause of entrepreneurship, but not moved to the point of action. However, if the trends discussed in this thesis continue in their current direction, the US will eventually reach a critical point when major reform is its only option.

The US and the EU offer the greatest hope for a more rational and effective intellectual property regime for the protection of software. Cooperation between the two jurisdictions could eventually lead to an international regulatory approach to this very global issue.[108] The EU has valuable expertise in two tier patent systems. The US has great insight into the relevant issues that are plaguing the system. Collaboration on patent harmonization seems to be an open topic for discussion between these two leading intellectual property authorities. The recent amendment to US patent laws to introduce the "first to file" system brings the two trading partners one step closer to this possibility.[109] Harmonizing the overall patent systems of these two trading partners is a monumental task and will require significant compromising and negotiating by both sides of the Atlantic. This latest signal by the US that it is interested in moving towards a uniform patent system with the EU will likely preoccupy policymakers for many years to come. Unfortunately, neither jurisdiction appears to be pushing an agenda for a domestic regulatory solution for the software industry, much less an integrated solution.

---

[108] C Deschamps, 'Patenting Computer-Related Inventions in the US and in Europe: the Need for Domestic and International Legal Harmony' [2011] European Intellectual Property Review 103 argues for domestic and international harmonization of software due to the ever expanding cross-boarder trade environment.
[109] David Kappos, 'A Global Call for Harmonization' (April 2011) Speech by the Director of the USPTO to the Managing IP International Patent Forum, London <http://www.uspto.gov/news/speeches/2011/kappos_london.jsp> accessed 25 August 2012 states that the US is "ready, willing and able to make bold moves" towards harmonization of intellectual property laws.

CONCLUSION

Software law is a highly contentious and politicized issue. Despite this, the role of policymakers is to ensure that laws provide a level playing field and a favourable environment for all players, regardless of their size. This has not happened in the software industry and there are no signs that this will improve in the near future. Given the fact that *sui generis* law is not a realistic goal, it will be necessary to work within the systems that are available. The only option that seems plausible is to increase the private value of patents for small software firms while, at the same time, reduce the incentive for large firms to patent.

A second tier patent law is the most promising solution to this perplexing problem. However, the timing may not be right for either the US or the EU to implement significant changes to their intellectual property systems to help foster the success of small software firms. As the divide grows further between large and small firms, a sense of urgency may prevail. This is unlikely to happen unless and until small software firms mobilize themselves and become activists for their cause. Yet, as the global economy becomes increasingly more reliant on intellectual capital and software becomes a global product, the lack of participation of small software firms in the intellectual property system will continue to have detrimental effect on their progress and consumer welfare as a whole. Large firms will continue to dominate the future of the industry and the progress of technology.

Given the mountains that must be climbed to effect change in intellectual property laws affecting software ownership, protection and exploitation, it is foolhardy to suggest that legal reform is a near-term solution to the competitive plight of small software firms. Is there a role for competition law in combating the superpowers

granted to large software firms? In the next chapter, the strengths and weaknesses of

the competition laws of the EU and US will be explored from this perspective.

CHAPTER 5: A DYNAMIC COMPETITION VIEW OF COMPETITION POLICY AND THE SMALL SOFTWARE FIRM

INTRODUCTION

At the outset of this thesis it was argued that small software firms make a critical contribution to innovation in the software industry.   They also serve a very significant role in the market structure and competitive landscape. As a contributor to consumer welfare, they bring important new and improved products and services to niche markets; they create businesses and jobs; they cooperate with larger firms to provide socially beneficial products and services; and they act as one mechanism to displace incumbent firms with radical new discoveries in very dynamic industries. Despite the significance of the small firm, it has been shown through a firm level and industry level analysis that intellectual property law has created a very unfair and inefficient competitive reality for small software companies.[1]   Instead of providing an environment for small firms to grow and prosper, invest in R&D, disseminate knowhow and commercialize innovative products and services, the environment in which they operate is tainted with barriers to entry, significant transaction costs, unpredictability in the law, and fear of sham litigation.

Although sacrifices are unavoidable in every legal rule[2], the exclusion of the small software firm as a viable competitor in software markets was not inevitable. In the early days of the industry, policymakers could have and should have enacted *sui generis* law relating specifically to software to avoid many of the current pitfalls of intellectual property law. In recent years there could have been more effort made to

---

[1] See Chapter 2 for the firm level analysis and Chapter 3 for the industry level analysis.
[2] RH Bork, *The Antitrust Paradox: A Policy at War with Itself* (The Free Press 1978) 79 states "Trade-offs, the sacrifice of one thing to gain another, are involved in the formulation of legal rule; they cannot be avoided. An antitrust law devoted entirely to consumer welfare faces severe trade-off problems."

create reasonable and meaningful amendments to intellectual property laws to add some stability and equality into the market. Yet, as was discussed in the previous chapter, it is unlikely that substantial change will take place to reform intellectual property laws in either the US or the EU so as to benefit the small software firm. Without extensive amendments to existing intellectual property laws, the small software firm will continue to struggle with collaborative agreements with other firms; will remain unable to access important technical information required for standardization and interoperability; and will be faced with increasingly intense superpowers exerted by large firms.

As discussed in Chapter 1, intellectual property and competition policy are related legal regimes. They share a common goal of promoting innovation, economic efficiency and consumer welfare. Competition is the key driver of innovation and innovation is an important requirement for dynamic competition.[3] Moreover, the theory of complementary[4] suggests that neither legal regime acting alone is capable of creating the optimal environment for innovation. When intellectual property rights, granted *ex ante*, have the effect of distorting the market and reducing competition, competition law serves to protect the competitive process *ex poste.* To what extent competition law should act as the oversight for intellectual property rights is a very controversial issue and a matter of much debate.[5]

---

[3] See JB Baker, 'Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation' (June 2007) AEI-Brookings Joint Centre for Regulatory Studies Working Paper <http://ssrn.com/abstract=962261 or http://dx.doi.org/10.2139/ssrn.962261> accessed 3 March 2011 for a discussion regarding the complex relationship between innovation and competition.
[4] See Chapter 1, section entitled "The Objectives of Competition Law and Intellectual Property."
[5] R Whish, *Competition Law* (6th edn Oxford University Press 2009) 759 states "The complex matter in modern competition policy is to determine at what point, if at all, the exercise of an intellectual property right could be so harmful to consumer welfare that competition law should override the position as it would be on the basis of the intellectual property law alone."

In order for competition law to provide a means for the small software firm to engage in the software market on a more level playing field, the limits of competition law to act as a tool to counteract intellectual property law is only one point of consideration. As was addressed in Chapter 1, a strict economic view of competition law does not consider small firms to be efficient and significant industry players that are worthy of protection. However, given the superpowers that intellectual property law has granted to large firms and given the increasing importance of small firms in high-technology industries, it is necessary to revisit this narrow view of the small firm. The attitudes of policy makers and the judiciary with respect to the importance of small firms are critical to their future role in the economy. In addition, the ability of the courts and competition authorities to consider the sector-specific nuances of software (and the effects of intellectual property law) will determine whether competition law can serve to correct the injustice that has been thrust upon the small software firm.

In this chapter, the remaining research question will be addressed. What is the role of competition policy in the problem and solution to the lack of competitiveness of the small software firm? It is argued that competition law must play an increasingly important role as small high-technology companies face greater challenges to compete under current intellectual property regimes. Once again, the legal regimes of the US and the EU as leading authorities in competition law[6] are examined from a historical, political and philosophical perspective. With their advanced intellectual property systems, it is essential that their competition policies are properly aligned with the realities of the software industry. Although it is acknowledged that the challenges of

---

[6] The US has the oldest competition regime in the developed world. Comparisons between the US and the EU are the norm with the US acting more as the benchmark against the developments of EU competition law. I Maher, 'Re-imagining the Story of European Competition Law' (March 2000) 20(1) Oxford Journal of Legal Studies 155

competition law are vast and complex, the goal herein is very limited. The main purpose of this chapter is to consider whether the US and/or the EU have/has any present or future mechanisms in their respective competition law tool boxes to assist in the small software firm's quest for fairness in the market. The chapter begins with a discussion regarding the limitations of competition law as the regulatory mechanism to save the small software firm and why intellectual property reform is the more important catalyst to improving its position as a competitive player. The remainder of the chapter then argues that competition law does have an appropriate oversight role in ensuring that small firms have a fair and equitable chance of competing in the software industry.

Specifically, the chapter is organized as follows: the first section discusses the limitations of competition law as the solution to the plight of the small software firm; the second section considers three areas that must be present in competition law analysis in order to assist the small firm (dynamic innovation focus, intellectual property scrutiny, small firm inclusion); the third section takes a detailed look at one specific area of competition law that captures many of the issues addressed in this thesis, the duty to deal under the abusive exclusionary conduct legislation;[7] and the fourth section looks at the future direction of competition law.

LIMITATIONS OF COMPETITION LAW

Before embarking on a detailed analysis of specific aspects of competition law, it is important to put this legal regime in perspective from the standpoint of the small software firm. Some general observations are necessary to explain why competition

---

[7] Specifically, Section 2 of the Sherman Act [1890] 26 Stat 209, codified at 15 USC 1-7 (1994) (as amended) and Section 102 of the Treaty of the Functioning of the European Union ("TFEU") Consolidation Version of the Treaty on the Functioning of the European Union [2010] OJ C 83/47 will be considered in relation to the refusal to deal jurisprudence. Competition law issues such as mergers, tying, standardization and anti-competitive litigation are important issues from the small software firm perspective. However, space does not permit a complete analysis of all of these areas.

law cannot and will not act as a replacement for a properly designed intellectual property system. Competition law will likely have a very limited role as a small firm remedy for dealing with the issues that have been addressed is previous chapters such as access to technological information and the strength of large firm patent portfolios.

Both the US and the EU have general principles which apply to competition law. These have been set out in various regulations and guidelines[8] and are well-established and generally non-controversial. First of all, intellectual property may create a legal monopoly, but there is no presumption that it creates a dominant position[9] in the context of competition law. Second, the aggressive exploitation of intellectual property law to obtain a competitive advantage is pro-competitive. Intellectual property rights are necessary to promote innovation. Third, it is not illegal to be a dominant company. It is acknowledged that firms with substantial market power will hold significant intellectual property rights and will exploit these rights to the full extent granted by the law. There is no limit as to the volume of rights that a company can hold. Thus, competition law applies when the actions of the firm with the market power act in some way that is out of the ordinary from what would normally be expected and encouraged in a free market. Competition law uses negative terms such as "abusive"[10], "exceptional circumstances"[11], and "unlawful"[12] conduct which is

---

[8] For example, these principles are set out in the "General Principle" sections of both the EU and US guidelines on technology transfer agreements. In the US, see US Department of Justice and the Federal Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property (April 1995) available at <www.justice.gov/atr/public/guidelines/0558.htm> accessed 5 January 2010; in the EU, see Guidelines on the Applications of Article 81 of the EC Treaty to Technology Transfer Agreements [2004] OJ C101/2 available at <http://ec.europa.eu/competition/antitrust/legislation/transfer.html> accessed 5 January 2010.

[9] Market power (US) and dominance (EU) are concepts at the centre of competition policy. How these terms are used in each jurisdiction is addressed below.

[10] The ECJ defines abuse as the behaviour of an undertaking in a dominant position which is such as to influence the structure of the market where, as a result of the very presence of the undertaking in question, the degree of competition is weakened and which, through recourse to methods different from those which condition normal competition in products or services on the basis of the transactions of commercial operators, has the effect of hindering the maintenance of the degree of competition still existing in the market or the growth of that competition. See Case 85/76 *Hoffman La Roche v Commission* [1978] ECR 461 [1979] 3 CMLR 211 par 91.

[11] See (n 117) below.

[12] RA Cass and KN Hylton, 'Preserving Competition: Economics Analysis, Legal Standards and Microsoft' (1999) 8 George Mason Law Review 1, 2 write that a violation under competition law is a crime and can result in prison terms or hefty fines.

fundamentally threatening to the economy as a whole, not just the competitor alleging the complaint.[13] Seen as the goal of most companies, the law does not condemn companies for gaining market power by using legitimate business practices.[14]

The vast majority of the issues faced by small firms because of existing intellectual property laws are not due to abusive, exceptional or unlawful conduct by large firms. The issues are ubiquitous and every day challenges. They are due to an improperly designed intellectual property system that fails to take into account the special characteristics of software and this has resulted in a distortion in the marketplace which negatively affects the small firms. Most large firms are simply engaging in "ordinary business practices."   For example, the law does not penalize large firms for taking advantage of a legal right to obtain an unlimited number of patents or to enter into (often efficient) cross-licensing[15] agreements with other large patent holders. The result of the proper exercise of this legal right is anti-competitive in the sense that it excludes small firms from being active participants in the market, but the acts themselves are not abusive as the term is currently used in competition policy. Barriers to entry and economic inefficiencies operate even in the absence of improper behaviour. This is not to suggest that large firms do not use these superpowers to ensure small firms do not pose a competitive threat to their success. Large firms in the software arena are fully aware that their market positions are tenuous and that small firms often have the technical savvy, flexibility and competitive drive to steal their

---

[13] See, for example, *Brooke Group Ltd v Brown & Williamson Tobacco Corp* 509 US 209, 225 (2003) "Even an act of pure malice by one business competitor against another does not, without more, state a claim under the federal antitrust laws…".

[14] In the famous *Alcoa* case, Judge Hand stated "The successful competitor, having been urged to compete, must be not turned upon when he wins*." US v Aluminum Co of America* 148 F2d 416, 430 (2d Cir 1945); See also, European Commission, 'Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to abusive Exclusionary Conduct by Dominant Undertakings' (2009) OJ C 45/7 par 1 (hereinafter referred to as the "EU Guidance Paper") stating that "a dominant undertaking is entitled to compete on the merits."

[15] See Chapter 3, section entitled "Cross-licensing."

customers by offering superior products. Large firms need small firms to remain weak

so they have greater bargaining power during licensing[16] or acquisition negotiations or

when they are trying to gain access to the small firm's technology during litigation

settlement talks. The law allows the large firm to escape scrutiny under competition

law by acting in the normal course of business. Competition law does not guarantee

equality or access.

Competition law is a broad reaching, imprecise tool. It does not serve to correct

specific market issues. Companies are generally free to conduct business as they deem

appropriate. Competition law is intended to police negative behaviour to ensure that

competition flows freely within specific industries.[17] It is an *ex poste* analysis of market

conditions that measure dominance and the effects of bad behaviour on the market.

While an examination at this stage could possibly determine the strength of particular

intellectual property rights within the market context, it cannot modify to any large

extent the excessive rights that have been granted by intellectual property laws. The

majority of the issues raised in this thesis originate *ex ante*, at the time the rights are

being granted to large firms. Competition law cannot improve the rate of patent filings

for small software firms so that they have at least some leverage against their larger

competitors. Only intellectual property reform can address these issues.[18]

Finally, the reality of competition enforcement is that it is very limited. Competition

enforcement authorities are only interested in pursuing the most important of cases.[19]

---

[16] See Chapter 2, section entitled "Licensing – Cooperation or Competition."

[17] DS Evans, '*Why Different Jurisdictions Do Not (and Should Not) Adopt the Same Antitrust Rules*' (2009) 10 Chicago Journal of International Law 161, 165 argues that competition policy is more about how the game of competition should not be played and has little to say about how firms should conduct themselves.

[18] The gap between competition law and intellectual property law to provide efficient regulation is more pronounced in the EU as patent rights are segregated among 27 Member States.

[19] For discussions on how few cases both the US and EU competition authorities pursue, see for example, Evans (n 17) 169. As an example, the EU Commission issued only two decisions per year from 1998-2007 for abuse of dominant position cases under

In the United States, firms pursue mainly private litigation in the courts while in the EU private litigation is very limited and public actions are more likely.[20] Therefore, any action which involves a small software firm alleging wrongdoing against a firm in a position of market power would have to pass a threshold of being a very important public policy matter case in order for the respective authorities to undertake its prosecution. Public policy is very difficult to define and it is highly unlikely that authorities would pursue such a case with enthusiasm. Of course, as with any other type of legal proceedings, pursuing a private action would be very expensive, time consuming and distracting for a small firm. Overall, the possibilities of a potential claim involving a small firm are remote. This is problematic, of course, because competition enforcement only acts as a deterrent if there is a chance that the firm will be caught and a remedy applied against it. Thus, large firms have been given significant latitude to abuse small firms without any repercussions.

The good news is that the competition law evolves as the market conditions change and there is increased understanding of how competitive industries operate.[21] Both the EU and the US have undergone a substantial evolution in how they assess anti-competitive behaviour under the influence of the Chicago School of Economics.[22] Substantial change is possible. Small firms are increasingly being viewed as more

Article 102. See, also, DS Evans and KN Hylton, 'The Lawful Acquisition and Exercise of Monopoly Power and its Implications for the Objectives of Antitrust' (2008) 4 *Competition Policy International* 203, 228.

[20] US Federal Agents only pursue very significant claims. See R Coco, 'Antitrust Liability for Refusal to License Intellectual Property: A Comparative Analysis and the International Setting' (Winter 2008) 12 Marquette Intellectual Property Law Review 1, 3. In the US, 95% of competition cases are filed by private plaintiffs. See Evans (n 17). The EU does not have a robust system for private litigation. For further discussion of the issue of private litigation, see Evans (n 17); and see Evans and Hylton (n 19) 227.

[21] Evans (n 17) 165 argues that boundaries change as courts and authorities hear more cases and views on the robustness of the markets shift. Whish (n 5) 19 argues that competition policy does not exist in a vacuum and is susceptible to change based on current values and aims of society.

[22] The US started its transformation towards a more economic approach to competition law in the 1970s. The EU, in contrast, didn't start to engage this reasoning until the 1990s. See A Pera, 'Changing Views of Competition, Economic Analysis and EC Antitrust Law' [June 2008] European Competition Journal 127 for a discussion of the relatively quick EU transformation.

important to innovative markets, especially in high technology industries.[23] As well,

there is significantly more focus in the academic literature on the unique circumstance

of dynamic competitive industries such as software. In the sections that follow, the

trends in competition law in the US and the EU are examined in an attempt to discover

current and shifing opinions of policy makers and judges as to the relative importance

of small firms, especially in high technology industries. To ignore them is counter to

the main objectives of competition law and intellectual property law.

SHIFTING COMPETITION POLICY TO CONSIDER SMALL SOFTWARE FIRMS

As the analysis below illustrates, US competition policy, in general, would have to

undergo a significant shift in philosophy and practice if it were to include small

software firms in its overall analysis or consider them as a legitimate complainant.

Small firms, in general, will likely never again be considered as a separate entity

requiring special protective measures simply because they are small and lack sufficient

resources to compete.[24] This approach has been ruled out in the US as being offside

with sound economic analysis.[25] The EU takes a more inclusive approach and does not

categorically exclude small firms as viable entities. Although it has been stated in

many other areas of this thesis, it deserves repeating here. The arguments that follow

are not suggesting that small firms should be accommodated by competition law

simply because they are small and inferior. Inferior firms, whether small or large,

should not be afforded special protection simply because they cannot survive without

support. What deserves and requires attention, however, is the fact that small firms

---

[23] See Chapter 1, section entitled "Small Software Firms – Consumer Welfare, Innovation and Economic Efficiency."
[24] In *Olympia Equipment Leasing v Western Union Telegraph* 797 F2d 370, 375 (7th Cir 1986), Judge Posner states "…as the emphasis of antitrust policy shifted from the protection of competition as a process of rivalry to the protection of competition as a means of promoting economic efficiency, it became recognized that the lawful monopolist should be free to compete like everyone else; otherwise the antitrust laws would be holding an umbrella over inefficient competitors."
[25] See Chapter 1, section entitled "The Objectives of Competition Law and Intellectual Property" for a discussion of how small firms were once considered important to protect under competition policy.

can be important factors in competitive analysis. In addition to the acknowledgement of the contribution of small firms, policy makers must consider the effects of intellectual property law on the competitive dynamics of the software industry. As well, there must be some recognition that software industries have special characteristics that make traditional competitive analysis problematic. Each of these areas is addressed in this section, starting with how dynamic industries fit within current competition policy.

Dynamic Industries and Small Software Firms

Dynamic competition is largely accepted today as the most powerful form of competition and dynamic efficiency is the most important class of efficiency necessary to promote economic growth.[26] Dynamic competition is a term that is now commonly applied to industries that are characterized by high rates of innovation, rapid technological change, and significant use of intellectual property.[27] Software is the prime example of this type of industry and, in fact, outshines all other high-technology industries as the sector obtaining the most attention from scholars and competition authorities.[28] Commentators and competition authorities occasionally consider the question whether dynamic industries deserve special treatment under competition law given the lack of similarities between such industries and those on which traditional

---

[26] JG Sidak and DJ Teece, 'Dynamic Competition in Antitrust Law' (2009) 5 Journal of Competition Law and Economics 581, 603 state that dynamic competition powered by the creation and commercialization of new products, new processes and new business models is the most powerful form of competition. And see, J Drexl, 'Is There a 'More Economical Approach' to Intellectual Property and Competition Law?' in J Drexl (ed), *Research Handbook on Intellectual Property and Competition Law* (Edward Elgar Publishing 2008) 39-40, saying that dynamic competition is preferred to the concept of dynamic efficiency because dynamic competition can rely on characteristics of relevant markets instead of from the view of gains or losses from a particular intervention from competition law.

[27]RA Posner, *Antitrust Law* (2nd edn The University of Chicago Press 2001) 245 refers to such high technology industries as software and internet-based businesses as the "New Economy." Sidak and Teece (n26) 596 use the term dynamic industries and argue that the term "new economy" has become cliché. The terms dynamic competition and dynamic industries will be used interchangeably herein.

[28] DJ Gifford and RT Kudrle, 'Antitrust Approaches to Dynamic Competitive Industries in the United Sates and the European Union' [2011] Journal of Competition Law & Economics 695, 700 say that most of the analysis on dynamic competition comes from the software industry. See, for example, Posner (n 27); F Etro, 'Market Leaders, Antitrust Policy and the Software Market' (2007) 5 Journal of Industrial Economics <www.cresse.info/uploadfiles/MicrosoftCase.pdf> accessed 10 June 2010; JG Sidak, 'An Antitrust Rule for Software Integration' (2001) 18 (1) Yale Journal on Regulation 1; and WH Page and SJ Childers, 'Software Development as an Antitrust Remedy: Lessons from the Enforcement of the Microsoft Communications Protocol Licensing Requirement' (2007) 14 Michigan Telecommunications & Technology Law Review 11.

competition law is based.[29] Despite the varying opinions on this issue, neither the US nor the EU has constructed *sui generis* type legislation to deal with the nuances of dynamic industries. It is generally accepted today that competition law applies to all industries, but that dynamic industries require a cautious, case-by-case analysis based on industry characteristics and incentive for promoting innovation.[30] Therefore, anti-competitive claims from the software industry will include a detailed investigation of the facts specific to the companies involved as well as the characteristics of the industry. It is this discretionary investigative approach that requires further analysis to determine if the appropriate issues are being considered in software.

At the heart of the debate over how competition law should deal with dynamic industries is how economists and policymakers currently interpret the early work of Joseph Schumpeter.[31] As discussed in Chapter 1, Schumpeter advocated for temporary monopolies and argued that a competitive market was not the most effective market structure for promoting innovation in dynamic markets. In his opinion, this is because large firms are more stable and have greater financial

---

[29] Traditional economic analysis and competition law jurisprudence is based on manufacturing type industries with fundamentally different market characteristics. Sidak and Teece (n 26) 583 state that scholars are actively debating the merits of replacing static competition with dynamic competition. In 2004, US Antitrust Modernization Commission asked the Intellectual Property Committee to consider the question of whether industries involving significant technical innovations should be treated differently under competition law. See generally, the US Antitrust Modernization Commission website at <http://govinfo.library.unt.edu/amc/index.html> accessed 4 May 2012 (hereinafter referred to as "US Antitrust Modernization Commission"). Very recently, then Acting Assistant Attorney General, Sharis Pozen, was asked in an interview whether current competition laws were sufficient to deal with high technology industries. Pozen maintained that competition law is extraordinarily flexible to deal with any industry. See American Bar Association: Antitrust source, 'Interview with Sharis A. Pozen' (April 2012) <www.americanbar.org/.../apr12_full_source_4_26f.authcheckdam.pdf> accessed 4 May 2012*;* In 2001, the Court of Appeals in the US *Microsoft* case noted that there was no consensus among commentators as to whether current doctrine should be amended to account for dynamic markets, but that whether the market in question was a dynamic market did not "appreciably alter" its mission in assessing an antitrust violation. *United States v Microsoft Corp* 253 F3d 34, 50 (DC Circuit 2001) (hereinafter referred to as the "US CA *Microsoft* Case"). Similarly, the EU Commission in EU *Microsoft* case rejected arguments that the traditional approach to competition law did not apply to the new economy. Case COMP C-3/37.792 *Commission v Microsoft Corporation* [2004] Par 465-470 (hereinafter referred to as "EU Commission Microsoft Case").

[30] There are still calls for more formalistic rules for dealing with dynamic industries. See, for example, Gifford and Kudrle (n 28) 702-703 arguing that calls for case by case analysis is a result of the lack of confidence felt by authorities in the courts or officials to craft generic approaches in advance that are adequately applied to the new economy. But see, MA Lemley, 'Industry-specific Antitrust Policy for Innovation' [2011] Columbia Business Law Review 637. Detailed case by case analysis is referred to as "rule of reason" analysis in competition law. Rule of reason is compared to "*per se*" violations which mean the act is *de facto* illegal and no further analysis is required. An example of *per se* illegality under competition law is price fixing.

[31] Most of the current understanding is based on his writings in J Schumpeter, *Capitalism, Socialism, and Democracy* (3rd edn Harper 1950).

resources. As such, they are the greatest source of R&D and have better capabilities to profit from their inventions. These early writings have had a major impact on competition doctrine over the past 40 years. Supporters of Schumpeter have focused on protecting temporary monopolies as a necessary evil in what is often referred to as "winner takes all" or "winner takes most" markets.[32] Proponents of this view argue that competition law should not interfere with monopolies in dynamic markets because the "gale of creative destruction" will work naturally to dislodge the incumbent. Thus, a non-interventionist view is promoted in favor of market self-correction. Opponents of this view argue that it is important to keep markets open and to create competition to challenge the incumbent. Without this market pressure, the incumbent may not be incentivized to engage in R&D.[33]

This "competition for the market vs. competition in the market" debate has major implications for the small software firm. First, if Schumpeterian-minded policymakers think that large firms are the only source of innovation, then small firms obviously have no role to play in dynamic markets. By comparison, they must be inefficient, lack economies of scale and lack sufficient resources to create new products. The emphasis on the large firm as the "winner" in the market has meant that competitive analysis focuses on large firms. Concentrated markets with a few large market players have

---

[32] See R Schmalensee 'Antitrust Issues in Schumpeterian Industries' (May 2000) 90 (2) The American Economic Review 192, 193 explaining that in winner takes all industries, there can only be one healthy survivor and the incumbent firm must be able to exclude its competition or die.

[33] There is a vast amount of literature on this debate. For examples of those that support the Schumpeterian view, see TO Barnett, 'Interoperability Between Antitrust and Intellectual Property' (2007) 14(4) George Mason Law Review 859, 865 stating that if large firms have to share its IP it may not innovate and rivals will spend their time bringing legal action to gain access to IP; Schmalensee (n 32) stating that it is important that the category leader is highly profitable for the proper functioning of the market. For examples of those that oppose the Schumpeterian view, see J Baker, '"Dynamic Competition" Does not Excuse Monopolization' (2008) 4 (2) Competition Policy International 243 stating it is unlikely that competition and competition law intervention will affect the dominant firm's incentive to innovate; HJ Hovenkamp, 'Schumpeterian Competition and Antitrust' (October 2008) University of Iowa Legal Studies Research Paper No. 08-43, 1 <http://ssrn.com/abstract=1275986> accessed 4 May 2012 arguing that Schumpeterian models are not testable at the competition policy level; Drexl (n 26) 41 "Schumpeter did not conclude that dynamic competition makes competition law intervention dispensable; he only opposed competition policy that indiscriminately bans all restrictive behaviour"; and see also Baker (n 3) 21 arguing there is no need to take sides because what is important is to focus instead on industry settings and promoting innovation.

become the ideal market structure and lead to case law discussing the relative efficiencies of large firms in the marketplace. The role of the small firm as a force of creative destruction is not considered. Instead of being considered for their anti-competitive effects on other industry players, barriers to entry and network effects are expected and required to safeguard the monopoly. Second, the protection of incumbent monopolies has had major implications for how courts deal with intellectual property. The support for temporary monopolies leads to a presumption that strong intellectual property rights are the norm of the modern economy and that somehow intellectual property holders are automatically innovative. Optimal market conditions that include minimizing barriers to entry, reducing transaction costs and encouraging dissemination of know-how become large firm issues that are resolved through cross-licensing with the blessing of competition authorities. Large firms are encouraged to further build their empire of intellectual property right. Third, large firms and concentrated markets become the route to greater efficiency and innovation, thus making large firms the means to achieving the ultimate goal of competition policy, consumer welfare. Entrusted with the role of promoting consumer welfare, large firms become the *de facto* creators of the most innovative, cost effective, high quality products and services. Large firms continue to set the pace for future innovation in the markets as they lock in their customers with strong network effects and the sharing of crucial know-how. The inevitable consequence of such an extreme position is that small firms become further removed from the marketplace. The effects of such an exclusion are not being considered in the overall analysis and may, in fact, have a detrimental effect on consumer welfare and innovation.

Several conceptual issues arise from how the Schumpeterian view of competition policy interacts with traditional economic analysis to further exclude the small software firm from the competitive analysis. First of all, the analysis focuses on issues of market power and concentration. In the US, market power is defined as the ability of the seller to affect the price of goods in the market to maximize profits to the detriment of competitors.[34] Such power is conventionally measured by market share in the relevant market, with the US threshold for prima facie evidence of market power being between 70 and 90 percent.[35] Although the Court of Appeal in *Microsoft* states that market share, in and of itself, does not determine market power,[36] there is very little evidence in US case law to suggest what factors are being considered other than excessive profits, price margins and low output.[37]

In software, market share and the ability to affect prices has little to do with innovation and commercialization.[38] Market power is often derived from intellectual property rights and network effects and not necessarily market share. Furthermore, market power does not necessarily mean that a firm has a higher propensity to innovate or that highly concentrated industries promote innovation.[39] Schumpeter's

---

[34] The US Supreme Court defines monopoly power as "the power to raise prices and exclude competition". *Eastman Kodak Co v Image Technical Services Inc.*504 US 451, 481 (1992); *Intergraph Corp v Intel Corp* 195 F 3d 1346, 1353 (Fed Cir 1999) states that "anticompetitive conduct is generally defined as conduct whose purpose is to acquire or preserve the power to control prices or exclude competition." See also, E Arezzo, 'Is There a Role for Market Definition and Dominance in an *Effect*-based Approach?' in MO Mackenrodt, B Conde Gallego and S Enchelmaier (eds) *Abuse of Dominant Position: New Interpretation, New Enforcement Mechanisms? (* Volume 5 2008) 21, 31-32

[35] US CA *Microsoft* Case (n 29) 54 reviews previous thresholds of market power; see also the US Department of Justice, 'Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act' (2008) 120-122 <http://www.justice.gov/atr/public/reports/236681.htm> accessed 9 July 2012 (hereinafter the "US Section 2 Report") discussing previous case law.

[36] US CA *Microsoft* Case (n 29) 54, states that "because of the possibility of competition from new entrants, looking at current market share alone can be "misleading".

[37] H Schmidt, 'Market Power – the Root of All Evil? A Comparative Analysis of the Concepts of Market Power, Dominance and Monopolisation' in Ariel Ezrachi (ed) *International Research Handbook on Competition Law* (Edward Elgar 2012) 390 suggests that because the US threshold is very high, it must be an indication that the US considers it to be a very important consideration. In the US Section 2 Report (n 35) 27, the authors review the US case law on alternate measures of market power.

[38] Sidak and Teece (n 26) 593 argue that market share is a poor proxy for appropriation in dynamic industries.

[39] R Gilbert, 'Looking for Mr. Schumpeter: Where Are We in the Competition-Innovation Debate?' (August 2006) 6 Innovation Policy and the Economy <www.nber.org/chapters/c0208> accessed 4 May 2012 reviews voluminous research and finds that empirical evidence does not support the Schumpeterian view that concentrated markets promote innovation; and see Sidak and

view that only large firms with deep pockets could be contributors to innovation is very short-sighted. He would not have had knowledge of software and could not have predicted the impact that public funding and private investment might have on the small firm's ability to innovate.[40] Price does not play a significant role in the competitiveness of firms in the software arena.[41] Neither small nor large firms compete on price. They compete on superior functionality, userability, adaptability, feature upgrades and flexible business models. In other words, they compete on dynamic efficiency as opposed to static efficiency.[42] Likewise, there is no issue of output restrictions in software. Software involves significant upfront costs, but once the product is ready, it can be copied multiple times with only nominal cost. There are no production capacity issues as in manufacturing industries. This is true regardless of the size of the software firm.

Short-term static measures of pricing and output in the immediate marketplace do not work in fast-paced dynamic industries. Market share varies with new product varieties, prices are flexible depending on negotiations and bargaining power, and output is potentially unlimited. Competitors may include firms of similar size but they may also include newcomers (of any size) in the market with a superior product offering. Taking a snapshot of the market at any given period in time fails to take into account these forces that are constantly at play. Forward thinking and longer term

---

Teece (n 26) 588 arguing that despite fifty years of research, economists have not found evidence that market concentration has a significant impact on innovation.

[40] Sidak and Teece (n 26) 587 argue that the new products coming from Silicon Valley are one example that supports the proposition that competition should be favoured over monopoly.

[41] DS Evans and R Schmalensee, 'Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries' (May 2001) National Bureau of Economic Research Working Paper No. 8268, 2 < www.nber.org/papers/w8268> accessed 5 May 2012; and see Arezzo (n 34) 25 arguing that power over prices is a poorly suited test to take into account all of the variables that contribute to dominance in dynamic markets.

[42] Evans and Hylton (n 19) 208 argue there is a "static competition bias" in dynamic markets because economic analysis shifts the focus away from dynamic competition because economic analysis is based on mathematical models; Sidak and Teece (n 26) 601; and Drexl (n 26) 39.

lenses are necessary to capture the dynamics of these fluctuating market conditions. Dynamic industries, therefore, require a more expanded and elastic view of consumer welfare. Small software firms must be included in this analysis as potential competitors that may have a significant impact on the future dynamics of the particular market.

The unwarranted emphasis on large firm temporary monopolies can have dangerous effects on consumer welfare. Temporary monopolists may or may not be the most innovative, technically advanced or have the highest quality software.[43] Consumer choice is impaired and overpowered by network effects, tipping, switching costs, and compatibility issues. As has been argued throughout, these issues have largely been created by poorly considered intellectual property laws and are manifested in current competition policy. Under the current legal regimes, there is no opportunity for natural market correction. Multiple layers of protection for such monopolists is overzealous and may, in fact, result in further damage to the consumer.[44] As well, there are far more examples of competitive markets in software than there are "winner takes all" markets.[45] The fascination for this market structure originated from the original *Microsoft* case in the US in the 1990s. Experts for Microsoft argued that dominant firms in dynamic industries deserved greater deference from competition enforcement because their monopolies were "fragile."[46] It was obviously within Microsoft's interest to find traction for this argument. Even with years of experience and a greater understanding of the software marketplace, little empirical evidence and

---

[43] FM Scherer, 'Abuse of Dominance by High Technology Enterprises: A Comparison of U.S. and E.C. Approaches' (2011) 38(1) Journal of Industrial and Business Economics 39, 46 argues that Microsoft is, in fact, not really innovative. The author cites many technologies that were "cribbed" and then expanded.

[44] Microsoft has held its monopoly position in operating systems for 20 plus years. That is a lifetime in the software industry.

[45] Gifford and Kudrle (n 28) 705-706 provides examples of competitive markets in software and argue the gale of creative destruction may not be as strong as some argue it to be.

[46] Schmulensee (n 32) 193

few market examples support this position. Evidence supporting the value of small

software firms and the importance of a mix of large and small firms in dynamic

industries makes the argument for the inclusion of small software firms equally as

plausible as the one for excluding them.[47] In the end, inclusion is the safer option and

one that will result in higher rates of innovation, greater opportunities for dynamic

efficiencies and overall increased consumer welfare over time.

US competition law, therefore, has a very narrow focus. As a general two-step

process, the determination of liability under competition law turns mainly on the initial

finding of market power and the abuse of that power to affect prices and output. This

is followed by an investigation as to whether the act in question immediately and

directly harms consumer welfare.[48] The standard for determining liability set by the

US judiciary requires proof of harm to the competitive process which can be rebutted

by firms illustrating greater efficiencies. Each of these broad concepts of market

power, consumer welfare and efficiency are considered through the lens of economics.

The overall premise of competition law is about largeness, market share, power and

efficiencies. Firms in software do not have to have market power to take advantage of

small firms.[49] Intellectual property laws give them the power without necessarily

giving them the market share. Patent portfolios, for example, prevent small firms from

being efficient while simultaneously making large firms more efficient. And of course,

inefficient firms, as a competition policy, do not affect consumer welfare because they

---

[47] See Chapter 1, section entitled "Small Software Firms – Consumer Welfare, Innovation and Economic Efficiency."
[48] In the US CA *Microsoft* Case(n 29), the effects-based balance test was considered as a three step approach; 1. The plaintiff proves the conduct had an anticompetitive effect and harm to consumers; 2. The monopolist can rebut the claim by proving there is a "procompetitive justification" for its conduct; and 3. The plaintiff must prove that the consumer harm outweighs the procompetitive benefit. Note also that in the US Section 2 Report (n 35) 33, the authors find that there is no agreed upon standard in the US for Section 2 violations of exclusionary conduct.
[49] E Arezzo, 'Intellectual Property Rights at the Crossroads Between Monopolization and Abuse of Dominant Position: American and European Approaches Compared' (2006) 24 John Marshall Journal of Computer & Information Law 455, 495 discusses how the word "monopoly" may not be appropriate for intellectual property rights but that "micro-monopoly" explains how holders of intellectual property can have a monopoly over a specific technical solution.

do not have enough power to have any fundamental effect on the competitive process. The overriding policy guiding US competition law does not convey interest in and concern for protection of the legitimate role of small firms in today's economy. The language raises the presumption that only large firms contribute to innovation and can engage in competitive activities. It takes a view of the market place at a static moment in time without taking into account the possibility of harm to consumers in the longer term, the indirect effects of the abuse, or the possibility of new competitors entering the market. This traditional view is too narrow to consider the small firm in a dynamic market and a more expansive view is necessary.

As will be seen in the following sections, the US has embraced the Schumpeterian position with the full force of competition law. The US approach to dealing with monopolists is summed up by a former Assistant Attorney General for the US Department of Justice Antitrust Division in a 2008 public address:

> Since dynamic efficiency is crucial, preserving innovation incentives is one of the most important concerns of US antitrust law. This can mean bringing an action to prevent conduct that reduces innovation or it can mean declining to act where overly aggressive antitrust enforcement risks chilling the type of vigorous, innovative competition that brings long-term benefits to consumers. In this regard, we recognize that when innovation leads to dynamic efficiency improvements and a period of market power, it is not a departure *from* competition, but it is particular *type* of competition, and one that we should be careful not to mistake for a violation of antitrust laws.[50]

---

[50] TO Barnett, 'Maximizing Welfare Through Technological Innovation' (2008) 15(5) George Mason Law Review 1191, 1200

The EU, on the other hand, has demonstrated skepticism for the Schumpeterian view of competition. When Microsoft made the same argument in its European case that the threat of a possible "technical revolution" must be considered when assessing Microsoft's market strength, the European Commission concluded:

> Such an argument is invalid. Even if it were to be the case that a dominant position might be limited in time, this does not in itself constitute a limitation to the *present* market strength of the dominant company. The specifics of any particular industry (be it "hi-tech" or "old economy") must of course be taken into account when analyzing issues of market definition and market power…. This, however, does not mean that no antitrust analysis could be applied to "new economy" markets.[51]

These differences in philosophies of the two jurisdictions play a very significant role in how each authority is likely to view intellectual property as a significant market force and how each will perceive the small software firm in its competitive analysis. The reluctance of the EU to accept, without challenge, the Schumpeterian view allows it to consider large firm superpowers with greater scrutiny and use a broader brush when considering the dynamics of the various players in the software industry.

The EU method of evaluation of dominance in the market is much more comprehensive and inclusive as compared to the US stance on market power. The European Court of Justice defines dominance as possession of an economic power in a relevant market "which enables [a company] to prevent effective competition being maintained in the relevant market by affording it the power to behave to an

---

[51] EU Commission *Microsoft* Case (n 29) par 468-470

appreciable extent independently of its competitors, customers and ultimately of its consumers."[52] The definition itself is very far reaching and is not limited to issues of price and output. As well, market share is not the ultimate measure of market power in the EU, as companies have been found to be dominant with a market share of 40-45 percent.[53] The recently published Guidelines on Article 102 (TFEU) support this broad definition[54] and state that firms with less than 40 percent market share are not likely to be dominant, but that it will examine all the relevant factors before making a determination of dominance.[55] Such factors include exclusive possession of inputs, ownership of technology, volume of production, scale of supply,[56] barriers to entry such as network effects,[57] economies of scale and scope, access to important technologies or an established distribution network.[58]

The EU quest for a deeper understanding of market conditions is precisely what is required in an industry known for dynamic competition. Barriers to entry and access to important technology are exactly the constraints being placed on small software firms due to current intellectual property laws. The EU approach focuses on consumer harm, but widens the parameters to include innovation, variety and quality of goods and services (as opposed to limiting the evaluation to price and output).[59] These parameters must take into account small software firms in the relevant market, as they are key players in the innovation process, as well as ensure that consumers receive choice and quality in their goods and services. The EU approach is also flexible enough

---

[52] Case 27/76 *United Brands v Commission* [1978] ECR 207 [1978] 1 CMLR 429, par 65; Hoffman-la Roche (n 10) par 38
[53] For example, see *United Brands* (n 52)
[54] EU Guidance Paper(n 14) par 10
[55] EU Guidance Paper (n 14) par 14, 15
[56] *Hoffman-la Roche* (n 10)
[57] Case T-201/04 *Microsoft Corporation v Commission of European Communities* [2007] 5 CMLR 11 par 558, 562 (hereinafter referred to as the "EU General Court Microsoft Case")
[58] EU Guidance Paper (n 14) par 17
[59] EU Guidance Paper (n 14) par 11

to take into account the competitive structure of the market, which includes actual

competitors, but also potential competitors.[60] Many small software firms would fit

into the category of potential competitors, but may not be significant enough players

to be considered "actual" competitors. This forward looking language speaks to the

fact that dynamic markets are constantly in flux and that the current list of

competitors is not necessarily the definitive list. It also considers that future products

may displace current products. The long term benefits to consumers are being

considered. Finally, the EU approach to dominance considers not only actual harm,

but the risk to harm to competitors.[61] Again, this flexibility allows the small software

firm to be considered in the overall evaluation as actual harm may be more difficult to

determine.

Perceived Importance of Intellectual Property

It has been argued throughout this thesis that intellectual property law that is poorly

designed for software is overprotecting large firms and leaving small firms vulnerable

to strong market forces from which they have no means of defense. This is distorting

the software market by not allowing small software firms to compete on a level playing

field with large firms. Competition authorities advocate that competition law is

flexible enough to consider specific industries, including the technical and legal

dynamics that affect competition levels and may result in harm to consumers.

Software is the classic example of when competition policy should intervene to

override excessive intellectual property rights. In this section, the philosophies of the

EU and US policymakers and how they approach the tension between intellectual

---

[60] EU Guidance Paper (n 14) par 12

[61] Case C-95/04 *British Airways PLC v Commission* [2007] ECR I-2331 [2007] 4 CMLR 22 par 95 ".. it is sufficient to demonstrate that there is a risk of it restraining competition.."; EU Guidance Paper (n 14) par 12 refers to the "credible threat of future expansion" by competitors.

property and fair competition is addressed. If the small software firm is going to be considered in competition analysis and play a greater role in meeting the ultimate goal of consumer welfare, addressing the challenges posed by intellectual property is a must.

It is evident that both the US and the EU are keenly aware that intellectual property law can have both negative and positive effects on competition. For example, the guidelines for technology transfer agreements[62] issued by both jurisdictions signify the respect that has been given for pro-competitive transactions involving the sharing of intellectual property. However, it is also evident that both jurisdictions still struggle with how to obtain the proper balance when conflict arises between the rights granted under the intellectual property legal regime and competition policy.[63] Despite efforts to understand the issues arising from the conflict, the US position on how to deal with intellectual property in a competitive environment has been unwavering for decades.[64] The US has always had a very positive perspective on the value of intellectual property. Both patent law and copyright law are ingrained in the US Constitution. Intellectual property rights are governed by federal laws that have remained relatively stable for hundreds of years. Such laws have generally been successful in maintaining the US position as a world leader in innovation, especially in information and telecommunication sectors. The safeguarding of intellectual property rights as a

---

[62] See (n 8) above.

[63] See, for example, See Federal Trade Commission, 'To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy' (October 2003) <www.ftc.gov/os/2003/10/innovationrpt.pdf> accessed 19 July 2011 (Note that there was an entire chapter devoted to issues in the software industry); US Antitrust Modernization Commission (n 29); US Department of Justice and the Federal Trade Commission, 'Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition' (April 2007) <www.ftc.gov/reports/index.shtm#2007> accessed 19 July 2011; and in the EU see P Regibeua and K Rockett, 'Assessment of Potential Anticompetitive Conduct in the Field of Intellectual Property Rights and Assessment of the Interplay Between Competition Policy and IPR Protection' (November 2011) Prepared for the European Commission (COMP/2010/16) <http://ec.europa.eu/competition/consultations/2012.../study_ipr_en.pdf> accessed 10 July 2012. This report focuses mainly on licensing with respect to patent pools and mergers.

[64] See the section "The Future of Competition Law and the Small Software Firm" below for a discussion on why a major shift in this position may be forthcoming.

means of honouring the financial investment and innovative effort of American inventors has been culturally entrenched in US history. Since adapting the economic view of competition law, the US authorities have embraced a philosophy that the market forces are self-correcting. And, as was discussed above, since the *Microsoft* case the US policy on competition has largely supported the Schumpeterian view that intellectual property is a necessary tool for large firms to protect themselves against displacement.[65] It is not surprising, then, that the US maintains a very hands-off, *laissez-faire* attitude towards intellectual property in competitive environments. US policy makers see very limited capacity for competition law to play a role in compensating for shortcomings in intellectual property law. The US position promotes large firm monopoly with the help of intellectual property and a philosophy that problems with intellectual property law should be addressed by intellectual property reform.[66]

The EU competition policy on whether intellectual property rights trump competition laws in support of innovation is much more flexible than that of its US counterpart. The EU's hesitation with granting intellectual property owners *de facto* power in the marketplace likely stems from the EU history of skepticism regarding the scope of intellectual property rights. Since the creation of the European Union in 1957, the EU has not had the benefit of control over intellectual property laws.[67] As the power to enact and enforce intellectual property rights in the EU remains largely within the national laws of the Member States and the power to regulate competition rests with

---

[65] Arezzo (n 49) 495 and Barnett (n 33) 860

[66] K Czapracka, 'Where Antitrust Ends and IP Begins – On the Roots of the TransAtlantic Clashes' (2007) 9 (2) Yale Journal of Law and Technology 44, 44 argues that US enforcers see little scope for antitrust policy to mitigate consequences of imperfect intellectual property and that such issues are better dealt with through intellectual property reform.

[67] As discussed in Chapter 4, there is no central authority for intellectual property rights in the EU.

the EU, the EU was unable to exert its decision making power to override intellectual property laws when necessary to meet the goals of the EU.

Early decisions by the European courts created a means for EU intervention in cases where intellectual property rights were perceived as problematic to the integration of the single market. These cases distinguished between the "grant" of rights under national intellectual property laws and the "exercise" of these same rights, which falls under the jurisdiction of the EU.[68] Because of their potential to act as barriers to the free flow of goods and services between Member States, intellectual property rights have historically been viewed with suspicion and hostility by the EU.[69] The EU's position on intellectual property and competition policy has relaxed considerably since these early days. Evidence can be found in the guiding principles of the 2004 Guidelines for Technology Transfer with the express acknowledgement that the exercise of intellectual property rights is presumably pro-competitive.[70] Yet, the 2004 European Commission decision and the 2008 decision from the General Court (previously known as the Court of First Instance) in *Microsoft* suggest that the current philosophy on intellectual property in this jurisdiction lies somewhere in between these two extremes. While the approach taken regarding Microsoft's refusal to supply interface information to a competitor will be analyzed in detail below,[71] two key observations arise from the *Microsoft* decisions that are important to highlight in this section. First, neither the Commission nor the General Court hesitated in dismissing

---

[68] These early cases include Joined Cases 56 & 58/64, *Establissments Consten SARL v Comm'n*, 1966 ECR 299; Case 78/70, *Deutsche Grammophon Gesellschaft GmbH v MetroSB-Gro markte GmbH & Co. KG*, 1971 ECR 478; and Case 15/74, *Centrafarm BV et Adriaan de Peijper v Sterling Drug Inc.*, 1974 ECR 1147.
[69] For a discussion on the historical development of EU views on intellectual property, see Coco (n 20); and see V Korah, 'The Interface Between Intellectual Property and Antitrust: The European Experience' (2001) 69 Antitrust L.J. 801.
[70] See (n 8) and accompanying text.
[71] The issue of access to interoperability information is central to this thesis. The other main issue in the EU *Microsoft* case was tying. Although this issue is relevant to small software firms, space does not permit an analysis of the issue of bundling software.

intellectual property rights when they believed that competition was being threatened in a given market. Despite Microsoft's arguments that it was the owner of copyrights, trade secrets and patents on its interface information, it was ordered to share the protected information with competitors.[72] Second, both levels of enforcement were willing to override current intellectual property laws for the greater goal of protecting competition and consumer choice. Central to the *Microsoft* case was the definition of interoperability. Although Microsoft argued that the definition in the Computer Directive[73] was appropriate and that the approach in the Directive sufficiently addressed the issues before the court, the language of the Directive was considered, overridden and new law on compulsory licensing of interoperable information was crafted.[74]

The EU *Microsoft* decisions were highly criticized by antitrust scholars as encroaching on the entitlement of intellectual rights holders,[75] weakening the right for EU companies to determine with whom they do business,[76] curbing private investment in R&D,[77] creating international barriers, penalizing successful innovators and creating a substantial risk on the incentive to innovate.[78] Following the *Microsoft* decision, the EU received considerable pressure to conform to US views. The *Microsoft* decision was considered economically unsound, signifying the EU's continuing practice of protecting

---

[72] D Curley, 'Interoperability and Other Issues at the IP-Antitrust Interface: The EU *Microsoft* Case' (2008) 11(4) The Journal of World Intellectual Property 296, 306 argues that both the Commission and the EU General Court avoided the need to determine whether Microsoft had intellectual property rights that would be subject to a compulsory license; DF Spulber, 'Competition Policy and the Incentive to Innovate: The Dynamic Effects of Microsoft v. Commission' (Summer 2008) 25 Yale Journal on Regulation 247, 259 argues that the Commission was "indifferent" as to whether Microsoft had intellectual property rights in the interface information.

[73] Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111 (codified version) (referred to herein as the "Computer Directive")

[74] It is important to note that the Software Directive is EU regulation. Coco (n 20) 47 questions whether the EU authorities would have the authority to make changes to national laws such as patent laws.

[75] M Dolmans, R O'Donoghue and PJ Loewenthal, 'Article 82 EC and Intellectual Property: The State of the Law Pending the Judgment in Microsoft v. Commission' (Spring 2007) 3 (1) Competition Policy International 107, 108

[76] C Ahlborn and DS Evans, 'The Microsoft Judgment and its Implications for Competition Policy Towards Dominant Firms in Europe' (April 2008) 75(3) Antitrust Law Journal 1, 9

[77] Czapracka (n 66) 107

[78] Spulber (n 72)

competitors and not competition, and being offside with the goal of consumer welfare.[79] The European Commission subsequently attempted to show greater convergence with the US point of view, but as will be seen below, the EU still maintains a unique perspective on the intellectual property and competition law intersection.

What does all this mean for the small software firm? In many respects, the US position is to protect the intellectual property rights of large firms unless there is some seriously anti-competitive conduct that causes identifiable harm to consumer welfare.[80] This stance is too extreme for a dynamic industry such as software. It dismisses relevant information such as the strength of network effects, the impact of powerful intellectual property rights for only select industry players, and intellectual property transfer agreements that may be seen as pro-competitive, but may actually have anti-competitive effects. A more open-minded, factually based analysis is required to discover the inequities existing in the sector. Competition policy should recognize that industries differ from each other in legal and technical ways and that in certain circumstances, such as the software industry, intellectual property laws may need to be overridden in order to ensure an open, competitive environment.

While large firms undoubtedly enjoy the US position, the more flexible EU approach has far greater reach into the unique characteristics of the software industry. The EU policymakers see fit to leave the door open to interfere with intellectual property rights when it is appropriate to protect competition. Based on the *Microsoft* cases, the

---

[79] US Department of Justice, Assistant Attorney General for Antitrust, 'Press Release: R. Hewitt Pate Issues Statement on the EC's Decision in its Microsoft Investigation' (2004) <www.usdoj.gov/opa/pr/2004/March/04_at_184.htm> accessed 10 May 2012
[80] In the US *Microsoft* case, Microsoft was forced to disclose protected information. In that case, Microsoft was found to have engaged in a "litany" of improper acts to maintain its monopoly in the operating systems market. See K McMahon, 'Interoperability: "Indispensability" and "Special Responsibility" in High Technology Markets' (2007) 9 Tulane Journal of Technology & Intellectual Property 123, 135.

EU approach seems more adept at assessing whether intellectual property is effective in software markets and whether the dominant firm is somehow lessening the overall innovativeness of the industry. This is promising from the perspective of the small software firm. Keeping markets open and ensuring a more level playing field at the expense of monopolies may be required to counter the strong market forces that are present in this industry.

Perceived Importance of Small Firms

Although the two authorities may have different tolerance levels for how flexible they are when dealing with high technology industries, the US and the EU competition policymakers are cognizant that a dynamic industry requires additional considerations and that intellectual property rights can interfere with normal levels of competition. However, this recognition will have no benefit for the small software firm if it is not seen as a viable competitive force worthy of protection. In this section, the perceived importance of small firms as legitimate players in the software industry is considered. Not only is it important for small software firms to be considered as players in any rule of reason analysis, but it may also be necessary for small firms to be specifically protected from large firms holding significant intellectual property rights that preclude small firm participation in competitive markets.[81]

In order to determine where small firms fit into current and future competitive analysis, it is important to revisit the objectives of competition law and the concept of "protecting competition and not competitors." This fixation focuses policy in a particular direction. Small company protection seems to be at the heart of this issue. The US has long ago decided that the one and only goal of competition law is

---

[81] This is not to suggest that small firms should receive *per se* rights under competition law. However, their significance should be considered in any rule of reason analysis based on a balancing test. See further discussion of a balancing test in the next section.

consumer welfare. US enforcers use an "effects-based" approach to determine a violation under competition laws. The concern is not for the individual complainant, but on the effect of the anti-competitive actions on consumer welfare. The US has not considered the welfare of individual competitors for many years.[82] The reluctance of US policymakers to consider competitors stems from its opposition to protecting small inefficient firms.[83] The US holds the opinion that protecting small firms through competition law promotes it as a form of industrial policy.[84] Once again, the characteristics of dynamic competition are not being considered. The model of dynamic competition includes the small firm. It has been stated by US authorities that consumer welfare includes ensuring there is an environment conducive to innovation and creating economic efficiencies. The definition of consumer welfare, then, fits well with the benefits that small software firms (and other small firms) bring to the marketplace.

Although the focus on small firms in US competition policy reform has been extremely limited, there have been a few strong proponents of including them in economic analysis. For example, in 2002, Shane Greenstein[85] spoke at the FTC Hearings on

---

[82] However, it appears that even the Court of Appeals has its limits. See US CA *Microsoft* Case (n 29) 79 stating "… suffice to say that it would be inimical to the purpose of the Sherman Act to allow monopolists free reign to squash nascent, albeit unproven, competitors at will – particularly in industries marked by rapid technological advance and frequent paradigm shifts."

[83] See Chapter 1, section entitled "The Objectives of Competition Law and Intellectual Property." The hostility towards small firms is really hostility towards small inefficient firms, most of which are not viable and would cause harm to consumers to protect them. Whish (n 5) 21 argues that protecting small business is counter to the idea of consumer welfare in the "technical economic sense."

[84] In its Final Report, the US Antitrust Modernization Commission unequivocally stated that "Antitrust law in the United States is not industrial policy: the law does not authorize the government (or any private party) to seek to "improve" competition. Instead antitrust enforcement seeks to deter or eliminate anti-competitive restraints." Antitrust Modernization Commission (n 29) Final Report and Recommendations 3; But see P Areeda, 'Antitrust Law as Industrial Policy: Should Judges and Juries Make It?' in TM Jorde and D J Teece (eds), *Antitrust, Innovation and Competitiveness* (Oxford University Press 1992) 29 stating that US competition law has been at the core of American industrial policy for 100 years. Despite the fact that industrial policy has a very broad scope, it is often associated with the social policy of protecting small firms. L Parret, 'Shouldn't We Know What We Are Protecting? Yes We Should! A Plea For a Sold and Comprehensive Debate About the Objectives of EU Competition Law and Policy' (August 2010) 6(2) European Competition Journal 339, 340 says industrial policy has no precise meaning but it is the mix of government decisions that seeks to maximize goods and services desired by consumers and citizens. This sounds similar to consumer welfare in the broader sense.

[85] Shane Greenstein, PhD, is an economist with Northwestern University and studies in the area of computing, communications and Internet infrastructure. < www.kellogg.northwestern.edu/faculty/greenstein/> accessed 15 July 2012

Competition and Intellectual Property Law in the Knowledge-based Economy.[86] He argued that current competitive analysis assumes that small firms have access to technical knowledge necessary for innovation and that small firms could effectively exclude incumbents from imitating their invention. He also questioned whether incumbent firms use their market power when bargaining with new entrants. He argued that traditional analysis could not accommodate new inventors competing and cooperating with incumbent firms who control existing assets. In 2005, testifying before the Antitrust Modernization Commission, Carl Shapiro[87] argued that major innovations come from lean and hungry firms introducing disruptive technologies and that it is important to prevent dominant firms from abusing their power to hold back smaller, innovative rivals.[88] However, despite these calls for further reflection on the direction of competition policy, the US policy remains committed to the protection of monopolistic firms. This overemphasis on large firm monopolies automatically rejects consideration of small firms. The current US approach assumes that if small firms are efficient, then they are equivalent to and have the same privileges as large firms to compete in the marketplace and to avail of the intellectual property system.[89] This may be true in some industries, but previous chapters have clearly demonstrated that small software firms are uniquely disadvantaged by the intellectual property system and, as a result, the software industry and the precarious position of the small firm requires special scrutiny under competition law.

---

[86] S Greenstein, 'Market Structure and Innovation: A Brief Synopsis' (February 2002) Testimony before the Federal Trade Commission hearings on Competition and Intellectual Property Law in the Knowledge-based Economy <www.ftc.gov/opp/intellect/shanemitchell.pdf> accessed 5 May 2012

[87] Carl Shapiro, PhD, is an economist at the University of California, Berkeley who has studied antitrust, innovation and competition policy for 30 years. <www.faculty.haas.berkeley.edu/shapiro/ > accessed 15 July 2012

[88] C Shapiro, 'Antitrust, Innovation, and Intellectual Property' (November 2005) Testimony Before the Antitrust Modernization Commission <www.faculty.haas.berkeley.edu/shapiro/amcinnovation.pdf> accessed 5 May 2012

[89] Barnett (n 33) 866 states "letting competition in the market drive technological development does not necessarily mean less access" because the market is self-correcting.

The EU position *vis-à-vis* the small firm appears once again to be more flexible than the US stance. Policymakers are more comfortable with having more than one goal for competition law. The three main aims of competition law are: 1) to maintain effective competition;[90] 2) maintain fair competition in the form of special protection for SMEs;[91] and 3) to promote market integration.[92] The second goal of fair competition creates a "special responsibility" of dominant firms not to allow their conduct to impair "genuine undistorted competition in the market".[93] The dominant company must act in proportion to its strengths[94] and the scope of the "special responsibility" will be considered on a case by case basis.[95]

This EU approach has received substantial criticism as not being aligned with the EU's stated goal of consumer welfare and for protecting competitors over competition.[96] Yet, the EU maintains that it must sometimes protect competitors in order to protect competition. This is evident in the 2008 Discussion Paper on Abusive Conduct by a Dominant Undertaking under Section 102 (TFEU).[97] While it states that the essential objective is the protection of competition as a means of enhancing consumer welfare, "it may sometimes be necessary to protect competitors that are not (yet) as efficient

---

[90] S Anderman and H Schmidt, *EU Competition Law and Intellectual Property Rights: The Regulation of Innovation* (2nd edn, Oxford University Press 2011) 25 explain this objective as the preservation of market structures and the process of competition from inappropriate harm.

[91] This structuralist approach is consistent with the beginnings of EU competition law. When first created, EU competition policy was heavily influenced by the ordoliberal view. This was the prominent view in Germany (the only state with a modern competition regime) at the time of the drafting of the Rome Treaty; Pera (n22) 145

[92] While this goal seems to have been overshadowed with the economic-based goal of protecting consumer welfare, the market integration goal may be gaining importance again to align with the objectives of the Lisbon Treaty. For a discussion of this, see Parret (n 84) 367.

[93] Case 322/*81 Nederlandsche Banden-Industrie Michelin NV v Commission* [1985] E.C.R. 3461 [1985] 1 CMLR 282 par 57

[94] *United Brands* (n 52) par 190

[95] C-333/94 P *Tetra Pak v Commission* (1996) ECR 1-5951, (1997) 4 CMLR 662 par 24; EU Guidance Paper (n 14) pars 1, 9 state that the "special responsibility" will be considered in light of the circumstances in each case.

[96] See, for example, US Department of Justice (n 79)

[97] European Commission, 'DG Competition Discussion Paper on the Application of Article 82 of the Treaty to Exclusionary Abuses' (December 2005) <www.ec.europa.eu/competition/antitrust/art82/discpaper2005.pdf> accessed 5 June 2012 (hereinafter referred to "EU Discussion Paper")

as the dominant company."[98]   The EU further clarifies this position when it released its Guidance Paper stating that "the Commission is mindful that what really matters is protecting an effective competitive process and not simply protecting competitors. This may well mean that competitors who deliver less to consumers in terms of price, choice, quality and innovation will leave the market."[99]

For small firms in dynamic markets, the EU position provides much greater opportunity to be heard.   The EU recognizes that there is a fine line between protecting competitors and protecting competition. Although it does not seem obliged to protect inefficient small entities, the EU policymakers seem capable of making a distinction between inefficient firms and firms that can have significant effects on competition even though they may be smaller and lack the economies of scale available to large firms.   Unlike the US, the EU embraces competition policy as part of its industrial policy.[100] It also maintains that a structural analysis provides all firms with an equal opportunity to compete as opposed to focusing on the protection of monopolists. This historical rationale for protecting small firms based on the ordoliberal view seems more in line with what current dynamic competition dictates as opposed to the US historical view that it was morally and socially correct to assist the weaker party.[101] The fact that it might, in certain circumstances, be appropriate to protect the small

---

[98] EU Discussion Paper (n97) par 54, 67 And see, B Hindley, 'An Economic Analysis of DG Competition's Discussion Paper on the Application of Article 82' (2006) The Stockholm Network Experts' Series on Intellectual Property and Competition 7 <www.stockholm-network.org/Publications/1> accessed 19 July 2012 who states that this nod in the direction of industrial policy is dangerous.

[99] EU Guidance Paper (n 14) par 6

[100] Neelie Kroes, European Commissioner for Competition Policy, 'EC Antitrust Rules: An Overview of Recent Developments' (October 2006) Hellenic Competition Commission < http://ec.europa.eu/competition/speeches/index_theme_1.html> accessed 10 June 2012 states that "Modern competition rules, effectively enforced, are central to the Lisbon strategy with its objectives of growth and job-creation within the EU."   The EU has been criticized for its "protectionist industrial policy view." See Spulber (n 72) 301.

[101] H Hovenkamp, 'Antitrust's Protected Classes' (October 1989) 88 (1) Michigan Law Review 1, 21 states that early framers of the Sherman Act were "concerned about the injuries that powerful firms might visit upon their smaller competitors." On pages 45 - 46, the author quotes early Congress views of the competition legislation where they refer to a small firms as "a humble man" starting a business, and the efforts of large firms to "crush out all small men", and "preying on every industry" and "robbing their victims."

software firm to avoid harm to consumer welfare seems to be lost on US policymakers. EU authorities may be more up to the task.

UNILATERAL REFUSAL TO LICENSE AND THE SMALL SOFTWARE FIRM

It is commonly stated in the literature that the US competition authorities are very aware of the issues in dynamic industries.[102] Regardless of its efforts to include economic analysis and consumer welfare protection into its competition policy, the EU has not convinced some competition law experts of its understanding of dynamic competition.[103] This issue is explored further in this section using the controversial issue of unilateral refusal to deal under the abuse of exclusionary conduct legislation. In the US, abusive conduct is covered under Section 2 of the Sherman Act and in the EU, a similar provision is found in Article 102 (TFEU).[104] In this section, the approach taken by the US and the EU on refusal to deal is compared with specific attention to dynamic competition, intellectual property and the small software firm.[105] The concept of refusal to deal is a very appropriate element of competition law to consider in light of the topics covered in other chapters of this thesis. Many (but not all) of the issues addressed herein involve the small software firm requiring access to technical information being protected by intellectual property laws owned by large firms. The refusal to deal doctrine captures the essence of the debate between small firms, intellectual property and dynamic industries. With the requirement for interoperability and connectivity in the software arena, compulsory licensing is a serious concern. This topic is also relevant as it illustrates how the differences

---

[102] Evans (n 17) 18 argues that US places great weight on dynamic competition because of their culture of entrepreneurship and well developed VC industry. He compares this to the EU where it is more costly to start a business and more difficult to obtain funding. See also, Scherer (n 43) 40 calling the US a "veteran" in dynamic industries.

[103] Ahlborn and Evans (n 76) 2 state that the EU authorities show no signs of logic or evidence of economic reasoning under Article 102 in 40 years.

[104] For a detailed comparison of these two sections, see Arezzo (n 34).

[105] The first EU judgment on refusal to deal involved the protection of a small firm, *Instituto Chemioterpico Italiano SpA v Commission*, Cases 6 & 7/73 [1974] ECR 223 [1974] 1 CMLR 309, CMR 8209; Korah (n 69) 808 argues this may be the reason why the EU doctrine on refusal to deal has such a wide scope.

between the US and the EU discussed in the last section of this chapter play out in legal jurisprudence. As shown below, refusal to deal (including the refusal to license intellectual property) is one of the more unsettled areas of law for both jurisdictions and the one area of competition law that the EU has not embraced the economic concepts that have been so pervasive in US policy for many years. The ultimate path forward by both authorities may have a significant impact on the small software firm's ability to compete on a level playing field with large firms.

US enforcement bodies are very reluctant to order a business to license its intellectual property to another company under Section 2 of the Sherman Act. One of the first US cases to deal with this issue was the 1994 case of *Data General*.[106] Grumman System brought an action against Data General for refusing to license a copyrighted software program. Although it was wary of exempting all exclusionary conduct based on copyright protection from antitrust scrutiny, the Court of Appeals established the presumption that a copyright holders' desire to exclude others from use of its protected work is a valid business activity and does not cause immediate harm to consumers.[107] The US Patent Act has codified such a presumption for patent law by stating that "No patent owner otherwise entitled to relief for infringement or contributory infringement of a patent shall be denied relief or deemed guilty of misuse or illegal extension of the patent right by reason of his having … refused to license or use any rights to the patent."[108] The notion that refusing access to intellectual property rights does not cause harm to consumers is well entrenched in US case law.

---

[106] *Data General Corporation v Grumman System Support Corporation* 36 F 3d 1147 (1st Circuit 1994)
[107] *Data General* (n 106) par 148, 155
[108] US Patent Act [1988] 35 USCS s 271(d)

In 2000, the Federal Circuit in *Xerox*[109] stated that "in the absence of any indication of illegal tying, fraud in the Patent and Trademark Office, or sham litigation, the patent holder may enforce the statutory right to exclude others from making, using, or selling the claimed invention free from liability under the antitrust laws." Needless to say, the presumption that intellectual property law is pro-competitive has not been successfully rebutted in recent US case law.[110]

As if it needed further support, the US non-interventionist attitude was solidified in *Trinko*,[111] the 2004 US refusal to deal case under Section 2 of the Sherman Act. The case involved a complaint by a local telephone service customer, Trinko, that Verizon engaged in anti-competitive behaviour by failing to share its local telephone network with competitors. Even though the case did not involve intellectual property and the setting was not related to high-technology,[112] *Trinko* significantly limited the scope of US authorities to intervene in cases involving intellectual property rights. This landmark case has resulted in strengthening both the intellectual property owner's exclusive rights as well as its monopoly.[113]

Despite the US insistence that dynamic industries deserve cautious, factually intensive investigations in order to determine liability under competition law, the US doctrine on refusal to deal has closed the door on any such rule of reason analysis. The presumption of the pro-competitiveness of intellectual property rights is virtually

---

[109] *In re Independent Service Organizations Antitrust Litigation CSU v Xerox Corp* 203 F 3d 1322, 1327 (Federal Circuit 2000) ("*Xerox*"); In the *Xerox* case, Xerox refused to supply copyrighted and patent protected spare parts to a rival.
[110] Considering the growth of intellectual property rights holdings in the US, it is surprising that there are relatively few duty to license intellectual property cases. For a review of the cases in the US, see Azerro (n 14); and see the US Section 2 Report (n 35) 120-122.
[111] *Verizon Communications Inc v Law Offices of Curtis v Trinko*, LLP 540 US 398 (2004); *Trinko* is said to be one of the most important antitrust cases in US history.
[112] In fact, the *Trinko* case involved an industry governed by the 1996 Telecommunications Act in the US.
[113] For example, Barnett (n 33) 865 referring to the *Trinko* decision while speaking publically on antitrust and intellectual property and arguing that *Trinko* should be followed in cases involving intellectual property rights.

unrebuttable, thus making this a *per se* legal rule in the US.[114] The US is not engaging

in any analysis of intellectual property laws or discussing any special issues that arise in

dynamic industries such as network effects and not providing any forward thinking,

longer term analysis of market conditions as required in such industries. This position

is too stringent to be effective in industries with so many factors affecting competition.

The small software firm will not serve as an important consideration in any such

analysis under current US laws. This strict approach solidifies large firm immunity in

software and further protects their intellectual property fortresses. Any issues that

arise with access between large software firms can be solved through technology

transfer agreements such as cross-licensing. US competition law is, therefore, part of

the problem with the small firm's fight to be more competitive in the software

industry.

Around the same time as the US decision in *Trinko*, the EU Commission released its

decision in *Microsoft*.[115] The *Microsoft* case provided a markedly different approach to

claims of refusal to license intellectual property.   The EU *Microsoft* case involved a

claim by Sun Microsystems that Microsoft had refused to supply it with necessary

interface information required by Sun to interoperate with the Windows workgroup

server operating system.   The Commission followed an expanded version of the

"exceptional circumstances" test set out in *Magill* and *IMS* and did a thorough

examination of the market, taking into account market factors such as network effects.

---

[114] Arezzo (n 34)

[115] The EU Commission *Microsoft* Case (n 29) was preceded by two important cases: *Magill* introduced the "exceptional circumstances test" and was the first time the European Court of Justice upheld the ordering of compulsory licensing for intellectual property; and the *IMS* case which widened the scope of *Magill*. *Radio Telefis Eireann and Independent Television Publications Ltd v Commission* [1995] Cases C-241/91 P and C-242/91 P, 1995 ECR I-743 ("*Magill*") and *IMS Health GmbH and Co OHG v NDC Health GmbH and Co KG* [2004] Case C-418/01 ECR I-5039 ("*IMS*") These cases are widely discussed in the literature and do not require repeating here. The *Microsoft* case is one of the most widely discussed cases by legal and antitrust scholars. The discussion here is limited to its relevance to small software firms.

The Commission's decision was approved by the General Court in 2007. The Court found that "exceptional circumstances" included the fact that interoperability was very important to highly networked industries and that Sun was unable to obtain this information through any other means, including reverse engineering. The *Microsoft* decisions included important forward-thinking analysis that improves the possibility that small software firms may be considered in software cases. First of all, the Court confirmed prior case law that a firm in a dominant position has a "special responsibility" not to allow its conduct to impair undistorted competition in the market.[116] Second, the Court considered that abusive conduct could include behaviour that results in limiting technical development.[117] This is a very broad category of abusive conduct. It is also very significant in software due to the fact it is a cumulative technology and follow-on innovation are important aspects of competition. Small firms, as well as large firms, compete on functionality by adding feature to existing products. Existing products may go through several versions as part of ongoing upgrades. This is a significant acknowledgement of the particular characteristics of software and how firms compete. It also stands for the notion that there are other players besides the incumbent firm that contribute to innovation in software. It acknowledges that consumer welfare does not always include having to purchase new products. Upgrades are very valuable to consumers who would often prefer to add on to their existing products than to purchase new products. Again, taking the criteria for the competitive analysis one step beyond "new product

---

[116] EU General Court *Microsoft* Case (n 57) par 229

[117] EU General Court *Microsoft* Case (n 57) par 632; the Court stated "The Commission thus took particular care to ascertain that Microsoft's refusal was a 'refusal to allow follow-on innovation', that is to say, the development of new products, and not a mere refusal to allow copying" and at 640 "Microsoft's competitors' products will implement the same set of protocols as Windows work group server operating systems do but will differ widely in terms of performance, security and functionality." This broadened the *Magill* test which required conduct that prevented a rival from introducing a new product into the market. The "technical development" concept comes directly from wording in Section 102(b) (TFEU) "limiting production, markets or technical development to the prejudice of consumers."

development" and including "technical development" is an important step forward, but it also highlights how the analysis must evolve to become less rules-oriented and more discretionary on the part of the competition authorities.

Third, the *Microsoft* decision softened the requirement set out in the *Magill* test that the information being requested must be "indispensable" in order for competitors to remain viable in the market.[118] The Court confirmed the Commission's "complex economic assessment"[119] to determine whether the interface information was necessary for interoperability with present and future products was the appropriate test. This again is recognition of the strength of network effects and the importance of interconnectivity in the software industry. Finally, the *Microsoft* case introduced a balancing test to determine whether, on balance, the possible negative impact of supplying the requested information on Microsoft's incentive to innovate is outweighed by the positive impact on the level of innovation on the whole industry (including Microsoft).[120] The EU authorities were interested in examining the effects of the refusal to license on the entire software market under consideration. This is a very progressive approach and shows the EU understands that many players are necessary for innovation in software and the behaviour of one strong player can dampen innovation in an entire market. Overall, the EU *Microsoft* decisions illustrates a very liberal approach to the software industry and demonstrates a greater understanding of the interplay between firms in the sector.[121] The EU authorities made a clear

---

[118] EU General Court *Microsoft* Case (n 57) pars 369 - 436
[119] EU General Court *Microsoft* Case(n 57) par 379
[120] EU General Court *Microsoft* Case (n 57) par 706; S Anderman, 'Does the Microsoft Case offer a New Paradigm for the 'Exceptional Circumstances' Test and Compulsory Copyright Licenses under EC Competition Law?' (December 2004) 1(2) The Competition Law Review 7, 20 argues the balance test is an endorsement that innovation and technical development is best promoted by a number of different firms innovating rather than one.
[121] The EU *Microsoft* decisions were criticized extensively from various angles in the academic literature. Of relevance to this thesis, see for example, Ahlborn and Evans (n 76) arguing that the EU decisions provide too much discretion to EU enforcers to distinguish between common business practices and findings of abuse, weakens patent law, and weakens the presumption that

statement to large firms that intellectual property rights will not trump the greater goal of promoting innovation in the relevant industry. The decision also stands for the fact that cooperation in dynamic industries such as software is very important for effective competition and for the promotion of innovation.

In 2009, the EU Guidance Paper was published for the purpose of providing greater clarity and predictability to Section 102 (TFEU).[122] In general, the EU Guidance Paper illustrates the EU's continuing attempt to integrate economic thinking into refusal to deal scenarios. There is more emphasis on efficiencies and a greater significance on consumer welfare as a primary goal.[123] As well, it further clarifies some of the changes to the refusal to license intellectual property framework that was introduced in the *Microsoft* case. From the small software firm's perspective, the EU Guidance Paper highlights the "special responsibility" of dominant firms.[124] This may be taken as a signal that small firms will be considered in abuse of dominance cases. Refusal to supply explicitly includes refusal to license intellectual property, including necessary interface information or a refusal to grant access to an essential facility or a network.[125] This clarity will create predictability in the marketplace and is in stark contrast to the US approach to refusal to supply cases. Finally, the EU Guidance Paper offers a balancing test for the purpose of determining consumer harm in refusal to

---

dominant firms can chose their trading partners; and see Evans and Hylton (n 19) 228 arguing that the analysis focuses on the distortion of market structure rather than foreclosure and anti-competitive effects on consumers.

[122] See (n 14).

[123] Note that "the wider objective of achieving an integrated internal market" is prominent in the EU Guidance Paper (n 14) par 1.

[124] EU Guidance Paper (n 14), pars 1, 9 state that the "special responsibility" will be considered in light of the circumstances in each case.

[125] The essential facilities doctrine originated in the US, but it has been construed narrowly by US courts to apply mainly to physical infrastructure. For a review of US case law on essential facilities, see Czapracka (n 66) 60-61. It is has recently been rejected by the US Supreme Court in the *Trinko* case; Arezzo (n 34) 27. In the EU, the essential facilities principle has been interpreted as meaning that one competitor in a downstream market must not be allowed to get control over the only source of supply of an input which is essential to that market and monopolize the market by shutting out its rival as this would result in foreclosure of existing competition. See JT Lang, 'European Competition Law and Intellectual Property Rights – a New Analysis' (2010) 11 ERA Forum 411, 419; In the EU, both the *Magill* and *IMS* cases treated intellectual property as an essential facility. The EU Commission drew heavily on the US essential facilities doctrine using words such as "indispensable." For a discussion of the use of the doctrine in the EU, see Dolmans, O'Donoghue and Loewenthal (n 75) 111; McMahon (n 80) 152; Spulber (n 72) 257, 261.

license cases.[126] The Commission will examine the likely impact of a refusal to license on consumer welfare and attempt to balance short term and long term effects of such refusal. Consumer harm may include whether follow-on innovation is limited by the refusal to license. The EU Guidance Paper also offers the dominant firm an opportunity to justify its refusal to license as long as no net harm to consumers arises.[127]

The Guidance Paper is very broadly worded and leaves considerable discretion to the competition authorities. Taken in its broadest terms, it is conceivable that a small software firm could bring a complaint under Article 102 (TFEU) against a large firm controlling a particular network for not providing the small firm with sufficient information required to interoperate with its software. The requested information is perhaps protected by copyright, trade secrets and patents. The small firm would have to show that the information requested is required to allow it to make technical improvements to its product that allow it to compete in the relevant market and that the large firm has an affirmative obligation to provide it. This is a request that virtually every small software firm in the market could make. Such a broad interpretation of the EU position on refusal to license intellectual property would surely open the floodgates and the EU authorities would be inundated with requests. It leaves the door open for large firms to have a special responsibility to license their intellectual property to small firms. This could potentially create uncertainty in the market. The EU's broad policy terms are welcome, but it may be forced to put some boundaries around the types of cases it is willing to consider. The Guidance Paper uses the term

---

[126] EU Guidance Paper (n 14), par 86-88
[127] EU Guidance Paper (n 14) par 28-31 and par 89-90

"effective competition"[128] throughout the document so it may be possible that small firms would not be considered as having the strength in the market to affect competition in any way. Ultimately, it comes down to balancing consumer welfare. The balance test is an important component of the analysis. There will certainly be situations when the refusal to license intellectual property to small firms will result in greater harm to consumers than it will negative consequences to the dominant firm. The balance test becomes the litmus test for determining whether small firms are legitimate players worthy of protection based on an investigation of innovation levels in the relevant market. A rule of reason analysis could determine both inefficiencies and innovative contribution of small firms in software markets.[129] It would involve a good understanding of the relevant market, the technology in question and the existing and potential players in that market. This is the only means of determining whether the small firm is deserving of the phrase "effective" competition. The investigation will be complex, but the results will create a more innovative environment and have a greater chance of really meeting the goals of consumer welfare. To exclude them too early in the analysis would be a mistake. It would also be a mistake to use the balance test as a means of arguing that because large firms are more innovative than small firms, the law should tip in their favour. This way of thinking is not prudent and does not take into account the important role that both firms have in the market.

---

[128] For example, see EU Guidance Paper (n 14), pars 5, 6, and 10.
[129] The ability to predict future innovation and whether a small firm will contribute to such innovations is problematic for the current analysis. As was argued in Chapter 2, small firms require a fair intellectual property regime to allow them to cooperate with larger players and overcome their lack of complementary assets. See Sidak and Teece (n 26) 594-597 arguing that a firm level analysis is required to determine the innovativeness of companies of all sizes. Innovative capabilities are derived from strong intellectual property rights, the nature of knowledge being created and complementary assets.

The EU position requires further clarity as to the obligation of dominant firms to protect small firms, the meaning of "effective" competition, and the extent and depth of the analysis to be undertaken in the balance test (specifically whether the exclusion of small firms from the market may/will lead to harm to consumers). The EU Commission should clarify the use of this doctrine by further explaining the scope of the dominant firm's obligations or, at a minimum, attempt to include some limiting principles. The EU position could be further solidified and act as a deterrent to monopolistic software firms if the EU Commission gave specific examples relating to small firms and specifically referred to issues such as patent portfolios as potentially leading to barriers to entry and thus creating market power. While it is clear that the proper language is present for the EU Commission to consider the competitive plight of the small software firm, it will be interesting to see how the Commission uses its discretion in a case involving such an entity.

Although it appears that the philosophy currently held by the EU with respect to refusal to deal cases could provide fair and reasonable evaluation of the needs and roles of small software firms, the US position is much more tenuous. The US competition policymakers will require a significant shift in attitude towards the value of small software firms in creating benefits to consumers and an acknowledgement that the lack of such entities may lead to considerable consumer harm. This will require the US to revisit its position on market power, offer more flexible analysis to dynamic markets, consider certain small entities worthy of protection, and offer the possibility of overruling legitimate intellectual property rights when such rights are excessive and lead to a distorted and unbalanced market. The US requires a wider lens on the issues that affect the innovative processes in certain industries and look beyond

its strict Schumpeterian view of the marketplace. With respect to its balancing test, focusing only on direct and immediate consumer harm is shortsighted and will not provide adequate analysis of all the issues that arise and can lead to consumer harm in a dynamic market. The ultimate goal of protecting consumers is a valid objective, but it requires a broader analysis and a greater understanding of harm that can befall on consumers when an important player in the market is omitted for artificial reasons and not based on the merits of healthy competition.

THE FUTURE OF COMPETITION LAW AND THE SMALL SOFTWARE FIRM

The US position on refusal to deal has been considered stable and consistent because of its focus on consumer welfare and its use of economic tools.[130] However, the US position today on refusal to deal cases is anything but settled. In September 2008, the US Department of Justice issued a report entitled "Competition and Monopoly: Single Firm Conduct Under Section 2 of the Sherman Act"[131] After reviewing recent case law on the issue of refusal to deal, the authors state:

> The Department believes that there is a significant risk of long-run harm to consumers from antitrust intervention against unilateral, unconditional refusals to deal with rivals, particularly considering the effects of economy-wide disincentives and remedial difficulties. The Department thus concludes that antitrust liability for unilateral, unconditional refusals to deal with rivals should not play a meaningful part of section 2 enforcement.[132]

---

[130] Gifford and Kudrle (n 28) 713
[131] US Section 2 Report (n 35)
[132] ibid 129

For a number of reasons related and unrelated to the refusal to deal section of the US Section 2 Report,[133] the report was officially withdrawn in a May 2009 speech by then Assistant Attorney General for the Department of Justice, Christine Varney.[134] This speech provides some insight as to the direction that the US may take with respect to refusal to deal cases. First, Varney rejects the extreme Schumpeterian notion of providing complete deference to monopoly firms and says the US authorities "must change course and take a new tack."[135] Second, citing the 1985 US refusal to deal case, *Aspen Skiing*[136], Varney said it was time to get "back to basics." She stated that *Aspen Skiing* stands for "the proposition that dominant firms can be expected to deal with their rivals" where "cooperation is indispensable to effective competition."[137] Finally, she concluded that it is important to look closely at pro-competitive and anti-competitive aspects of a dominant firm's conduct and determine "whether on balance the net effect of this conduct harms competition and consumers."[138] She summarizes by stating that the Department of Justice is "committed to aggressively pursuing enforcement of Section 2."[139] This speech represents a major change of philosophy for US enforcement agencies. It suggests the US policymakers have realized that the Schumpeterian model taken to its limits is only beneficial to monopolist firms. 'Cooperation' and 'balance' are welcome words and sound remarkably similar to the

---

[133] The Report was publically criticized by the Federal Trade Commission Commissioners in two separate statements. Commissioners Harbour, Leibowitz and Rosch stated that the report "is chiefly concerned with firms that enjoy monopoly or near-monopoly power, and prescribes a legal regime that places these firms' interests ahead of those of consumers. At almost every turn, the Department would place a thumb on the scales in favour of firms with monopoly or near-monopoly power and against other equally significant stakeholders." See Federal Trade Commission, 'Statement of Commissioners Harbour, Leibowitz and Rosch on the Issuance of the Section 2 Report by the Department of Justice' and 'Statement of Federal Trade Commission Chairman William E. Kovacic' (8 September 2008) <http://www.ftc.gov/opa/2008/09/section2.shtm> accessed 19 July 2012

[134] CA Varney, 'Vigorous Antitrust Enforcement in This Challenging Era' (May 2009) Remarks Prepared for the Centre for American Progress < www.justice.gov/atr/public/speeches/245777.htm> accessed 10 June 2012

[135] ibid 8

[136] *Aspen Skiing Co v Aspen Highlands Skiing Corp* 472 U.S. 585 (1985); It is interesting to note that Varney did not mention *Trinko*. For a discussion of the Varney speech and her choice of case law, see X J Lui, 'Lorain, Aspen, and the Future of Section 2 Enforcement' (Spring 2010) 16 Michigan Telecommunications and Technology Law Review 419.

[137] Varney (n 134) 13

[138] Varney (n 134) 13

[139] Varney (n 134) 14

EU approach to duty to deal cases. What this change of attitude means for the small

software firm remains to be seen.[140]

Although the US does not have a current framework for dealing with refusal to deal

cases, it is actively pursuing large firms in markets involving innovation, intellectual

property and network effects.[141] A similar trend is occurring in the EU where enforcers

have considered competitive law violations against many high profile firms in dynamic

industries such as Qualcomm, Intel and Microsoft.[142] While it is important that

competition authorities in both jurisdictions remain committed to keeping competitive

markets open in high technology industries, they must not lose sight of the larger goal

of innovation and consumer welfare. If bringing actions against large firms results only

in forcing them to share their technical information with other large firms, then the

small software firm is no further ahead in its competitive plight.

In the US, the scope of competition policy has to be extended beyond its current

analysis. Small firms are relevant and vital players in innovative markets. There has to

be a major shift in thinking. The EU has all the mechanisms within its framework to

consider these important entities. As policy makers learn more about how intellectual

property affects competition and how small firms contribute to the competitiveness of

industries, it is likely that competition policy will move more towards inclusion.

Consideration of small firms in the software industry will include longer-term

investigation and appropriate time-frames of market dynamics as opposed to snap

shots in the market; an indepth scrutiny of the forces that play in software markets,

---

[140] Coco (n 20) 24 says that in the US, the philosophies of incumbent policymakers help shape changes in competition policy.
[141] GA Manne and JD Wright, 'Innovation and the Limits of Antitrust' (2010) 6 (1) Journal of Competition Law & Economics 153, 154 says these large firms, such as Google, have been put on notice of anti-competitive legal actions.
[142] J Nurton, E McDermott and P Ollier, 'IP Under Threat from Competition Clampdown' (April 2009) 188 Managing Intellectual Property 34; Manne and Wright (n 141) 154 refer to the EU as a "leader" in single firm conduct enforcement in industries important to EU economy.

including intellectual property laws; an investigation of ALL players in the relevant industry; future products and technical developments; and an enlarged view of consumer welfare. The analysis will likely become more complicated, more discretionary and less rule-based as competitive environments become more uncertain, but it is a challenge that must be met.[143]

CONCLUSION

Given the strength of intellectual property laws and the resulting competitive forces that operate in dynamic industries, strong and aggressive competition laws are vital to counteract these intense factors.[144] The EU competition authorities reacted to dynamic industries by taking a more aggressive and "activist" stance against monopolist firms.[145] Despite being severely criticized for being intolerant of successful firms[146] and lacking confidence in its consumers and companies to make the right decisions to ensure that a healthy market prevails, the EU position shows a healthy skepticism towards concentrated markets and aims to maintain market structures as much as possible. As such, the EU has deemed it necessary to use competition law to control and regulate markets. It is been argued herein that this is the more appropriate position in dynamic industries where intellectual property laws distort market conditions. The United States has only recently come to the revelation that its strict position in favour of large firms will come back to haunt it as firms became more powerful with the aid of the intellectual property system. This chapter has demonstrated that competition laws are part of the problem with the current

---

[143] Sidak and Teece (n 26) 644 says competition policy is moving towards dynamic industry analysis at a "glacial" pace because current economic thinking does not have adequate tools.
[144] MA Lemley, 'A New Balance Between IP and Antitrust' (April 2007) Working Paper No. 340 Stanford Law School 19 <http://ssrn.com/abstract=980045> accessed 4 October 2011 argues that when intellectual property laws are strong, antitrust laws should get stronger to prevent abuse.
[145] Spulber (n 72) 248; and Pera (n 22) 160
[146] Evans and Hylton (n 19) 25; Spulber (n 72) 301

competitive levels of small firms, especially in the US, but it can be part of the solution. Competition policy will never take the place of more evenly crafted intellectual property laws, but there is certainly a place for more aggressive policy in software markets.

The tension between strong intellectual property rights and market structures is still largely misunderstood. The current direction of EU policymakers is sending a message to large firms that they must be willing to cooperate with other large firms in the relevant markets in order to achieve the ultimate goal of consumer welfare. In this chapter, a more expanded role for competition law is called for to offer greater consideration for the strain that intellectual property laws are placing on small firms who are attempting to compete on a level playing field with their larger counterparts. The same message must be sent to large firms that they must be willing to deal with smaller players to ensure that they have equal access to technical information so that they can fulfill their role as innovators. While there seems to be a shift in thinking among policy makers in the EU, it remains to be seen whether small software firms will be provided with any greater support and protection than they have in the past.

CHAPTER 6: CONCLUSION

Intellectual property laws relating to the protection and exploitation of software are problematic to the future of the software industry. The market structure of the software industry has always been one of low concentration with thousands of small companies as active participants in innovation and commercialization. It is the premise of this thesis that these small firms are a significant part of the software industry and are a major reason the industry is still highly innovative. Software continues to outpace other high technology industries and is a sizable contributor of economic growth through the birth of new industries, the release of new and improved products and services, and through job creation. The technology provides efficiencies to many aspects of life, both personal and professional and has become an essential catalyst for productivity in many other industries.

Although small firms are seriously underrepresented in empirical studies and academic research, the information that is available suggests that intellectual property laws are becoming increasingly problematic to them. The issues that have been raised in this thesis have not yet had a profound effect on the success of the business of software. During the early stages of the industry, the technology was developing rapidly and new uses for software were being discovered at exponential rates. Radical innovations were commonplace and new sectors within the software marketplace were blossoming on a regular basis. Players of all sizes could make a profit. As the industry matures, patents are becoming the price of admission into the competitive game of software. Those firms fortunate enough to hold strong patent rights created by unsuitable laws are able to control network effects, interoperability, standardization,

follow-on innovation, international markets and future technological progress. As the technology becomes more interconnected and interdependent, compatibility and interoperability will become essential conditions of innovation. These unnatural market forces are all working together to minimize the role that small firms will be able to play in the industry.

The evidence to support this prediction is mounting. The rate of software patenting continues to outpace all other categories in the US, the EU and around the world. A very small percentage of software firms file patent applications. Almost all of the software patent holders are large firms. The divide between large and small firm patent holders is widening, not narrowing. Licensing deals are becoming high risk propositions for small firms as they are unable to protect their core technologies. The lead time so desperately needed by small firms lacking complementary assets is not available and they are forced to engage in first mover strategies in "stealth" operations. As patent thickets become impenetrable, incremental innovation, interoperability and access to standards will become a large firm privilege. The software business is moving quickly to more global business models and protection against infringement and free-riding is expanding outside domestic boundaries. The lack of intellectual property protection will continue to expose small software firms to unnecessary market hazards.

The main research question of this thesis asks whether current intellectual property laws are hindering the competitiveness of small software firms. As was discussed throughout this paper, intellectual property laws should provide the following market characteristics to ensure a healthy marketplace: minimization of barriers to entry;

minimization of transaction costs; predictability in scope and duration; encouragement for disclosure and dissemination of knowhow; encouragement of economic efficiency through mediums such as licensing and mechanisms to avoid duplication of efforts; provision of reasonable lead time; and incentives to avoid litigation.   Taking these competition principles into consideration, it is evident that intellectual property laws do not create a healthy environment for small software firms. They create excessive barriers to entry; insurmountable transaction costs; lack of predictability, lack of disclosure and access to key know-how; inefficiencies in licensing; no reasonable lead time and incentives to engage in litigation.   Therefore, the answer to the main research question is a resounding "yes."

As small firms become increasingly unable to profit from their R&D efforts, it is a reasonable assumption that they will enter the market in far fewer numbers and/or turn to the open source model and settle for lower revenue generating business models. As a result, the future role of the small software firm as the creator of the "gale of creative destruction" will diminish. Incumbent firms will be less incentivized to innovate and will lose a serious source of new product development in the ideas market. Niche markets will no longer be exploited. The consumer will have fewer choices in state-of-the-art technology and quality of existing products and services will be compromised.

The role of intellectual property is to foster innovation. In the software industry, intellectual property law is not meeting this goal. This problem is not inevitable and is not a natural progression of a maturing industry. It is an artificial problem created by poor decisions made by policymakers in the 1980s. It is also evident that the problems

are not being alleviated through a process of self-correction in the market or through incremental changes to the law.   It has been argued in this thesis that if software laws had been written to accommodate the unique features of software, many of these problems would not exist or would be minimized. *Sui generis* law would have created a more level playing field by taking strong monopoly powers away from large firms. A less complex, lower cost and more efficient system with a shorter term, automatic lead time, better searchability and mechanisms for compulsory access to interoperable information would have alleviated many of the issues faced by small firms today. Unfortunately, it is too late for such a system as neither the US nor the EU has the political will to institute such a monumental change. The disruption to the industry would not be tolerated by large firms, law makers and even consumers. Although the second-tier patent system suggested in Chapter 4 may be a meaningful compromise, it is also unlikely to receive acceptance with large software firms who are benefiting greatly from the present system. Unless and until small software firms find their own united voice and stand together to demand change, the patent system will continue to compromise the industry.

The final research question asks whether there is a role for competition policy in addressing the anti-competitiveness of the small software firm. While the role of competition law is to police dominant behavior, it is very narrow in its focus and most of the issues addressed herein will not be caught under such legislation.   The importance of small firms in dynamic industries such as software raises some interesting challenges to traditional elements of competition law and will require a policy shift and a new level of analysis in order to provide hope for the small software firm. The EU approach to dynamic competition seems far more favourable to inclusion

of the small software firm in competitive analysis. The US may be undergoing a significant change in how it views the competitive aspects of dynamic industries, but the impact remains to be seen. While competition law has the means to play oversight in circumstances when software laws are providing unfair and discriminatory advantages to large firms, it will not be a substitute for a properly designed intellectual property system.

This thesis, and the extensive body of research on which it relies, raises significant legal and economic issues. The future of the small software firm as a meaningful industry player is less than bright. The software industry will survive as the momentum created by large firms will sustain it. Although it may not be evident now or even ten years from now, the outlook of the software industry is not as promising as it should be and the industry is too important to consumers and the economy to ignore this prediction. Empirical research on the survival rates of small software firms; the extent of valuable inventions not being commercialized; the limitations to innovation without interoperability information; the optimal market structure for the software industry; and the prognosis for the industry without the backbone of small firms are but a few of the important issues that would assist policy makers in making some difficult decisions on legal reform. The literature relied on in this thesis is current to September, 2012.

BIBLIOGRAPHY

TABLE OF CASES

UNITED STATES
Supreme Court

Aspen Skiing Co v Aspen Highlands Skiing Corp 472 US 585 (1985)

Bilski v Kappos 130 S Ct 3218 (2010)

Brooke Group Ltd v Brown & Williamson Tobacco Corp 509 US 209 (2003)

Diamond v Diehr 450 US 175, 187 (1981)

Eastman Kodak Co v Image Technical Services Inc. 504 US 451 (1992)

Northern Telecom, Inc. v Datapoint Corp 908 F2d 931 (Fed Cir), cert. denied, 11 S Ct 296 (1990)

Verizon Communications Inc v Law Offices of Curtis v Trinko LLP 540 US 398 (2004)

Court of Appeals

Apple Computer Inc v Franklin Computer Corp 714 F 2d 1240 (3rd Circuit 1983)

Apple Computer Inc v Microsoft Corp 35 F 3d 1435 (9th Circuit 1994)

Bateman v Mnemonics Inc 79 F 3d 1532 1539-40 18 (11th Circuit 1996)

Bilski, In Re 545 F 3d 943, 88 USPQ 2d 1385 9, 30-31 (Fed Cir 2008)

Computer Associates International Inc v Altai Inc 982 F 2d 693 (2nd Circuit 1992)

Data General Corporation v Grumman System Support Corporation 36 F 3d 1147 (1st Circuit 1994)

Dossel, In Re 42 USP 2d 1881 (Fed Cir 1997)

Fonar Corp v General Electric Co 107 F3d 1543, 1549 (Fed Cir 1997)

Independent Service Organizations Antitrust Litigation CSU, In Re v Xerox Corp 203 F 3d 1322, 1327 (Fed Cir 2000)

Intergraph Corp v Intel Corp 195 F 3d 1346, 1353 (Fed Cir 1999)

Olympia Equipment Leasing v Western Union Telegraph 797 F2d 370, 375 (7th Cir 1986)

Robotic Vision Sys Inc v View Eng'g Inc 42 USP 2d 1619 (Fed Cir 1997)

Sega Enterprises Ltd v Accolade Inc 977 F 2d 255 (5th Circuit 1988)

Sega Enterprises Ltd v Accolade Inc 977 F 2d 1510 (9th Circuit 1992)

Sony Computer Entertainment Inc v Bleem! 214 F 3d 1002 (9th Circuit 2000)

Sony Computer Entertainment Inc v Connectix Corp 203 F 3d 596 (9th Circuit 2000)

State Street Bank & Trust Co v Signature Financial Group Inc 149 F 3d 1368, 1374 (Fed Cir 1998)

United States v Microsoft Corp 253 F 3d 34 (DC Circuit 2001)

United States v Aluminum Co of America 148 F2d 416, 430 (2d Cir 1945);

District Court

Apple Computer Inc v Microsoft Corp 799 F Supp 1006 (ND 1992)

Computer Associates International Inc v Altai Inc 775 F Supp 554 (EDNY 1991)

EUROPEAN UNION

Court of Justice

Case C-95/04 *British Airways PLC v Commission* [2007] ECR I-2331 [2007] 4 CMLR 22

Case 15/74 *Centrafarm BV et Adriaan de Peijper v Sterling Drug Inc* [1974] ECR 1147

Case 78/70 *Deutsche Grammophon Gesellschaft GmbH v MetroSB-Gromarkte GmbH & Co KG* [1971] ECR 478

Cases 56 & 58/64 *Establissments Consten SARL.v Comm'n [1966] ECR 299*

Case 85/76 *Hoffman La Roche v Commission* [1978] ECR 461 [1979] 3 CMLR 211 par 91

Case C-418/01 *IMS Health GmbH and Co OHG v NDC Health GmbH and Co KG* [2004] ECR I-5039

Cases 6 & 7/73 *Instituto Chemioterpico Italiano SpA v Commission* [1974] ECR 223, CMLR 309, CMR 8209

Case 322/*81 Nederlandsche Banden-Industrie Michelin NV v Commission* [1985] E.C.R. 3461 [1985] 1 CMLR 282

Case C-241 & C-242/91P *Radio Telefis Eireann and Independent Television Publications Ltd v Commission* [1995] ECRI-743

C-406/10 *SAS Institute Inc v Word Programming Ltd* 2 May 2012

C-333/94 P *Tetra Pak v Commission* (1996) ECR 1-5951, (1997) 4 CMLR 662

Case 27/76 *United Brands v Commission* [1978] ECR 207 [1978] 1 CMLR 429

General Court

Case T-201/04 *Microsoft Corp v Commission of European Communities* [2007] 5 CMLR 11

High Court of Justice of England and Whales

SAS Institute Inc v World Programming Ltd [2010] EWHC 1829 (Ch) (23 July 2010)

Commission

Case T-201/04 *Microsoft Corp v Comm'n* [2004] OJ C179/36

European Patent Office

Case No. G 3/08, Referral of the President of the European Patent Office under Article 112(1) of the EPC

EPO T 0208/84 3.5.1 15 July 1986 Vicom

Opinion of the Enlarged Board of Appeal dated 12 May 2010 G 3/08, OJ EPO, 1/2011 10

TABLE OF STATUTES AND RELATED INSTRUMENTS

UNITED STATES

Statutes

Copyright Act [1976] 17 U.S.C.

Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011)

Sherman Act [1890] 26 Stat 209, codified at 15 USC 1-7 (1994) (as amended)

US Constitution in 1787 (art. 1, S. 8, cl 8)

US Patent Act [1988] 35 USCS s 271 (d)

US Small Business Act (1953) Public Law 85-536

Guidelines

US Department of Justice and the Federal Trade Commission, Antitrust Guidelines for the Licensing of Intellectual Property (April 1995)

EUROPEAN UNION

Treaties/Statutes

Treaty of the Functioning of the European Union Consolidation Version of the Treaty on the Functioning of the European Union [2010] OJ C83/47

Directives

Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111

Commission Recommendations

Commission Recommendation 2003/361/EC of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises [2003] OJ L124

Commission Notices

Commission Notice on Agreements of Minor Importance Which Do Not Appreciably Restrict Competition Under Article 81(1) of the Treaty Establishing the European Community [2001] OJ C368/7

Guidance on the Commission's Enforcement Priorities in Applying Article 82 EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings [2009] OJ C45/7

Guidelines on the Application of Article 81 of the EC Treaty to Technology Transfer Agreements [2004] OJ C101/2

Guidelines on the Applicability of Article 101 of the Treaty on the Functionality of the European Union to Horizontal Co-operation Agreements [2011] OJ C11/01

Commission Proposals

Proposal for a Directive of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions (COM(2002) 92 – 2002/0047 (COD)) <http://ec.europa.eu/internal_market/indprop/comp/index_en.htm> accessed September 10, 2012

Other Instruments

Agreement of Trade-Related Aspects of Intellectual Property Rights ("TRIPS"), Dec. 15, 1993, para. 1, 33 I.L.M. 81, 87 (1994)

European Patent Convention (Convention on the Grant of European Patents (1973) 13 I.L.M. 268)

ARTICLES

'Everlasting Software' (2012) 125 Harvard Law Review 1454

E Abraham, 'Bilski v. Kappos: Sideline Analysis from the First Inning of Play' (2011) 26 Berkeley Technology Law Journal 15

Abramson B, 'Promoting Innovation in the Software Industry: A First Principles Approach to Intellectual Property Reform' (2002) 8 Boston University Journal of Science and Technology Law 75

Ackerman LJ, 'Prioritization: Addressing the Patent Application Backlog at the United States Patent and Trademark Office' (2011) 26 Berkeley Technology Law Journal 67

Ahlborn C and Evans DS, 'The Microsoft Judgement and its Implications for Competition Policy Towards Dominant Firms in Europe' (2008) 75(3) Antitrust Law Journal 1

Allison JR and Dunn A and Mann RJ, 'Software Patents, Incumbents and Entry' (2007) 85(7) Texas Law Review 1579
- - and Lemley MA, 'Empirical Evidence on the Validity of Litigated Patents' (1998) 26 AIPLA Quarterly Journal 185
- - and Mann RJ, 'The Disputed Quality of Software Patents' (2007) 85 Washington University Law Review 297
- - and others, 'Valuable Patents' (2004) 92 Georgetown Law Journal 435

Anand BN and Khanna T, 'The Structure of Licensing Contracts' (2000) 48(1) The Journal of Industrial Economics 103

Anderman S, "Does the Microsoft Case offer a New Paradigm for the 'Exceptional Circumstances' Test and Compulsory Copyright Licenses under EC Competition Law?' (2004) 1(2) The Competition Law Review 7

Anderson RD, 'The Interface Between Competition Policy and Intellectual Property in the Context of the International Trading System' [1998] Journal of International Economic Law 655

Arezzo E, 'Intellectual Property Rights at the Crossroads Between Monopolization and Abuse of Dominant Position: American and European Approaches Compared' (2006) 24 John Marshall Journal of Computer & Information Law 455

Arora A and Fosfuri A, 'Licensing the Market for Technology' (2003) 52 Journal of Economic Behaviour & Organization 277
- - and Fosfuiri A and Gambardella A, 'Markets for Technology and Their Implications for Corporate Strategy' (2001) 10(2) Industrial and Corporate Change

<http://ssrn.com/abstract=204848> accessed 9 December 2011
- - and Merger RP, 'Specialized Supply Firms, Property Rights and Firm Boundaries' (2004) 13(3) Industrial and Corporate Change 451

Atun RA and Harvey I and Wild J, 'Innovation, Patents and Economic Growth' (2007) 11(2) International Journal of Innovation Management 279

Baker JB, 'Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation' (2007) AEI-Brookings Joint Centre for Regulatory Studies Working Paper <http://ssrn.com/abstract=962261> accessed 3 March 2011
- - '"Dynamic Competition" Does not Excuse Monopolization' (2008) 4(2) Competition Policy International 243

Ball GG and Kesan JP, 'Transaction Costs and Trolls: Strategic Behaviour by Individual Inventors, Small Firms and Entrepreneurs in Patent Litigation' (2009) Illinois Public Law and Legal Theory Paper Series No. 08-21 < http://papers.ssrn.com/abstract=1337166> accessed 3 October 2010

Ballardini RM, 'Software Patents in Europe: the Technical Requirement Dilemma' (2008) 3(9) Journal of Intellectual Property Law & Practice 563
- - 'The Software Patent Thicket: A Matter of Disclosure' (2009) 6(2) Scripted 207 <www.law.ed.ac.uk/ahrc/script-ed/vol6-2/ballardini.asp> accessed 19 October 2011

Barnett JM, 'Private Protection of Patentable Goods' (2004) 25 Cardozo Law Review 1251

Barnett TO, 'Interoperability Between Antitrust and Intellectual Property' (2007) 14(4) George Mason Law Review 859
- - 'Maximizing Welfare Through Technological Innovation' (2008) 15(5) George Mason Law Review 1191

Bessen J 'A Generation of Software Patents' (June 2011) Boston University School of Law Working Paper No. 11-31 <www.bu.edu/law/faculty/scholarship/workingpapers/2011.html> accessed 25 August 2012
- - and Hunt R, 'The Software Patent Experiment' (2004) 3 Federal Reserve Bank of Philadelphia Business Review Journal 22
- - and Hunt R, 'An Empirical Look at Software Patents' (2007) 16(1) Journal of Economics & Management Strategy 157
- - and Maskin E, 'Sequential Innovation, Patents and Imitation' (2000) Department of

Economics MIT Working Paper < www.researchoninnovation.org/patent.pdf> accessed 15 June 2010

- - and Meurer MJ, 'The Patent Litigation Explosion' (2005) Boston University School of Law Working Paper No. 05-18 <http://ssrn.com/abstract=831685> accessed 4 October 2010

Blind K, 'Intellectual Property In Software Development: Trends, Strategies and Problems' (2007) 4(1) Review of Economic Research on Copyright Issues 15

Blomqvist K and Hurmelinna P and Seppanen R, 'Playing the Collaboration Game Right - Balancing Trust and Contracting' (2005) 25 Technovation 497

Breschi S and Malerba F and Orsenigo L, 'Technological Regimes and Schumperterian Patters of Innovation' (2000) 110 The Economic Journal 388

Breyer S, 'The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs' (1970) 84 Harvard Law Review 281

Buddelmeyer H and others, 'Innovation and the Determinants of Company Survival' (2010) 62 Oxford Economic Papers 261

Burk DL and Lemley MA, 'Is Patent Law Technology-Specific?' (2002) 17 Berkeley Technology Law Journal 1155
- - 'Policy Levers in Patent Law' (2003) 89(7) Virginia Law Review 1575

Campbell-Kelly M, 'Not All Bad: An Historical Perspective on Software Patents' (2005) 11 Michigan Telecommunications and Technology Law Review 191
- - and Valduriez P, 'A Technical Critique of Fifty Software Patents' (2005) <http://ssrn.com/abstract=650921> accessed 19 June 2010

Carroll MW, 'One for All: The Problem of Uniformity Cost in Intellectual Property Law' (2006) 55 American University Law Review 845

Cass RA and Hylton KN, 'Preserving Competition: Economics Analysis, Legal Standards and Microsoft' (1999) 8 George Mason Law Review 1

Chapman MT, 'Copyright Law – Putting Too Much Teeth into Software Copyright Infringement Claims: Whelan Associates v. Jaslow Dental Laboratory' (1987) 12 The Journal of Corporation Law 785

Charlesworth A, 'Copyright in Computer Programs: Back to Basics? (1995) 145 National Law Journal 596

Cheffins B, 'Using Theory to Study Law: A Company Law Perspective' (1999) 58(1) The Cambridge Law Journal 197

Chien CV, 'Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents' (2009) Santa Clara University School of Law 123, Legal Studies Research Papers Series Working Paper No. 09-13 <http://ssrn.com/abstract=1396319> accessed 4 October 2010

Clark ML III and Saade RN, 'The Role of Small Business in Economic Development of the United States: From the End of the Korean War (1953) to the Present' (2010) 2 Office of Advocacy US Small Business Administration <www.sba.gov/advocacy/7540/12143> accessed 3 May 2010

Cockburn IM and MacGarvie MJ, 'Entry, Exit and Patenting in the Software Industry' (2006) National Bureau of Economic Research Working Paper No. 12563 <http://www.nber.org/papers/w12563> accessed 8 July 2010
- - 'Patents, Thickets and the Financing of Early-Stage Firms: Evidence from the Software Industry' (Fall 2009) 18(3) Journal of Economics & Management Strategy 729
 - - and Wagner S, 'Patents and the Survival of Internet-Related IPOS' (2007) National Bureau of Economic Research Working Paper Series No. 13146 <http://www.nber.org/papers/w13146> accessed 4 October 2010

Coco R, 'Antitrust Liability for Refusal to License Intellectual Property: A Comparative Analysis and the International Setting' (2008) 12 Marquette Intellectual Property Law Review 1

Cohen JE and Lemley MA, 'Patent Scope and Innovation in the Software Industry' (2001) 89(1) California Law Review 1

Crick D and Jones MV, 'Small High-Technology Firms and International High-Technology Markets' (2000) 8(2) Journal of International Marketing 63

Cummings PA, 'From Germany to Australia: Opportunity for a Second Tier Patent System in the United States' (2010) 19 Michigan State Journal of International Law 297

Curley D, 'Interoperability and Other Issues in the IP-Antitrust Interface: The EU Microsoft Case' (2008) 11(4) Journal of World Intellectual Property 296

Czapracka K, 'Where Antitrust Ends and IP Begins – On the Roots of the TransAtlantic Clashes' (2007) 9(2) Yale Journal of Law and Technology 44

Dam KW, 'Some Economic Considerations in the Intellectual Property Protection of Software' (1995) 24 Journal of Legal Studies 321

Davis L, 'How Do Small, High-Tech Firms Manage the Patenting Process?' (2006) DRUID Summer Conference on Knowledge, Innovation and Competitiveness Working Paper No. 164 <www2.druid.dk/conferences/viewabstract.php?id=164&cf=8 > accessed 2 February 2011

Deschamps C, 'Patenting Computer-Related Inventions in the US and in Europe: the Need for Domestic and International Legal Harmony' [2011] European Intellectual Property Review 103

Devlin A, 'Systemic Bias in Patent Law' (2011) 61 DePaul Law Review 57
- - 'Improving Patent Notice and Remedies: A Critique of the FTC's 2011 Report' (2012) 18 Michigan Telecommunications and Technology Law Review 539

Dolmans M and O'Donoghue R and Loewenthal PJ, 'Article 82 EC and Intellectual Property: The State of the Law Pending the Judgement in Microsoft v. Commission' (2007) 3(1) Competition Policy International 107

Durell KL, 'Intellectual Property Protection for Computer Software: How Much and What Form is Effective' (2000) 8(3) International Journal of Law and Information Technology 231

Dutra T, 'Should Small Companies Seek Non-US Patent Protection?' (2006) 25 Magazine of Intellectual Property and Technology 1

Ehrlich MA, 'Fair Use or Foul Play? The EC Directive on the Legal Protection of Computer Programs and Its Impact on Reverse Engineering' (1994) 13(3) Pace Law Review 1003

Elengold S, 'An Inquiry Into Computer System Patents: Breaking Down the "Software Engineer"' (2005) 61 New York University Annual Survey of American Law 349

Etro F, 'Market Leaders, Antitrust Policy and the Software Market' (2007) 5 Journal of Industrial Economics < www.cresse.info/uploadfiles/MicrosoftCase.pdf> accessed 10 June 2010

Evans DS, 'Why Different Jurisdictions Do Not (and Should Not) Adopt the Same Antitrust Rules' (2009) 10 Chicago Journal of International Law 161
 - - and Hylton KN, 'The Lawful Acquisition and Exercise of Monopoly Power and its Implications for the Objectives of Antitrust' (2008) 4 Competition Policy International 203
- - and Layne-Farrar A, 'Software Patents and Open Source: The Battle Over Intellectual Property Rights' (2004) 9(10) Virginia Journal of Law and Technology 1
- - and Schmalensee R, 'Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries' (2001) NBER Working Paper No. 8268 <www.nber.org/papers/w8268> accessed 5 May 2012

Farrell J and others, 'Standard Setting, Patents, and Hold-Up' (2007) 74(3) Antitrust Law Journal 603

Forge S, 'The Rain Forest and the Rock Garden: The Economic Impacts of Open Source Software' (2006) 8(3) The Journal of Policy, Regulation and Strategy for Telecommunications, Information, and Media 12

Forrester IS, 'Regulating Intellectual Property Via Competition? Or Regulating Competition Via Intellectual Property? Competition and Intellectual Property: Ten Years On, The Debate Still Flourishes' [2005] European University Institute <www.eui.eu/RSC AS/.../Competition/2005/200510-CompForrester.pdf> accessed 27 February 2011

Francis J and Collins-Dodd C, 'The Impact of Firms' Export Orientation on the Export Performance of High-Tech Small and Medium-Sized Enterprises' (2000) 8(3) Journal of International Marketing 84

Freel M, 'The Characteristics of Innovation-Intensive Small Firms: Evidence from "Northern Britain"' (2005) 9(4) International Journal of Innovation Management 401

Fuentes JR, 'Patent Insurance: Towards a More Affordable, Mandatory Scheme?' (2009) 10 Columbia Science and Technology Law Review 267

Galbi E, 'Proposal for the Protection of Computer Programs' (1970) 17 Bulletin of the Copyright Society 280

Gans J and Stern S, 'Incumbency and R&D Incentives: Licensing the Gale of Creative Destruction' (2000) 9(4) Journal of Economics & Management Strategy 485
- - 'The Product Market and the Market for Ideas: Commercialization Strategies for Technology Entrepreneurs' (2003) 32 Research Policy 333
 - - and Hsu DH, 'When Does Start-Up Innovation Spur the Gale of Creative Destruction?' (2002) 33(4) The Rand Journal of Economics 571

Garfinkel SL and Stallman RM and Kapor M, 'Why Patents are Bad for Software' [1991] Issues in Science and Technology

Giarratana MS, 'Entry, Survival and Growth in a New Market. The Case of the Encryption Software Industry' (March 2002) LEM Working Paper Series No. 2002/01 <http://ideas.repec.org/p/ssa/lemwps/2002-01.html> accessed 6 July 2008
- -'The Birth of a New Industry: Entry by Start-ups and the Drivers of Firm Growth - The Case of Encryption Software' (2004) 33(5) Research Policy 787

Gifford DJ and Kudrle RT, 'Antitrust Approaches to Dynamic Competitive Industries in the United Sates and the European Union' [2011] Competition Law & Economics 695

Gilbert R, 'Looking for Mr. Schumpeter: Where Are We in the Competition-Innovation Debate?' (2006) 6 Innovation Policy and the Economy <www.nber.org/chapters/c0208> accessed 4 May 2012

Ginsberg JC, 'Four Reasons and a Paradox: The Manifest Superiority of Copyright Over Sui Generis Protection of Computer Software' (1994) 94 Columbia Law Review 2559

Giuri P and others, 'Open Source Software: From Open Science to New Marketing Models: An Enquiry into the Economics and Management of Open Source Software' (2002) LEM Working Paper Series No. 2002/23 <www.lem.sssup.it/WPLem/files/2002-23.pdf> accessed 10 January 2012

Goldstein P, 'Comments on "A Manifesto Concerning the Legal Protection of Computer Programs"' (1994) 94(8) Columbia Law Review 2573

Graham S and Mowery DC, 'Software Patents: Good News or Bad News?' (2004) TI:GER Faculty Working Papers < www.tiger.gatech.edu/files/gt_tiger_software.pdf> accessed 9 March 2010

Graham SJH and Sichelman T, 'Why Do Start-Ups Patent?' (2008) 23(3) Berkeley Technology Law Journal 1063
 - - and others, 'High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey' (2009) 24(4) Berkeley Technology Law Journal 1255

Guntersdorfer M, 'The Death of *State Street*' (2008-2009) 9 Wake Forest Intellectual Property Law Journal 1

Griem JM, 'Against a *Sui Generis* System of Intellectual Property for Computer Software' (1993) 22 Hofstra Law Review 145

Grosche A, 'Software Patents – Boon or Bane for Europe?' (2006) 14 International Journal of Law & Information Technology 257

Hall BH and MacGarvie M, 'The Private Value of Software Patents' (2006) NBER Working Paper No. 12195 < www.nber.org/papers/w12195> accessed 3 May 2010

Haunss S, 'The Politicisation of Intellectual Property: IP Conflict and Social Change' [2011] WIPO Journal 129

Hewitt-Dundas N, 'Resource and Capacity Constraints to Innovation in Small and Large Plants' (2006) 26(3) Small Business Economics 257

Hicks D and Hedge D, 'Highly Innovative Small firms in the Markets for Technology' (2005) 34 Research Policy 703

Hindley B, 'An Economic Analysis of DG Competition's Discussion Paper on the Application of Article 82' (2006) The Stockholm Network Experts' Series on Intellectual Property and Competition 7 <www.stockholm-network.org/Publications/1> accessed 19 July 2012

Hovenkamp H, 'Antitrust's Protected Classes' (1989) 88(1) Michigan Law Review 1

Hovenkamp J, 'Schumpeterian Competition and Antitrust' (1 October 2008) University of Iowa Legal Studies Research Paper No. 08-43 < http://ssrn.com/abstract=1275986> accessed 4 May 2012

Hsu DH, 'Venture Capitalists and Cooperative Start-Up Commercialization Strategy' (2006) 52(2) Management Science 204

Janis MD, 'Second Tier Patent Protection' (1999) 40 Harvard International Law Journal 151

Joseph ET, 'Apocalypse Soon: How the Implementation of Web Services Changes the Game for Extraterritoriality' (Fall 2010) 36 Iowa Journal of Corporation Law 239

Julien P, 'Small Business as a Research Subject: Some Reflections on Knowledge of Small Businesses and Its Effects on Economic Theory' (1993) 5 Small Business Economics 157

Karjala, DS 'Copyright Protection of Operating Software, Copyright Misuse, and Antitrust' (1999) 9 Cornell Journal of Law and Public Policy 161

Kazi I, 'Will We Ever See a Single Patent System Covering the EU, Let Alone Spanning the Atlantic or Pacific?' [2011] European Intellectual Property Review 538

King PE and Roberts RM and Moshirnia AV, 'The Confluence of European Activism and American Minimalism: "Patentable Subject Matter" After Bilski' (2010-2011) 27 Santa Clara Computer & High Technology Law Journal 247

Kingston W, 'A Case for Compulsory Arbitration: Empirical Evidence' [2000] European Intellectual Property Review 154

 - - 'Enforcing Small Firms' Patent Rights' (2000) Study Contract No. EIMS 98/173 <ftp://ftp.cordis.europa.eu/pub/innovation-olicy/studies/studies_enforcing_firms_patent_rights.pdf > accessed 10 December 2009
 - - 'Improving Patents for Smaller Firms: Insurance, Incontestability, Arbitration' [2007] Intellectual Property Quarterly 1

Kirkwood J and Lande RH, 'The Fundamental Goal of Antitrust: Protecting Consumers, Not Increasing Efficiency' (2008) 84(1) Notre Dame Law Review 191

Kitagawa Z, 'Comments on "A Manifesto Concerning the Legal Protection of Computer Programs"' (1994) 94(8) Columbia Law Review 2610

Knight G, 'Entrepreneurship and Marketing Strategy: The SME Under Globalization' (2000) 8(2) Journal of International Marketing 12

Korah V, 'The Interface Between Intellectual Property and Antitrust: The European Experience' (2001) 69 Antitrust Law Journal 801

Lang JT, 'European Competition Law and Intellectual Property Rights - a New Analysis' (2010) 11 ERA Forum 411

Lanjouw JO and Lerner J, 'Tilting the Table? The Use of Preliminary Injunctions' (2001) 44(2) Journal of Law and Economics 573
- - and Schankerman M, 'Protecting Intellectual Property Rights: Are Small Firms Handicapped?' (2004) 47(1) Journal of Law & Economics 45

LaRouche P, 'The European *Microsoft* Case at the CrossRoads of Competition Policy and Innovation' (2008) 75 Antitrust Law Journal 601

Lea G and Hall P, 'Standards and Intellectual Property Rights: an Economic and Legal Perspective' (2004) 16 Information Economics and Policy 67

Leger PM and Quach L, 'Post-merger Performance in the Software Industry: The Impact of Characteristics of the Software Product Portfolio' (2009) 29 Technovation 704

Leifeld P and Haunss S, 'Political Discourse Networks and the Conflict Over Software Patents in Europe' (2012) 51 European Journal of Political Research 1041

Lemley M, 'Antitrust and the Internet Standardization Problem' (1996) 28 Connecticut Law Review 1041

 - - 'A New Balance Between IP and Antitrust' (2007) Stanford Law School Working Paper No. 340 < http://ssrn.com/abstract=980045 > accessed 4 October 2011

- - 'Ten Things to Do About Patent Holdup of Standards (and One *Not* to)' (2007) 48 Boston College Law Review 149

- - 'Ignoring Patents' [2008] Michigan State Law Review 19

- - 'Industry-specific Antitrust Policy for Innovation' [2011] Columbia Business Law Review 637

Lerner J and Tirole J, 'The Simple Economics of Open Source' (2000) National Bureau of Economic Research Working Paper No. 7600 < www.nber.org/papers/w7600> accessed 12 January 2012

- - and Zhu F, 'What is the Impact of the Software Patent Shifts?: Evidence from *Lotus v. Borland*' (2007) 25(3) International Journal of Industrial Organization 511

Lindholm S, 'Marking the Software Patent Beast' (2005) 10(2) Stanford Journal of Law, Business & Finance 82

Long C, 'Patent Signals' (2002) 69(2) University of Chicago Law Review 625

Lu JW and Beamish PW, 'The Internationalization and Performance of SMEs' (2001) 22 Strategic Management Journal 565

Lui XJ, 'Lorain, Aspen, and the Future of Section 2 Enforcement' (2010) 16 Michigan Telecommunications and Technology Law Review 419

Luo T and Mann A, 'Survival and Growth of Silicon Valley High-Tech Businesses Born in 2000' [September 2011] Monthly Labor Review 16

Macdonald S, 'Bearing the Burden: Small Firms and the Patent System' (2003) 1(17) Journal of Information Law and Technology 1 <http://www2warwick.ac.uk/fac/soc/law/elj /jilt/2003_1/macdonald/> accessed 30 April 2009

- - 'When Means Become Ends: Considering the Impact of Patent Strategy on Innovation' (2004) 16 Information Economics and Policy 135

Maher I, "Re-imagining the Story of European Competition Law' (2000) 20(1) Oxford Journal of Legal Studies 155

Mann RJ, 'Do Patents Facilitate Financing in the Software Industry?' (2005) 83(4) Texas Law Review 961

- - 'Commercializing Open Source Software: Do Property Rights Still Matter?

(2006) 20(1) Harvard Journal of Law & Technology 1

- - and Sager TW, 'Patents, Venture Capital, and Software Start-Ups' (2007) 36 Research Policy 193

Manne GA and Wright JD, 'Innovation and the Limits of Antitrust' (2010) 6(1) Journal of Competition Law & Economics 153

Matal J, 'A Guide to the Legislative History of the America Invents Act: Part I of II' (2011-2012) 21 The Federal Circuit Bar Journal 435

Maurer SM and Scotchmer S, 'Open Source Software: The New Intellectual Property Paradigm' (2006) National Bureau of Economic Research Working Paper Series Working Paper No. 12148 <http://www.nber.org/w12148> accessed 2 January 2012

McMahon K, 'Interoperability: "Indispensability" and "Special Responsibility" in High Technology Markets' (2007) 9 Tulane Journal of Technology & Intellectual Property 123

McNulty PJ, 'Economic Theory and the Meaning of Competition' (1968) 82(4) The Quarterly Journal of Economics 639

Menell PS, 'The Challenges of Reforming Intellectual Property Protection for Computer Software' (1994) 94 Columbia Law Review 2644

- - 'Intellectual Property: General Theories' (2003) Levine's Working Paper Series No. 618897000000000707 <http://www.dklevine.com/archive/ittheory.pdf> accessed 29 January 2011

- - 'Forty years of Wondering in the Wilderness and No Closer to the Promised Land: Bilski's Superficial Textualism and the Missed Opportunity to Reform Patent Law to Its Technology Mooring' (June 2011) 63 Stanford Law Review 1289

Merges RP, 'A New Dynamism in the Public Domain' (2004) 71 The University of Chicago Law Review 1

- - 'Patents, Entry and Growth in the Software Industry' [2006] University of California Berkeley School of Law Working Paper <http://ssrn.com/abstract=926204> accessed 3 October 2009

- - 'Software and Patent Scope: A Report from the Middle Innings' (2007) 85 Texas Law Review 1627

Meurer MJ, 'Inventors, Entrepreneurs, and Intellectual Property Law' (2008-2009) 45 Houston Law Review 1201

Noel M and Schankerman M, 'Strategic Patenting and Software Innovation' (2006) Centre for Economic Policy Research Discussion Paper No. 57012006 <http://sticerd.lse.ac.uk/dps/ei/ei43.pdf> accessed 3 June 2009

Nummela N and Saarenketo S and Puumalainen K, 'A Global Mindset - A Prerequisite for Successful Internationalization?' (2004) 21(1) Canadian Journal of Administrative Sciences 51

Nurton J and McDermott E and Ollier P, 'IP Under Threat from Competition Clampdown' (2009) 188 Managing Intellectual Property 34

Orbach B, 'The Antitrust Consumer Welfare Paradox' (2010) 7(1) Journal of Competition Law and Economics 133

Page WH and Childers SJ, 'Software Development as an Antitrust Remedy: Lessons from the Enforcement of the Microsoft Communications Protocol Licensing Requirement' (2007) 14 Michigan Telecommunications & Technology Law Review 11

Paley MA, 'A Model Software Petite Patent Act' (1996) 12 Santa Clara Computer & High Technology Law Journal 301

Park J, 'Evolution of Industry Knowledge in the Public Domain: Prior Art Searching for Software Patents' (March 2005) 2(1) Scripted 47
- - 'Has Patentable Subject Matter Been Expanded? A Comparative Study on Software Patent Practices in the European Patent Office, the United States Patent and Trademark Office and the Japanese Patent Office' (November 2005) 13 IJL & IT 336

Parret L, 'Shouldn't We Know What We Are Protecting? Yes We Should! A Plea for a Solid and Comprehensive Debate About the Objectives of EU Competition Law and Policy' (2010) 6(2) European Competition Journal 339

Pehlivan CS, 'The Creation of a Single European Patent System: From Dream to (Almost) Reality' [2012] European Intellectual Property Review 453

Pera A, 'Changing Views of Competition, Economic Analysis and EC Antitrust Law' [2008] European Competition Journal 127

Pila J, 'Software Patents, Separation of Powers, and Failed Syllogisms: A Cornucopia from the Enlarged Board of Appeals of the European Patent Office' (2011) 70 The Cambridge Law Journal 203

Pinkerton MJ, 'Considering the Next Generation of Innovators: Incorporating the Needs of Start-Ups Into the United States Patent and Trademark Office's Intellectual Property Strategy' (2011) 23 Pacific McGeorge Global Business & Development Law Journal 313

Polka RP and Parchomovsky G, 'Patent Portfolios' (2005) 154(1) University of Pennsylvania Law Review 1

Posner RA, 'The Present Situation in Legal Scholarship' (1981) 90(5) The Yale Law Journal 1113
- - 'Legal Scholarship Today' (2002) 115(5) Harvard Law Review 1314

Raskind LJ, 'The Uncertain Case for Special Legislation Protecting Computer Software' (1986) 47 University of Pittsburgh Law Review 1131

Reese B, 'Judicially Re(de)fining Software Patent Eligibility II: A Survey of Post-Bilski Jurisprudence' (2010/2011) 27 Santa Clara Computer & High Technology Law Journal 673

Reichman JH, 'The Know-How Gap in the TRIPS Agreement: Why Software Fared Badly, and What Are the Solutions' (1995) 17 Hastings Communications and Entertainment Law Journal 763

Regibeau P and Rockett K, 'The Relationship Between Intellectual Property Law and Competition Law: An Economic Approach' [2004] University of Essex Discussion Paper Series < http://www.essex.ac.uk/economics/discussion-papers/papers.../dp581.pdf> accessed 7 March 2011

Riley CA, 'Review: Gower, Still a Blueprint for Curriculum Reform in Company Law?' (1993) 13(2) Oxford Journal of Legal Studies 271

Robertson PL and Verona G, 'Post-Chandlerian Firms: Technological Change and Firm Boundaries' (2006) 46(1) Australian Economic History Review 70

Rowe KD, 'Why Pay for What's Free?: Minimizing the Patent Threat to Free and Open Source Software' (2008) 7 John Marshall Law School Review of Intellectual Property Law 595

Rubin E, 'Law and Society and Law and Economics: Common Ground, Irreconcilable Differences, New Directions: Law and the Methodology of Law' [1997] University of Wisconsin Law Review 251

Samuelson P, 'Creating a New Kind of Intellectual Property: Applying the Lessons of the Chip Law to Computer Programs' [1985-1986] 70 Minnesota Law Review 471

- - 'Benson Revisited: The Case Against Patent Protection for Algorithms and other Computer-Related Inventions' (1990) 39 Emory Law Journal 1025

- - 'Comparing U.S. and EC Copyright Protection for Computer Programs: Are They More Different Than They Seem?' (1994) 13 Journal of Law and Commerce 279

- - 'The Strange Odyssey of Software Interfaces and Intellectual Property Law' (2008) UC Berkeley Public Law Research Paper No. 1323818
<http://ssrn.com/abstract=1323818> accessed 10 January 2011

- - 'Are Patents on Interfaces Impeding Interoperability?' (2009) 93 Minnesota Law Review 1943

- - 'The Uneasy Case for Software Copyrights Revisited' (2011) 79(6) The George Washington Law Review 1746

- - and others, 'A Manifesto Concerning the Legal Protection of Computer Programs' (1994) 94 Columbia Law Review 2308

- - and Scotchmer S, 'The Law and Economics of Reverse Engineering (2002) 111 Yale Law Journal 1575

Scherer FM, 'Abuse of Dominance by High Technology Enterprises: A Comparison of US and EC Approaches' (2011) 38(1) Journal of Industrial and Business Economics 39

Schmalensee R, 'Antitrust Issues in Schumpeterian Industries' Papers and Proceedings of the One Hundred Twelfth Annual Meeting of the American Economic Association (2000) 90(2) The American Economic Review 192

Shapiro C, 'Patent System Reform: Economic Analysis and Critique' (2004) 19 Berkeley Technology Law Journal 1017

E Shinneman, 'Owning Global Knowledge: The Rise of Open Innovation and the Future of Patent Law' (2010) 35 Brooklyn Journal of International Law 935

Sichelman T and Graham SJH, 'Patenting by Entrepreneurs: An Empirical Study' (2010) 17 Michigan Telecommunications and Technology Law Review 111

Sidak JG, 'An Antitrust Rule for Software Integration' (2001) 18(1) Yale Journal on Regulation 1
 - - and Teece DJ, 'Dynamic Competition in Antitrust Law' (2009) 5 Journal of Competition Law and Economics 581

Smith BL and Mann SO, 'Innovation and Intellectual Property Protection in the Software Industry: An Emerging Role for Patents' (2004) 71 University of Chicago Law Review 241

Spulber DF, 'Competition Policy and the Incentive to Innovate: The Dynamic Effects of Microsoft v. Commission' (2008) 25 Yale Journal on Regulation 247

Stern RH, 'The Bundle of Rights Suited to New Technology' (1986) 47 University of Pittsburgh Law Review 1229

Teece DJ, 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy' (1986) 16 Research Policy 285

Thomas JR, 'Everything Old is New Again: Statutory Subject Matter in Context: Lessons in Patent Governance from Bilski v. Kappos' (Spring 2011) 15 Lewis & Clark Law Review 133

Thomas RS, 'The Increasing Role of Empirical Research in Corporate Law Scholarship' (2004) 92 The Georgetown Law Journal 981

Thomas RE, 'Vanquishing Copyright Pirates and Patent Trolls: The Divergent Evolution of Copyright and Patent Laws' (2006) 43(4) American Business Law Journal 689
- -'Debugging Software Patents: Increasing Innovation and Reducing Uncertainty in the Judicial Design of Optimal Software Patent Law' (2008-2009) 25 Santa Clara Computer & High Technology Law Journal 191

Treacy P and Lawrance S, 'FRANDLY Fire: Are Industry Standards Doing More Harm Than Good?' (2008) 3(1) Journal of Intellectual Property & Practice 22

Van Pottelsberghe B, 'Lost Property: The European Patent System and Why It Doesn't Work' (2009) 9 Bruegal Blueprint Series
<http://ideas.repec.org/b/bre/bluprt/312.html> accessed 7 May 2012

Vetter GR, 'Patent Law's Unpredictability Doctrine and the Software Arts' (2011) 76 Missouri Law Review 763

Watts JJS and Baigent D, 'Intellectual Property, Standards and Competition Law: Navigating a Minefield' (2002) 2 International Engineering Management Conference, IEEE International 837
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1038547&isnumber=22258 > accessed 6 March 2011

Webbink MH, 'A New Paradigm for Intellectual Property Rights in Software' [2005] Duke Law and Technology Review 12

Wilson D, Pearce D and Sharp C, 'Patentability of Computer-Implemented Inventions' [2010] European Intellectual Property Review N83

Welsh JA and White JF, 'A Small Business is Not a Little Big Business' (1981) Harvard Business Review 1

Zittrain J, 'The Un-Microsoft Un-Remedy: Law Can Prevent the Problem That It Can't Patch Later' (1999) 31 Connecticut Law Review 1361

BOOKS

Agerfalk PJ and others, 'Assessing the Role of Open Source Software in the European Secondary Software Sector: A Voice from Industry' in Scotto M and Succi G (eds), *Proceedings of the First International Conference on Open Source Systems* (OSS2005)

Anderman S and Schmidt H, *EU Competition Law and Intellectual Property Rights: The Regulation of Innovation* (2nd edn, Oxford University Press 2011)

Anderman SD, *The Interface Between Intellectual Property Rights and Competition Policy* (Cambridge University Press 2007)

Areeda P, 'Antitrust Law as Industrial Policy: Should Judges and Juries Make It?' in Jorde TM and Teece DJ (eds), *Antitrust, Innovation and Competitiveness* (Oxford University Press 1992)

Arezzo E, 'Is There a Role for Market Definition and Dominance in an *Effect*-based Approach?' in Mackenrodt MO and Conde Gallego B and Enchelmaier S (eds) *Abuse of Dominant Position: New Interpretation, New Enforcement Mechanisms? MPI Studies on Intellectual Property, Competition and Tax Law* (Springer 2008)

Arndt JM and others, 'The Emergence of Partnership Networks in the Enterprise Application Software Industry - An SME Perspective' in Heinzl A and others (eds), *Primium – Process Innovation for Enterprise Software* (Primium 2009) <http://subs.emis.de/LNI/Proceedings/Proceedings151/gi-proc-151-011.pdf> accessed 15 January 2011

Arrow KJ, 'Economic Welfare and the Allocation of Resources for Invention' in Universities-National Bureau (Ed) *The Rate and Direction of Inventive Activity: Economic and Social Factors* (National Bureau of Economic Research 1962) <www.nber.org/chapters/c2144> accessed 10 November 2010

Bainbridge DI, *Intellectual Property* (6th edn, Pearson Education Limited 2007)

Bessen J and Meurer MJ, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators At Risk* (Princeton University Press 2008)

Bork RH, *The Antitrust Paradox: A Policy at War with Itself* (The Free Press 1978)

Campbell-Kelly M, *From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry* (MIT Press 2004)

Carree MA and Thurik AR, 'The Impact of Entrepreneurship on Economic Growth' in Acs ZJ and Audretsch DB (eds) *Handbook of Entrepreneurship Research* (Kluwer Academic Publishers 2003)

Church J and Ware R, 'Network Industries, Intellectual Property Rights and Competition Policy' in Anderson RD and Gallini NT (eds), *Competition Policy and Intellectual Property Rights in the Knowledge-Based Economy* (University of Calgary Press 1998)

Cornish W and Llewelyn D and Aplin T, *Intellectual Property: Patents, Copyrights, Trade Marks and Allied Rights* (7th edn, Sweet & Maxwell 2010)

Cusumano MA, *The Business of Software: What Every Manager, Programmer, and Entrepreneur Must Know to Thrive and Survive in Good Times and Bad* (Free Press 2004)

Drexl J, *Research Handbook on Intellectual Property and Competition Law* (Edward Elgar Publishing Limited 2008)

Evans DS and Hagiu A and Schmalensee R, *Invisible Engines: How Software Platforms Drive Innovations and Transform Industries* (The MIT Press 2006)

Ghidini G and Arezzo E, 'One, None, or a Hundred Thousand: How Many Layers of Protection for Software Innovations?' in Drexl J, *Research Handbook On Intellectual Property And Competition Law* (Edward Elgar Publishing Limited 2008)

Glader M, *Innovation Markets and Competitive Analysis: EU Competition Law and US Antitrust Law* (Edward Elgar Publishing Limited 2006)

Graham S and Mowery DC, 'Intellectual Property Protection in the U.S. Software Industry" in Cohen WM and Merrill SA (eds), *Patents in the Knowledge-Based Economy* (National Academies Press 2003)

Harison E, *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* (Edward Elgar Publishing 2008)

Ireland D, 'Competition Policy, Intellectual Property and the Consumer' in Anderson RD and Gallini NT (eds), *Competition Policy and Intellectual Property Rights in the Knowledge-based Economy* (University of Calgary Press 1998)

Jorde TM and Teece DJ, 'Innovation, Cooperation, and Antitrust' in Jorde TM and Teece DJ (eds), *Antitrust, Innovation, and Competitiveness* (Oxford University Press 1992)

Lerner J and Schankerman M, *The Comingled Code: Open Source and Economic Development* (MIT Press 2010)

Lianos J, 'Competition Law and intellectual Property Rights: Is the Property Rights' Approach Right?' in Bell J and Kilpatrick C (eds), *Cambridge Yearbook of European Legal Studies* (Volume 8, Hart Publishing 2005-2006)

Motta M, *Competition Policy, Theory and* Practice (Cambridge University Press 2004)

Olivieri G and Marchegiani L, 'Open Source Software and Technological Innovation: Competitive Issues' in Cellini R and Cozzi G (eds), *Intellectual Property, Competition and Growth* (Palgrave MacMillan 2007)

Posner RA, *Antitrust Law* (2nd edn, The University of Chicago Press 2001)

Scherer FM and Ross D, *Industrial Market Structure and Economic Performance* (3rd edn, Houghton Mifflin Company 1990)

H Schmidt, 'Market Power – the Root of All Evil? A Comparative Analysis of the Concepts of Market Power, Dominance and Monopolisation' in Ariel Ezrachi (ed) *International Research Handbook on Competition Law* (Edward Elgar 2012)

Schumpeter J, *Capitalism, Socialism, and Democracy* (3rd edn, Harper & Row 1950)

Sell SK, *Private Power, Public Law: The Globalization of Intellectual Property Rights* (Cambridge University Press 2003)

Shapiro C, 'Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting' in Jaffe AB and Lerner J and Stern S (eds), *Innovation Policy and the Economy* (MIT Press 2001)

Whish R, *Competition Law (*6th edn, Oxford University Press 2009)

OTHER MATERIALS

Akkad OEI and Marlow I, 'The New Standard for Justice in Patent Law is i4i' *The Globe and* Mail (Toronto, 9 June 2011)

American Bar Association Antitrust source, 'Interview with Sharis A. Pozen' (April 2012) < www.americanbar.org/.../apr12_full_source_4_26f.authcheckdam.pdf> accessed 4 May 2012

Bakels R, 'The Patentability of Computer Programs: Discussion of European-level Legislation in the Field of Patents for Software: A Study Commissioned at the Request of the Committee on Legal Affairs and the Internal Market of the European Parliament' (2002) Legal Affairs Series Working Paper <www.europarl.europa.eu/meetdocs/.../juri/.../SoftwarePatent.pub.pdf> accessed 20 September 2010

Business Software Alliance, 'Software Industry Facts and Figure' <www.bsa.org/country/Public%20Policy/~/.../sw_factsfigures.ashx> accessed 23 October 2010

Cheffins BR, 'The Trajectory of (Corporate Law) Scholarship' (2003) University of Cambridge and European Corporate Governance Institute 49 <http://ssrn.com/abstract=429624> accessed 4 January 2011

CHI Research Inc, 'Small Serial Innovators: The Small Firm Contribution to Technical Change' (2003) SBAHQ-01-C-0149 Small Business Office of Advocacy <http://www.sba.gov/advo/research/rs225tot.pdf > accessed 3 February 2008
- - 'Small Firms and Technology: Acquisitions, Inventor Movement, and Technology Transfer' (2004) SBAHQ-02-M-0491 Small Business Office of Advocacy <www.sba.gov/advo/research/rs233tot.pdf > accessed 3 February 2008

CJA Consultants, 'Study for the European Commission on Patent Litigation Insurance' (October 2002) <https://ec.europa.eu/internal_market/.../docs/patent/studies/litigation_en.pdf> accessed 20 November 2011

Computing Technology Industry Association, *Promoting the European Software Industry* (White Paper, October 2008) <www.smeunion.eu/viewdoc.php?LAN=en&FILE=doctextext&ID=790> accessed 23 October 2010

EIM Business & Policy Research, 'European SMEs under Pressure: Annual Report on EU Small and Medium-Sized Enterprises 2009' (2010) Prepared for the Directorate-General for Enterprise and Industry <http://ec.europa.eu/enterprise/.../pdf/dgentr_annual_report2010_100511.pdf> accessed 29 April 2011

European Commission, 'DG Competition Discussion Paper on the Application of Article 82 of the Treaty to Exclusionary Abuses' (2005) <www.ec.europa.eu/competition/antitrust/art82/discpaper2005.pdf> accessed 5 June 2012

- - 'European SMEs Under Pressure: Annual Report on EU Small and Medium Sized Enterprises 2009' < http://ec.europa.eu/enterprise/.../pdf/dgentr_annual _report2010_100511.pdf > accessed 29 April 2011

- - 'Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions: Europe 2020 Flagship Initiative Innovation Union' (SEC 1161, 2010)

- - < http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=keydocs> accessed 10 June 2010

- - 'Commission Report Highlights Europe's Innovation Emergency and Analyses Member States' Progress' (EUROPA Press Release, 9 June 2011) <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/692> accessed 20 June 2012

- - 'Small Business Act for Europe' Communities (June 2008) <http://ec.europa.eu/enterprise/policies/sme/small-business-act/> accessed 5 September 2011

European Patent Office, 'Patents for software?' < www.epo.org/news-issues/issues/computers/software.html> accessed 23 August 2012

- - < http://www.epo.org/law-practice/legislative-initiatives/eu-patent/news.html> accessed 2 August 2 2012

'Europe's Small Business Act strengthens small businesses and drives growth' (*EUROPA Press Release*, 23 February 2011) <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/218> accessed 29 April 2011

European Union, 'Green Paper on the Protection of Utility Models in the Single Market- COM (95) 370 Final' <http://europa.eu/documents/comm/green_papers/pdf/utility_model_gp_COM_95_3 70.pdf > accessed 24 August 2012;

Federal Trade Commission, 'To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy' (2003) <www.ftc.gov/os/2003/10/innovationrpt.pdf> accessed 19 July 2011

- - 'The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition' (2011) < www.ftc.gov/os/2011/03/110307patentreport.pdf> accessed 10 August 2012

- -'Statement of Commissioners Harbour, Leibowitz and Rosch on the Issuance of the Section 2 Report by the Department of Justice' and 'Statement of Federal Trade Commission Chairman William E. Kovacic' (8 September 2008) <http://www.ftc.gov/opa/2008/09/section2.shtm> accessed 19 July 2012

Fried I, 'Microsoft Opens Technology to More Licensing' (3 December 2003) *CNET News.com* < http://news.com.com/2100-1012-5113033.html> accessed 3 May 2012

Gao LS and Iyer B, 'Partnerships Between Software Firms: Is There Value From Complementaries?' (2008) *Conference Proceedings from the 41st Annual Hawaii International Conference on System Sciences* <http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4439091&tag=1 > accessed 10 December 2011

Gannon P, 'Piracy Battles Stir Up Brussels' *Computer Weekly* (19 July 1990) 14

Ghosh RA, 'Study on the Economic Impact of Open Source Software on Innovation and the Competitiveness of the Information and Communication Technologies (ICT) Sector in the EU' (2006) Final Report to the European Commission <http://ec.europa.eu/enterprise/sectors/Ict/documents/competitiveness/index_en.htm > accessed 10 January 2012

Greenstein S, 'Market Structure and Innovation: A Brief Synopsis' (February 2002) Testimony before the Federal Trade Commission hearings on Competition and Intellectual Property Law in the Knowledge-based Economy <www.ftc.gov/opp/intellect/shanemitchell.pdf> accessed 5 May 2012

IBIS World, 'Software Publishing in the US: Market Research' (September 2012) <http://www.ibisworld.com/industry/default.aspx?indid=1239> accessed 18 September 2012

Harhoff D, 'Economic Cost-Benefit Analysis of a Unified and Integrated European Patent Litigation System' (2009) Final Report Institute for Innovation Research, Technology Management and Entrepreneurship' < <https://ec.europa.eu/internal_market/.../patent/.../litigation_system_en.pdf > accessed 10 July 2012
- - and others, 'The Strategic Use of Patents and its Implications for Enterprise and Competition Policies' [2007] < https://ueaeprints.uea.ac.uk/37550/1/study-202852-2008_en_2475.pdf > accessed 3 July 2012

Hart K, 'Tech Industry Splinters Over Patent Reform Proposal' (*The Hill*, 3 September 2010) < http://thehill.com/blogs/hillicon-valley/technology/85515-tech-industry-splinters-over-patent-reform-proposal > accessed 11 August 2012

Headd B, 'An Analysis of Small Business and Jobs' (2010) 359 Small Business Administration Office of Advocacy <www.sba.gov/advocacy/849/7642>accessed 29 April 2011

Hesseldahl A, 'What to Do with Apple's Cash' *BusinessWeek* (1 March 2007) <www.businessweek.com/print/technology/content/mar2007/tc20070301_402290.htm > accessed 18 October 2011

Kappos D, 'A Global Call for Harmonization' (April 2011) Speech by the Director of the USPTO to the Managing IP International Patent Forum, London <http://www.uspto.gov/news/speeches/2011/kappos_london.jsp> accessed 25 August 2012

Katz ML and Shapiro C, 'Antitrust in Software Markets' in Jeffrey A Eisenach and Thomas M Lenard (eds), *Competition, Convergence and the Microsoft Monopoly* <http://faculty.haas.berkeley.edu/shapiro/software.pdf> accessed 3 April 2011

Kroes N, 'EC Antitrust Rules: An Overview of Recent Developments' (2006) Hellenic Competition Commission <http://ec.europa.eu/competition/speeches/index_theme_1.html> accessed 10 June 2012

Lisbon European Council Presidency Conclusions <www.europarl.europa.eu/summits/lis1_en.htm#b> accessed 10 August 2012

Lohr S, 'Apple-Samsung Case Shows Smartphone as Legal Magnet' *The New York Times* (25 August 2012) A4

Market Line, 'Global Software Industry Profile' (December 2011) <www.reportlinker.com/ci02072/Software.html> accessed 10 September 2012

Michel P, 'Key Note Address by the Former Chief Judge for the US Court of Appeals to the Princeton University, Centre for Information Technology Policy Conference, "Patent Success or Failure? The American Invents Act and Beyond"' (May 2012) <https://citp.princeton.edu/event/patent-success-or-failure/> accessed 23 August 2012

Munck C, 'Facts and Figures on the European Angel Market' (*European Trade Association for Business Angels, Seed Funds and Other Early Stage Market Players*, 18 May 2009) < www.slideshare.net/burtonlee/claire-munck-eban-stanford-may1809 > accessed 3 September 2010

National Research Council, 'A Patent System for the 21st Century' (2004) <www.nap.edu/html/patentsystem/0309089107.pdf> accessed 10 August 2012

National Economic Council, Council of Economic Advisers, and Office of Science and Technology Policy*, 'A Strategy for American Innovation: Securing our Economic Growth and Prosperity'* (Whitehouse*,* February 2011) <www.whitehouse.gov/sites/default/files/.../InnovationStrategy.pdf> accessed 29 April 2011

Northwestern University < www.kellogg.northwestern.edu/faculty/greenstein/> accessed 15 July 2012

'Open Source Software Market Accelerated by Economy and Increased Acceptance From Enterprise Buyers, IDC Finds' *BusinessWire* (Framingham, Massachusetts, 29 July 2009) < www.businesswire.com/news/home/20090729005107/en/Open-Source-Software-Market-Accelerated-Economy-Increased > accessed 1 January 2012

Oxford Dictionaries, '*Software*'
http://oxforddictionaries.com/definition/english/software> accessed 15 February 2013

Oxford Dictionaries, '*Competition'*
<http://oxforddictionaries.com/definition/competition> accessed 21 September 2011

Regibeua P and Rockett S, 'Assessment of Potential Anticompetitive Conduct in the Field of Intellectual Property Rights and Assessment of the Interplay Between Competition Policy and IPR Protection' (2011) Prepared for the European Commission (COMP/2010/16)
<http://ec.europa.eu/competition/consultations/2012.../study_ipr_en.pdf> accessed 10 July 2012

Report of an Industry Expert Group on the European Software Strategy, 'Playing to Win in the New Software Market' (2009)
<ftp://ftp.cordis.europa.eu/pub/fp7/.../European_S oftware_Strategy.pdf > accessed 4 May 2011

Rumball D, 'Case Studies of Collaborative Innovations in Canadian Small Firms' (*Industry Canada Small Business Policy Branch*, May 2007)
<www.ic.gc.ca/.../CaseStudies_Innovation.../CaseStudies_Innovation> accessed 3 February 2008

Shapiro C, 'Antitrust, Innovation, and Intellectual Property' (November 2005) Testimony Before the Antirust Modernization Commission
<http://www.faculty.haas.berkeley.edu/shapiro/amcinnovation.pdf> accessed 5 May 2012

Sichelman T, 'Patent Bullies, How Industry Incumbents Abuse the Patent System' (6 August 2009) Cardozo School of Law Presentation to the IP Scholars Conference

Small Business Administration, *'The Small Business Economy: A Report to the President*' (United States Government Printing Office 2010)
<www.sba.gov/sites/default/files/sb_econ2010.pdf> accessed 29 April 2011

Small Business Administration, Table of Small Business Size Standards Matched to North American Industry Classification System Codes
<http://www.sba.gov/sites/default/files/files/Size_Standards_Table(1).pdf> accessed 15 February 2013

Software Top 100, 'Top 100 Software Companies in the United States 2010' (December 1010) <www.softwaretop100.org/top-100-software-companies-in-the-united-states-2010> accessed 10 September 2012

Tang P and Adams J and Pare D, 'Patent Protection of Computer Programmes: Final Report Submitted to the European Commission, Directorate-General Enterprise' <http://eupat.ffi.org/papri/tangadpa00/tangadpa00.pdf> accessed 20 September 2010

Truffle 100, 'Ranking of the Top 100 European Software Vendors' (October 2011) <www.truffle100.com/2011/ranking.php> accessed 10 September 2012

University of California, Berkeley <www.faculty.haas.berkeley.edu/shapiro/ > accessed 15 July 2012

US Antitrust Modernization Commission <http://govinfo.library.unt.edu/amc/index.html> accessed 4 May 2012

US Department of Commerce International Trade Administration, 'Working Group on Venture Capital: Final Report' (*European Commission,* October 2005) <http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id =1201&userservice_id=1> accessed 3 September 2010

US Department of Justice, Assistant Attorney General for Antitrust, 'Press Release: R. Hewitt Pate: Issues Statement on the EC's Decision in its Microsoft Investigation' (2004) < http://www.usdoj.gov/opa/pr/2004/March/04_at_184.htm> accessed 10 May 2012

US Department of Justice, 'Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act' (2008) <www.justice.gov/atr/public/reports/23681.htm> accessed 9 July 2012

US Department of Justice and the Federal Trade Commission, 'Antitrust Guidelines for the Licensing of Intellectual Property' (April 1995) <www.justice.gov/atr/public/guidelines/0558.htm> accessed 5 January 2010
- - 'Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition' (2007) < www.ftc.gov/reports/index.shtm#2007> accessed 19 July 2011

US Congress Private Members' Bill "The Saving High Tech Innovators from Egregious Disputes' <https://www.eff.org/sites/default/files/SHIELD_ACT_0.pdf> accessed 10 September 2012

United States General Accounting Office, 'Experts' Advice for Small Businesses Seeking Foreign Patents: Report to the Senate Committee on Small Business and

Entrepreneurship' (GAO-03-910, 2003) < www.gao.gov/new.items/d03910.pdf>
accessed 8 January 2008

United States Patent and Trademark Office, 'Fee Schedule'
<www.uspto.gov/web/offices/ac/qs/ope/fee092611.htm> accessed 27 August 2012
- - < www.uspto.gov/aia.../120910-aia-ombudsman-white-paper.pdf> accessed 13
September 2012
- - < www.uspto.gov/inventors/proseprobono/index.jsp> accessed 13 September 2012.

US Patent and Trademark Office and US Small Business Administration, 'International
Patent Protections for Small Businesses' (January 2012) Report to Congress
<www.uspto.gov/aia_implementation/20120113-ippr_report.pdf> accessed 29 August
2012

Van Pottelsberghe B, 'Lost Property: The European Patent System and Why It Doesn't
Work' (2009) Bruegel Blueprint Series 12
<http://www.bruegel.org/publications/publication-detail/publication/312-lost-
property-the-european-patent-system-and-why-it-doesnt-work> accessed 13 May
2012

Varney CA, 'Vigorous Antitrust Enforcement in This Challenging Era' (2009) Remarks
Prepared for the Centre for American Progress
<www.justice.gov/atr/public/speeches/245777.htm> accessed 10 June 2012

WIPO, 'Model Provisions on the Protection of Computer Software' (1978)
<www.wipo.int/cgi-bin/koha/opac-detail.pl?bib=17100> accessed 10 August 2012

WIPO IP Facts and Figures 2012 (2012) 21
<www.wipo.int/freepublications/en/statistics/.../wipo_pub_943_2012.pdf> accessed 5
September 2012

WPIO <www.wipo.int/patent-law/en/harmonization.htm> accessed 24 August 2012

Womack B and Tracer Z, 'Google to Buy Motorola Mobility for $12.5 Billion to Gain
Wireless Patents' (Bloomberg, 15 August 2011) <www.bloomberg.com/news/2011-08-
15/google-agrees-to-acquisition-of-motorola-mobility-for-about-12-5-billion.html >
accessed 21 August 2011