



PATENT POOL FORMATION WITH STANDARD ESSENTIAL PATENTS IN EMERGING TECHNOLOGIES

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Abstract

This paper aims at identifying the characteristics and the trends of patent pooling especially on Standard Essential Patents (SEPs) to clarify the key factors that help to spur innovation while minimizing the risk of litigation. Now patent pools provide multiple patent owners' technologies into licensing, and they provide simplified and integrated technologies access across multiple sectors, especially in telecommunications and healthcare industries. This framework reduces the harm of fragmented patent ownership described as the "tragedy of the anti-commons" whereby fractured ownership can slow down innovation. There are still some drawbacks associated with patent pooling which can be named as follows: the most crucial one is associated with competition law. Questions like royalty stacking, over-declaration of patents as well as possible anti-competitive conducts should call for higher regulator control of the functioning of the patent pools in order not to distort the market. In this context, Standards Development Organizations (SDOs) play an important and defining role in setting up the necessary governance frameworks as societies ensure equal access to technological products and non-violation of competition law. In conclusion, this paper posits that with the right checks and balances in place, patent pools can act as potent incentives to innovation not only to individual players but also to markets, thus making it possible to promote fairness and competition in the technology market for the overall development of a healthy technological environment.

Keywords: Patent pool, Standard Essential Patents (SEPs), Licensing, FRAND, Technological standards, and Royalty stacking.

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I Introduction

A patent pool is an arrangement in which two or more patent owners agree to grant licenses to third parties or each other for one or more of their patents. A patent pool is a collection of patent rights shared by several patent holders. Subsequently, licensees who are neither members nor non-members can access the pooled patents.¹ Usually, the pool divides the licensing payments it receives among its members according to the value of each patent. Patent pools are frequently linked to sophisticated technologies that call for complementary patents to offer effective technological solutions. With this arrangement, they can bundle their ideas and offer them for free or on a license basis to others, frequently including competitors.²

Although patent pools have been there since the 19th century, their significance has only grown in the context of our contemporary, globalized economy. Recent years have seen the resurgence of patent pools, and many people predict that these will be just as important—if not more so – in the new economy than they were in more established industries.³

The idea of patent pooling is not new. Its origin can be traced to the establishment of the Sewing Machine Combination in 1856, the first known example of a patent alliance formed by a collection of patent holders. The *Albany Agreement*, which created the first patent pool on October 24, 1856, made history. This was a reaction to the sewing

¹ World Intellectual Property Organization (WIPO), *Patent Pools and Antitrust – A Comparative Analysis* (Prepared by the Secretariat, March 2014).

² *Ibid.*

³ Robert P. Merges, Institutions for Intellectual Property Transactions: The Case of Patent Pools, available at: <https://www.law.berkeley.edu/files/pools%281%29.pdf> (last visited on July 23, 2024).

machine war, in which nine patents related to the production of sewing machines were combined.⁴ The "*sewing machine wars*," or intense legal action between the parties that could have stopped production and sales, led to the voluntary arrangement known as the "*Sewing Machine Combination of 1856*", which put together nine complementary patents held by various patent holders to build a functional sewing machine. This patent pool lasted for all the original patents and ended when the last patent expired.⁵

II Historical Evolution and Impact of Patent Pools

In the United States, pooling agreements were widely used by the 1890s. One reason for the interest in patent pools was the intention to get around the Sherman Act of 1890's prohibitions on anti-competitive behaviour. According to Serafino's analysis of around 35 patent pools created or suggested across a range of industries between 1856 and the present, "*each of the patent pools was organized in response to a particular set of policy objectives and circumstances*." He classified patent pools into the following categories:

1. Early pools linked to cartels and monopolies, such as the Davenport Folding Beds (1916), National Harrow Company (1890), Motion Picture Patents Company (1908), and Sewing Machine Combination (1856).

⁴ Daniel Quint, "Patent Pools" 4 *The New Palgrave Dictionary of Economics* 77 (2008).

⁵ Ryan L. Lampe and Petra Moser, Patent Pools and the Direction of Innovation: Evidence from the 19th-Century Sewing Machine Industry, NBER Working Paper No. 17573 (National Bureau of Economic Research, Cambridge, November 2011), available at: <http://www.nber.org/papers/w17573> (last visited on October 15, 2024).

2. Manufacturers Aircraft Association (1917) and Radio Corporation of America (1919) are two examples of pools established in response to US government policy objectives.
3. Three more recent pools that focus on standardization are the MPEG-2 Patent Portfolio, MPEG-4 (1998), DVD 3C (1998), DVD 6C (1999), and so on.

Manufacturers Aircraft Association (MAA) is a government-enforced example of a patent pool. Two significant owners of important aviation patents, the Wright Company and the Curtiss Company, were essentially forced to establish a patent pool in 1917 by the US federal government. The United States was on the verge of joining World War I in 1917.⁶ However, numerous patent battles had effectively stopped new airplane development, just as they had in the sewing machine business sixty years earlier. The Manufacturers' Aircraft Association was established by Wright, Curtiss, and other important patent holders on the 'recommendation' of the Secretaries of War and Navy. The Wright and Curtiss companies, the two largest patent holders, had essentially prevented any new airplanes from being built, which the government needed to use in huge quantities for the impending start of World War I, therefore the development of the MAA was vital to the US government. The award to be given to individual patent owners was determined by a board of arbitrators.⁷

Consumer electronics has seen some of the most well-known and effective uses of patent pooling in recent years. Even the "fiercest

⁶ Jay Pil Choi and Heiko Gerlach, "Patent Pools, Litigation, and Innovation" 46(3) *RAND Journal of Economics* 499-523 (2015).

⁷ Josh Lerner and Jean Tirole, "Efficient Patent Pools" 94(3) *American Economic Review* 691-711 (2004).

enemies" have to work together to promote new standards, as the majority of these were established in response to the necessity for standard setting. Once a standard is selected, the patents required to develop it become extremely important, and the standard itself may be delayed if the patent holders refuse to grant appropriate licenses for their inventions.⁸

III Patent Pool Structures and Strategic Benefits

A patent pool can therefore be defined as a strategic collaboration where multiple players that own patents decide to license them in a pooled manner. It makes it easier for firms to obtain a bundle of patents under a single package since they do not have to negotiate individually with every owner of the patents. A patent pool has a common pool of patents that are licensed out with fees collected being distributed among the owners of patented inventions in proportion to the number of inventions contributed in the form of royalty or agreed amount at the time of pooling formation.⁹

The advantages of having a patent pool are many and varied. First, they simplify the problem of licensing by cutting the time and paperwork and providing an opportunity for companies to get access to several patents. The pool enables firms to obtain licenses from different patent owners without individually entering into bilateral relationships. It also minimizes the possibility of occasional misunderstandings and litigation that may result from dealing with several parties.¹⁰

⁸ *Supra* note 7.

⁹ Alexander Morrow, "Patent Pools" 5(3) *The Antioch Review* 429-439 (1945).

¹⁰ Josh Lerner and Jean Tirole, "Public Policy toward Patent Pools" 8 *Innovation Policy and the Economy* 157-186 (2007).

Several models can be used to create patent pools. Another way is the influence exerted by outside forces or crises. For instance, when COVID-19 broke out, a vaccine patent pool was created to ensure that vaccines are made available to everyone in the world, where patent pools play a significant role in moments of global crises.

The other method of forming patent pools includes cases where several owners of patents decide to pool their patents voluntarily. Some of the common ways through which companies get involved in patent pools include contracts or arrangements like Joint ventures or cross-licenses.¹¹ In the past, patent pools have been employed to deal with diverse challenges as discussed in this paper. Previous patent pools have been created with a view of avoiding litigation and royalties' management. For example, a company called Motion Picture Patents Company was created in the first half of the 1900s and had a goal to control the patent rights concerning motion picture technologies and minimize disputes. Many of these early pools provided a foundation for even more elaborate structures and strategies employed in today's patent pools.¹²

Today, and again especially in the new technology industries, patent pools are particularly formed to deal with standards. For instance, pools have been created for scenes such as digital video broadcasting and technologies that involve several patents to constitute a working standard. Formation of the patent pools for such technologies has been instrumental in the actualization of new standards while making necessary patents available to every party interested.¹³

¹¹ *Supra* note 5.

¹² *Supra* note 6.

¹³ *Supra* note 12.

Modern patent pools usually consist of formal administrative bodies – licensing offices that control the agreements and resolve conflicts. These entities make sure that efficiency becomes a cardinal virtue in the pool and again serve as the one-stop centre for all licensing issues. It is noteworthy that the experience of some of the first patent pools, including Edison’s Motion Picture Patents Corporation, was successful and contributed to the formation of further developments and stated the efficiency of the competition.¹⁴

Therefore, it can be said that the patent pools are a rather effective strategic approach to the management of intricate patent environments and provide the essential conditions for innovational development. Through the concentration of the licensing procedures and the limitations of the transaction costs, the formation of patent pools brings easiness in access to key technologies and fosters the cooperation of Patent owners.

IV Patent Pools in Standard-Essential Patents (SEPS) and Technological Standards

Patent pools regarding SEPs and technological standards play a significant role in the creation of industries mainly in the telecommunication and information technology sectors. A standard is a technical prescription intended to offer a common framework for a particular product or procedure. Standards have existed from time immemorial to the present, provide relevance in maintaining and enhancing the consistency and reliability of technology, and serve as a key tool in providing for effective transfer of technology across borders.

¹⁴ *Supra* note 10.

They enhance global business by making the products and services standards compatible for use in various countries.¹⁵

It is created by agreement and codified by standard-setting bodies inclusive of the International Organization for Standards (ISO)¹⁶. These organizations make sure that standards are developed to fit the needs of industries, and at the same time weigh the factors of the market environment. Standards can emerge in two ways: de facto and de jure.

Functional standards can be defined as those that become standard as the result of the forces of supply and demand and become the market leader de facto, just like Microsoft Windows or Adobe's PDF format. On the other hand, de jure standards are instituted by the European Telecommunication Standards Institute (ETSI)¹⁷ and the International Telecommunication Union (ITU)¹⁸. These formally defined reference models have fundamental relevance in industries where conformity and strict compliance with certain technical directives and protocols are crucial for the components of products to work efficiently.¹⁹

Standardization has played a major role in providing interoperability in the information and communication technology sector. This implies that

¹⁵ TT Consultants, Standard Essential Patents & Their Significance, *available at*: <https://ttconsultants.com/standard-essential-patents-their-significance/> (last visited on October 11, 2024).

¹⁶ International Organisation of Employers, International Organization for Standardization, *available at*: <https://www.ioe-emp.org/international-organisations/international-organization-for-standardization> (last visited on October 11, 2024).

¹⁷ Telecommunication Engineering Centre, Department of Telecommunications, ETSI, *available at*: <https://www.tec.gov.in/etsi> (last visited on October 11, 2024).

¹⁸ *Ibid.*

¹⁹ Dize Dinçkol, Pinar Ozcan, Markos Zachariadis, "Regulatory standards and consequences for industry architecture: The case of UK Open Banking" Research Policy, *available at*: <https://www.sciencedirect.com/science/article/pii/S0048733323000446> (last visited on October 12, 2024).

products from different manufacturers can be interfaced even if they are rivals in the marketplace.²⁰ Protocols include Wi-Fi, Bluetooth, 2G, 3G, 4G, and 5G are standards in ICT that have dramatically transformed telecommunication for devices to communicate seamlessly across the networks. This level of interoperability was achieved through partnering and working in consultative forums by the standard-setting organizations (SSOs), SEP holders, and implementers. These players collaborate to make sure that it follows the same set of rules, this makes the products to be compatible with most of the market in the global market.

A standard essential patent is then defined as a patent that is covered by a standard and to practice that standard necessarily involves the use of the patented technology. These patents have core technologies that cannot be compromised or replaced by any other methods. That is, before adopting any standard, a manufacturer is mandated to employ SEPs, and therefore, ceases to be able to avoid tripping over these patents if he is to embrace the standard in question.²¹ For instance, producers of smartphones or laptops simply have to conform to many standards, among them SEPs to offer devices fit for the current technologies such as 5G or Bluetooth. Technological standards rely on SEPs since these are the patented technologies that are central to meeting the requirements established by the SSOs.

²⁰ Gregory Tassey, Standardization in Technology-Based Markets (National Institute of Standards and Technology, available at: <https://www.nist.gov/system/files/documents/2017/05/09/researchpolicypaper.pdf> (last visited on October 15, 2024).

²¹ Government of India, Department of Industrial Policy and Promotion, Ministry of Commerce & Industry, "Discussion Paper on Standard Essential Patents and Their Availability on FRAND Terms" (March 1, 2016), available at: https://ipindia.gov.in/writereaddata/Portal/News/196_1_standardEssentialPaper_01March2016_1_.pdf (last visited on October 15, 2024).

That is how the SEPs are brought into existence in a prescribed manner, and based on particular principles which this work has uncovered. In the context of a broad range of implementers, SSOs, and Standard Development Organizations (SDOs) have the major roles in creating the standards that are going to be used. Many companies join the SSO to declare the patents of potential use in the developing standard, hence, after discussion, SSOs agree on which patents are critical in the standard. These patents then become SEPs, and the owners, referring to SEP holders, pose a strong threat to sellers.

After an SSO has provided a standard to follow, manufacturers and implementers wishing to develop products to SSO standards are required to obtain a license from the SEP holders. The need for such licensing makes SEP holders occupy a strategic market position because they dictate the use of valuable technology.

To overcome these challenges SSOs demand that SEP holders impose the license terms to SEPs that are assessed to be FRAND (fair, reasonable, and non-discriminatory). FRAND licensing terms enable the SEP holders to receive royalties for their research and development, at the same time avoiding exploitation of higher status by holders of SEP.²² Reasonable terms mean conditions that are not prejudicial to the competitive structure of the market and do not place SEP holders in a privileged position. Reasonable royalty usually refers to the amount that relates to the value of the patented technology in an arm's length transaction which is voluntary for both parties. Non-discriminatory terms demand

²² John Cassels, "What is FRAND?" Fieldfisher, *available at*: <https://www.fieldfisher.com/en/insights/what-is-frand>(last visited on October 23, 2024).

that SEP holders provide the same terms to all implementers without discriminating against those not favoured in the market.²³

However, the flexibility that the FRAND stands for has been a subject of debate and has been a reason for court battles. The controversies caused by FRAND terms, especially what constitutes a reasonable royalty, have occasioned what is referred to as the FRAND wars or smartphone wars. Courts have tried to describe such terms but there is variation in the definition from one jurisdiction to the other. For example, in the USA, *Georgia-Pacific Corp. v. United States Plywood Corp.* 1970 has outlined fifteen factors while using reasonable royalties. Furthermore, in *Microsoft Corp. v. Motorola, Inc.*²⁴ the court understood the specificity of SEPs and it referred to the identification of FRAND that should be based, among others, on the contribution of the protected technology to the formation of the standard and its significance for the final product. Looking at the nature of the innovation being patented and which party enjoys the benefits of the patent, the court came up with the incremental value approach to assess the value of SEPs as the next best option.

The SEP system has also provoked some critical anti-competitive issues including; patent hold-up issues, royalty stacking issues to do with threats of injunctions as well as over-declaration. Patent hold-up is a situation where SEP holders set high royalty rates and implementers have no option other than using the patented technology. This situation is not balanced, because the implementers are compelled to accept unequal Licensing terms due to the need for SEPs. The CCI in *Micromax*

²³ *Supra* note 22.

²⁴ *Microsoft Corp. v. Motorola, Inc.*, CASE NO. C10-1823JLR.

*vs. Ericsson*²⁵ also highlighted that patent hold-up distorts the forces of competition and leads to additional charges to consumers.

V Anti-Trust and Competition Law Consideration in Patent Pooling

Now, since the beneficial or the technical aspects of patent pooling have been discussed it's time to tackle something that limits or creates concerns in patent pooling in respect of competition consideration in the market. So, one of them is royalty stacking which means a situation where an implementer is faced with having to pay royalties to several SEP holders concerning different patents contained in a single product. Another factor includes injunctive relief whereby the SEP holders' resort to the court systems to force the implementers to agree to high royalty rates by threatening them with a cease of operation throughout their undertakings. This gag frankly places implementers on the spot since they rely on the SEPs to produce their products. Another anti-competitive behaviour is over-declaration, in which the patent holder will assert that all their patents are necessary for a standard. This leads to uncertainty and hitches negotiations for licensing and more so inflating the estimated value of the SEP portfolio.

The *InterDigital vs. Xiaomi*²⁶ case in 2020 was one of the finest examples of SEP litigation in India. A company, Interdigital, which holds 3G and 4G SEPs, offered to license its patents to Xiaomi, but negotiations fell apart for reasons of how a royalty rate on FRAND should be established. Xiaomi was sued by Interdigital, which said that Xiaomi's rates were not in line with FRAND compliance. In response, Xiaomi argued it wanted

²⁵ *Micromax Informatics Limited v. Telefonaktiebolaget LM Ericsson (Publ)*, Case No, 50/2013.

²⁶ *Interdigital Technology Corporation & Ors. v. Xiaomi Corporation & Ors.*, AIR ONLINE 2021 DEL 650.

access to comparable license agreements to gauge the appropriate royalty rates, but Interdigital balked, saying the confidentiality protections wouldn't allow that. This case revealed the difficulties around the settlement of FRAND terms and generated litigations based upon anti-suit and anti-anti-suit injunctions of jurisdictions in Delhi and Wuhan that issued contrary orders.

A series of disputes going as far back as 2013 with Ericsson set the Indian SEP litigation landscape in motion. Ericsson's cases against Indian manufacturers, including Micromax and Intex compelled several important questions about abuse in market dominance and how FRAND terms should be interpreted. In its *Micromax vs. Ericsson*²⁷ case, Micromax had accused Ericsson of charging exorbitant royalties on its SEPs and lay a complaint before the CCI. The CCI had ordered Ericsson to pay Micromax Rs 3,100 crore after estimating that its royalties were discriminatory and excessive, as the royalties were based on the overall price tag of a product and not on the value of the SEP.

Patent pools and the management of SEPs are still an active and constantly developing field in the context of the current developments in the general area of intellectual property legislation. SEP licensing remains a contentious issue, and the absence of direction on the implementation of FEAD terms means that more legal battles can be expected in other jurisdictions. The relationship between SEPs and technological standards is therefore an area of legal growth and research interest in the existing modern economy because of the opportunities in the innovation ecosystem and the fairness of competition.

²⁷ *Supra* note 26.

VI Technology Innovation and Future of Patent Pooling

The landscape of innovation is rapidly evolving, influenced significantly by the mechanisms of patent pooling. Patent pools, defined as agreements among multiple patent owners to license their patents collectively, have emerged as a strategic tool to facilitate technology commercialization and reduce litigation risks. As industries grapple with the complexities of overlapping intellectual property rights, patent pools offer a promising solution to mitigate the so-called "*tragedy of the anti-commons*," where fragmented patent ownership hinders innovation.²⁸

Patent pools are important because they encourage creativity, productivity, and teamwork. Companies can access a wider choice of innovations by pooling their patents, avoiding the need for drawn-out and time-consuming negotiations. Because businesses are no longer required to expend resources obtaining unique licenses for every patent, this results in significant labour savings and cost savings²⁹. Patent pools offer advantages such as risk sharing and a decrease in patent infringement lawsuits, in addition to promoting cooperation among rivals and the exchange of information and resources for mutual gain. In sectors like technology and pharmaceuticals where innovation is essential, patent pools can hasten the creation of new goods and services.³⁰

²⁸ Depenning, Leveraging Patent Pools for Collaboration and Innovation, *available at*: <https://depenning.com/blog/leveraging-patent-pools-for-collaboration-and-innovation/> (last visited on October 11, 2024).

²⁹ Kenneth Flamm, A Tale of Two Standards: Patent Pools and Innovation in the Optical Disk Drive Industry, NBER Working Paper No. 18931 (National Bureau of Economic Research, Cambridge, March 2013), *available at*: <http://www.nber.org/papers/w18931> (last visited on November 2, 2024).

³⁰ Ryan L. Lampe and Petra Moser, Do Patent Pools Encourage Innovation? *available at*: <http://www.nber.org/papers/w18316> (last visited on November 2, 2024).

Patent pools are useful for invention creation. Further developments will be hindered when new technologies are invented and they pursue a standard patent. Because the creator will be less or not at all motivated to spend on R&D technology after a monopolistic market is established out of the pool. However, if patent pools are established, the patent holders would be highly motivated to spend in the R&D sector as they would share the costs of litigation or other market expenses concurrently.

A cooperative licensing agreement for all patents necessary to meet the high-tech system's standards can benefit society by lowering transaction and royalty costs for the numerous complementary patent licenses needed to put the system into place in the absence of a pool (clearing the "*patent thicket*" and preventing "*royalty stacking*"). This will lower the cost of producing such an innovative high-tech system and increase its likelihood of happening.³¹

Another benefit can be increased investment. Anticipating the creation of a patent pool will boost the return ex-ante on investment in the invention by companies intending to join the pool since it boosts income from pool patents for pool members. This might even lead to excessive investment (from a societal standpoint) before the formation of the pool.³²

One of the main strategic benefits of patent pooling is its capacity to expedite the procurement and application of technology. Companies might avoid the difficulties and unknowns involved in separate licensing

³¹ Vianney Dequiedt and Bruno Versaevel, "Patent Pools and Dynamic R&D Incentives" 6 *International Review of Law and Economics* 78 (2013).

³² Gu Hai-ying, Study on the Microcosmic Mechanism of the Patent Pool, *Information Sciences* (2006).

talks by combining patents under one organization or contract. This efficient method lowers transaction costs and administrative responsibilities while hastening the creation and introduction of new goods and services.³³

Through a case study of a classic CD audio player launch, we can study the impact of patent pools on the rate of innovations. In 1982, the first CD audio players were released onto the market. It did not take long to realize that an optical disc storage technology for computer applications would likewise find a sizable market. The first CD-ROM (CD Read Only Memory) standard was introduced by Philips and Sony in 1984, and the first commercial CD-ROM players were shipped as add-ons to big computer systems in 1985. In that same year, worldwide standards organizations also adopted the norm. Before 1988, when the international standard ISO 9660 file interchange format replaced proprietary formats, there was no standard for the arrangement of data and file systems on CD-ROM discs.³⁴

Soon after, in 1989, Microsoft joined Philips and Sony in putting forth a single CD-ROM XA standard that let computers use multimedia CD discs. These CD-ROM format modifications were quickly included in computer operating systems, including Windows and UNIX. In 1990, CD-ROM data disc players were initially offered as accessories for personal computers.

From less than 5 million units annually in 1993 to a peak of over 85 million units annually just five years later, in 1998, the CD-ROM market for PCs expanded rapidly in the mid-1990s.

³³ *Supra* note 32.

³⁴ *Supra* note 2.

Following 1998, computers were progressively connected to DVD drives and eventually writeable CD format drives.

This was one of the peculiar examples of how patent pools actually help innovative technologies to grow in the market. By speculating the current terms, we can say that the innovative technologies will grow at a higher rate.

There are some concerns too that are associated with patent pools such as Antitrust concerns and Quality controls. Because patent pools are collaborative in nature, there may be an unintentional stifling of competition if they are not properly structured. Strict regulatory oversight will be necessary to guarantee adherence to competition laws. The process of valuing a pool of patents can become more complex when patents of different quality are combined. Retaining fairness and openness is essential for keeping participants' trust.³⁵

VII Patent Pool and Management Mechanism

The management of patent pools encompasses several essential components. Formation Agreements establish the initial terms for creating the pool, detailing the roles and responsibilities of participants. Operational Documents include management plans that outline governance structures and decision-making processes, along with necessary financial records. Finally, Legal Frameworks involve confidentiality and non-disclosure agreements to safeguard sensitive

³⁵ *Supra* note 2.

information exchanged among participants. The management works are usually done by the Standard Developing Organisations.³⁶

Standards Development Organizations (SDOs) are groups where industry experts come together to collaborate on new technologies. Patent holders or **contributors** bring in their specialized knowledge, while companies, individuals or **adaptors** who plan to use these technologies, known as implementers, share their practical insights.³⁷ The goal of an SDO is to find the best solution to a technical challenge by agreeing on a common design. This decision encourages the whole industry to adopt and invest in the new technology.³⁸

Standards Development Organisations (SDOs) are essential for improving business safety and efficiency. They facilitate the creation and manufacturing of new goods by streamlining the process, offering defined standards for quality and safety, and guaranteeing consistency through batch quality control. SDOs lower communication uncertainty by standardizing terminology, which increases customer choice and competition while lowering costs.³⁹

Furthermore, they guarantee that goods fulfil the requirements for reliability, quality, safety, and interoperability, which builds consumer

³⁶ Page White, What is a patent pool and how does it operate, *available at*: <https://www.pagewhite.com/news/what-is-a-patent-pool-and-how-does-it-operate> (last visited on October 11, 2024).

³⁷ Justus Baron, Jorge Contreras, Martin Husovec, Pierre Larouche, Nikolaus Thumm (ed.), *Making the Rules: The Governance of Standard Development Organizations and their Policies on Intellectual Property Rights* (Publications Office of the European Union, Luxembourg, 2019).

³⁸ *Ibid.*

³⁹ Zhu Xianghua, Organizational Structure and Standard Development Procedures of Standard Development Organizations—Comparative Research Based on Domestic and Foreign Perspectives, (2020), *available at*: <http://creativecommons.org/licenses/by/4.0/> (last visited on July 23, 2024).

trust. The fact that patents revealed to SDOs receive far more citations and are cited for longer than other patents indicates that standards allowing IPRs are crucial for the introduction of significant technology into the market.⁴⁰

Aeronautics, artificial intelligence⁴¹, automotive, life sciences, wireless and mobile, electronics, and many more industries and technical categories are among the various industries and technical categories in which SDOs operate. SDOs also differ greatly in terms of scale. There are 1,120 SDOs worldwide as of July 2020. The basic work of SDOs is to create standards for the industries and this can be very beneficial for the emerging technologies.⁴²

Innovative developments that have the potential to have a big influence on society and industry are known as emerging technologies. Renewable energy, blockchain, IoT, and artificial intelligence are a few prominent examples. These technologies in their initial phases face challenges with regard to the patenting process. If SDO helps in creating standards for them in the initial phases, it will ensure the smooth functioning and growth of these emerging technologies.

There are five types of organizations that develop standards, namely ANSI-Accredited SDOs / VCSBs, Professional and Scientific Organizations,

⁴⁰ Martin J. Tyas, "International Standards: Why Do We Need Them"? 28 *Dental Materials Journal* 57-61 (2009).

⁴¹ UNESCO, Enabling AI Governance and Innovation through Standards, *available at*: <https://www.unesco.org/en/articles/enabling-ai-governance-and-innovation-through-standards> (last visited on October 11, 2024).

⁴² *Supra* note 2.

Pharmacopeia, Government Agencies, and Certification / Accreditation Bodies.⁴³

Every country has its own story of the evolution of patent pool technology. There is various country-based professionalized institution that helps to set standards. By studying individual organizations one by one we can interpret how SDOs have historically helped innovative technologies to survive better in competitive markets.

The first one is the American National Standards Institute (ANSI)⁴⁴ which was originally created as the American Engineering Standards Committee (AESC), which approved its first standard on pipe threads a year after the AESC was constituted. ANSI is a private, non-profit organization whose goal is to promote a voluntary standardization and conformity assessment system in order to increase the US's competitiveness in the worldwide market.

Now for Europe, there is the European Telecommunications Standards Institute (ETSI), a French organization with headquarters in Sophia Antipolis, which creates international standards for ICTs, such as broadcast, Internet, mobile, fixed, and convergence technologies used in aviation and aerospace. The European Union (EU) has officially recognized ETSI as a European standards organization. It is a self-governing, non-profit organization with over 700 members from 62 nations.⁴⁵

⁴³ Standards Coordinating Body, Standards Development Organizations (SDOs), *available at*: <https://www.standardscoordinatingbody.org/sdos> (last visited on October 11, 2024).

⁴⁴ *Supra* note 5.

⁴⁵ European Telecommunications Standards Institute (ETSI), *available at*: <https://www.etsi.org/> (last visited on October 11, 2024).

ETSI's dedication to future technologies involves analysing the ramifications of breakthroughs such as machine-to-machine communications, network functions virtualization (NFV), and software-defined networking (SDN). These domains are essential for facilitating adaptable and effective telecommunications networks that can meet changing needs.⁴⁶

The Japan Electronic Industries Development Association and the Electronic Industries Association of Japan merged to establish the Japan Electronics and Information Technology Industries Association (JEITA) in 2000. JEITA creates standards, the most well-known of which is the JEITA memory card standard used in laptops, in addition to its interest in promoting the electronics and IT industries.⁴⁷

Standards have been set by the Japan Electronics and Information Technology Industries Association (JEITA) for memory cards that are often found on laptops and other devices. As technology evolves, JEITA continuously updates its standards to accommodate new advancements.

China National Institute of Standardization (CNIS) offers standards information services and carries out thorough and strategic research on standardization. CNIS was established in 1990, and since then, it has worked on a number of important national research initiatives, such as studying and creating plans for Chinese technological standards.⁴⁸

⁴⁶ Joinup, ETSI - European Telecommunications Standards Institute, *available at*: <https://joinup.ec.europa.eu/collection/etsi-european-telecommunications-standards-institute> (last visited on October 11, 2024).

⁴⁷ Wataru Imatake, Makoto Akabane, and Kazuyo Tanaka, Issues of SSML in Japanese (The Position of the JEITA Speech Group), Position Paper from JEITA Speech Group, Workshop on SSML, November 2005.

⁴⁸ China National Institute of Standardization (CNIS), China National Institute of Standardization, *available at*: <https://en.cnis.ac.cn/> (last visited on October 11, 2024).

Standards Council of Canada (SCC) represents Canada at the ISO. The Standards Council of Canada Act, the organization's governing law, gives SCC the authority to coordinate and manage the organizations that make up the National Standards System and to encourage voluntary standardization in Canada.⁴⁹

For the purpose of creating telecom standards in India, Telecommunications Standards Development Society, India (TSDSI)⁵⁰ is a recently established standardization organization. Its goal is to make it easier for telecom standards to be developed in a coordinated manner that is particularly appropriate for the Indian market. Its vision is to take Indian innovation to the global standard organizations. It develops, based on Indian research and innovation, standards for access, backhaul, and infrastructure systems, solutions, and services that best address the unique telecom and ICT needs of India.

TSDSI has always kept itself updated with the recent trends and one of the primary examples is calling proposal accelerated research on 6G.

These organizations are the prime examples of the SDOs and their Patent pool mechanisms. Standards, in Stanford's words, are essential for "market-perfecting" goals like "creating industry image, identifying sub-standard products, promoting system capability, ensuring desired qualities and performance levels, and establishing consistent terminologies." Standard Developing Organisations help to develop standards in the

⁴⁹ Standards Council of Canada, *Canadian Standards Development: Program Overview* 111 (Standards Council of Canada, Ottawa, 2017).

⁵⁰ Telecommunications Standards Development Society, India (TSDI), *Rules & Regulations V1.0.0*, available at: <https://tsdsi.in/wp-content/uploads/2022/05/Rules-Regulations-V1.0.0.pdf> (last visited on October 11, 2024).

market which make business smoother. SDOs have great scope in managing emerging technologies by creating patent pools for them.

IX Conclusion

Patent pools have become established as a new model in the regulation of intellectual property rights in those fields that rely on SEPs. While they facilitate licensing for a group of first patentee's pooling their technologies together make it easy for the various patent holders to license their technologies hence the creation of various downloading sectors in such economic sectors as telecommunication information technology and health. This framework reduces the likelihood of patent infringement litigation while at the same time promoting the advancement of knowledge and sharing of technological items for the enhancement of the two industries as well as the consumer market.

However, patent pools present certain difficulties, especially in connection with competition law. This one believes will further result in issues such as royalty stacking, over-declaration of patents, and anti-competitive practices that act as hurdles for the implementers and would distort the market in the process. A loophole that needs to be addressed to avoid degeneration is the issue of regulation lest these pools act as inhibitors to innovation or simply become monopolistic weapons. Standards Development Organizations (SDOs) remain central to managing the patent pools and providing proper guidelines, compliance with competition laws, and appropriate means of addressing technology.

Given the progress being made on the global front in innovation, the patent pools shall continue to be crucial tools for making understanding intellectual property easier. These features make them important in the

context of the interest of both patentees and implementers as well as in helping to foster progress in the technological context. If well-regulated, they will assist in the promotion of growth, fairness, and competitive force within the global economy.