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Advancing the Business of Intellectual Property Globally

LES NOUVELLES JOURNAL OF THE LICENSING EXECUTIVES SOCIETY INTERNATIONAL

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▸ VIEW THE PRELIMINARY PROGRAM

The **LES 2023 Annual Meeting** will take place at the trendy Chicago Marriott Downtown Magnificent Mile, October 15-18, 2023. Under the theme of ***Winds of Change: Dealmaking Trends in the Evolving Innovation Economy,*** our dynamic international IP community will meet in Chicago for four action-packed days of education, outstanding programming, and networking with global dealmaking opportunities.

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- The Research Finance Web: Foundation, University, Private Equity, Drug Discovery Entanglements
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OCTOBER 14 | 9AM - 4PM CT
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OCTOBER 15 | 8AM - 5PM CT

IP Valuation in Early-Stage Technology
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*PLEASE NOTE: courses are not included in the LES 2023 Annual Meeting registration fee. You must select the courses as an add-on to your registration.

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A limited block of rooms have been reserved for LESAM23 participants at the special rate of $259 USD plus applicable taxes and fees per night for a single, king room. Rooms are available on a first-come, first-serve basis. The hotel reservation cut-off date is September 21, 2023.

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les Nouvelles Covers

Our plan is to rotate the globe a quarter turn with each issue. The current view on the cover will be presented in every September issue of the Journal. We have worked hard to be sure that no country is slighted as we move around the globe. For your reference, the graphics here represent our view of the LESI globe each quarter.

David Drews, *Editor@lesi.org.*

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LESI'S SDG-IP Index: An Approach To Appraise Effective Sustainability Impact

By Véronique Blum and Maxime Mathon

Under the presidency of Ichiro Nakatomi, LESI has set the basis for a project titled "SDG IP-Index," which was already described in the Part 1 article of this series: "LESI's SDG-IP Index: Using Quality of Life Aspects—and Intellectual Property—as an Indicator of a Company's Future Success" (Nakatomi *et al.*, 2023). This second part exposes how the SDG-IP Index Committee[1] approached the following question: how can we effectively capture the sustainability impact embedded in innovations? In order to address that issue, we opted for a qualitative analysis in a supplement to the quantitative analysis exposed in Part 1. Also, during the last LES Winter Planning Conference in Geneva, and in the same vein, someone raised their hand and asked, "By the way, what is ESG?" This article sheds light on those two questions and justifies the methodological choices made to build LESI's SDG-IP Index.

This second part develops as follows: first, we come back to the roots of ESG-oriented investment to discover how ESG (Environment, Social and Governance) and SDG (Sustainable Development Goals) are two acronyms that resonate, yet that still seek paths for a better interconnection. Second, while data is perceived as instrumental for addressing SDGs, its current usage, and specifically in ESG ratings, has become controversial and insufficient to address the goals developed by the United Nations. Finally, we examine how combining IP and SDGs can be beneficial, and why LESI'S SDG-IP Index methodology includes a second layer.

1. A Short History of World Views that Lead to the Emergence of Sustainable Development Goals

1.1 The Rise of Awareness

The origin of Environmental (E), Social (S) and Governance (G) concerns remains fuzzy, but it certainly stems out of a series of U.S. initiatives, when ethical funds or funds managed by trade unions decided to focus on social progress as a means to foster growth. This took place a century ago, but a more radical change occurred in the 1960s and 1970s; it was a change of paradigm.

In 1962, Rachel Carson published "Silent Spring," a lyrical and scientific study of the decline in biodiversity in Pennsylvania. For the first time, she observed that spring had become silent due to the collapse of populations of insects, birds, fish and even livestock, creating a threat to the entire food chain, up to human beings. This raises the further issue: how can we represent the effects of human activities on our planet? In 1966, Stewart Brand rephrased this question as follows: why have we still not seen a complete picture of the Earth? In other words, and in order to represent the impacts of our activities on Earth, it may be useful to share a common representation of the Earth. NASA responded to his request the following year with the release of a legendary snapshot described by some as "one of the most important photographs ever taken:" "Earthrise from Apollo 8" by William Anders, who commented, *"We came all this way to explore the moon, and the most important thing is that we discovered Earth."* The image of our Earth seen from space triggers an immediate and global awareness: our earth is vulnerable, in the middle of the void. Environmental awareness was then ready to grow. But the early social concerns are not forgotten. In 1970, the apartheid regime in South Africa fostered the need for Codes of Conduct such as the Sullivan principles of General Motors. Codes of conduct are soft, non-binding laws that set rules and that also avoided a complete disinvestment in South Africa.

1.2 Institutionalization of Environmental and Social Awareness

After half a century of increasing environmental and social awareness, the "responsible" movement was being institutionalized. In 1968, the first United Nations conference using the term "ecologically sustainable development" took place; it is the "Intergovernmental Conference for Rational Use and Conservation of

■ Véronique Blum,
Associate Professor,
University of Grenoble Alpes,
Founder of StradiValue,
France
E-mail: vblum@stradivalue.com

■ Maxime Mathon,
Partner,
Ascend,
Paris, France
E-mail: maxime.mathon@ascend-esg.com

1. SDG-IP Index Committee members participating in the construction of the instrument were: Andreas Zagos, Bruno Vandermeulen, Rinaldo Plebani, Suracha Udomsak, Thierry Van Beckhoven, and Véronique Blum.

the Biosphere" organized by UNESCO. The establishment by the OECD polluter pays principle (PPP) followed, with OECD adherents having to comply with the "Guiding Principles on the Economic Aspects of International Environmental Policies." The same year, the first United Nations Conference on the Human Environment (UNCHE) was held in Stockholm and the "Limits to Growth" report, also known as the Meadows Report was published.

It is in that context that a series of industrial accidents occurred that questioned the concept of responsibility: the Seveso industrial accident in Italy (1976), a series of shipwrecks and oil spills—Amoco Cadiz (1978, 1,600K bbl), SS Atlantic Express (1979, 2,015K bbl) Exxon Valdez (1989, 260K bbl)—the Three Mile Island accident (1979), followed by Chernobyl in 1985. In the midst of a high inflation period, taxpayers understood that they are the payers of last resort and brought pressure for more urgent responsible investments.

In 1987, the United Nations World Commission on Environment and Development published its final report titled "Our Common Future" that included the first occurrence of the term "sustainable development." The so-called "Brundtland" report argued that future generations will suffer from uncontrolled development: thus, *"Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs."*

Five years later, in 1992, the United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro. It brought together political leaders, diplomats, scientists, representatives of the media and non-governmental organizations (NGOs) from 179 countries for a massive effort to reconcile the impact of human socio-economic activities on the environment. UNCED proclaimed the concept of sustainable development as an achievable goal for everyone around the world, whether at the local, national, regional or international level. It recognized that combining and balancing economic, social and environmental concerns in meeting our needs is vital to sustaining human life on the planet and that such an integrated approach is achievable if minds and hands work together. This included the need to re-think our lifestyles (production, consumption, coordination and decision-making).

1.3 Time for Action and Tools Development

Action followed the institutionalization period. In 1994, Elkington called for a Triple Bottom Line (TBL), *i.e.*, a triple profit and loss end line, in order to capture social equity environmental practices as a supplement to the profit bottom line, also coined as "People, Planet and Profit." However, if the initial idea means to encourage companies to manage their impact on people and the planet, many early users argued in favor of a compensation (doing harm to the planet is, for example, covered by financial profits), and find there an "alibi for inaction" (Elkington, 2018). To cope with its vulnerability, the TBL was later extended by the Triple Depreciation Line by Rambaud and Richard (2015).[2]

The same year, the Caux Roundtable produced a "simple, universal and voluntary commitment framework" based on the statement of the "Principles for Responsible Business." Developed from the framework of the "Minnesota Center for Corporate Responsibility (MCCR)," they aimed to involve companies in global cooperation for the preservation of the environment. The voluntary and non-binding nature of the initiative encouraged the inauguration of a virtuous cycle that demonstrated exemplary behavior rather than being limited to compliance. It is on the basis of this work that the U.N. Global Compact issued its 10 Principles in 2000:

- **Human Rights**

  Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and

  Principle 2: Make sure that they are not complicit in human rights abuses.

- **Labour**

  Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;

  Principle 4: The elimination of all forms of forced and compulsory labour;

  Principle 5: The effective abolition of child labour; and

  Principle 6: The elimination of discrimination in respect of employment and occupation.

- **Environment**

  Principle 7: Businesses should support a precautionary approach to environmental challenges;

  Principle 8: Undertake initiatives to promote greater environmental responsibility; and

  Principle 9: Encourage the development and diffusion of environmentally friendly technologies.

- **Anti-Corruption**

  Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

Also, in the year 2000, 193 Member States of the United Nations as well as 20 international organizations

2. Rambaud, Alexandre; Richard, Jacques (2015). "The Triple Depreciation Line Instead of the Triple Bottom Line: Towards a Genuine Integrated Reporting." *Critical Perspectives on Accounting*. 33: 92–116.

met at the Millennium Summit at the organization's headquarters in New York. It is the largest gathering of heads of state and government of all time: 189 of them signed the Millennium Declaration,[3] which set out the Millennium Development Goals for the period 2000-2015. They will serve as a framework for the construction of future Sustainable Development Goals (SDGs).

The term ESG was coined in the 2004 report "Who Cares Wins," which was intended to be the expression by the financial community of a set of recommendations for integrating CSR (Corporate Social Responsibility), as proposed by the UN Global Compact, within business lines: *"asset management, securities brokerage services and associated research functions."*

This shaped the then-upcoming United Nations Principles for Responsible Investment (UNPRI) that sought to empower the shareholders of the largest global companies and to accelerate the adoption by companies of behavior compatible with sustainable development. UNPRI was launched with 100 investor signatures; there are currently 4,902, with about USD $121.3 trillion assets under management.

In 2010, experts from 99 countries produced the ISO 26000 standard that provided guidelines to help companies and organizations with their implementation of the principles of sustainable development. The text was approved by 93 percent of the participating countries with the exception of India, Luxembourg, Turkey, Cuba and the United States. Notably, ISO 26000 is not certifiable. This leaves room for other initiatives to flourish. In California, the B Corp label is one of the initiatives that fills the gap.

Finally, in 2015 and as part of the 2030 Agenda, the United Nations promoted the Sustainable Development Goals (SDGs) that superseded the Millennium Development Goals and constitute "a global call to action to eradicate poverty, protect the planet and ensure that all people live in peace and prosperity by 2030." With 17 holistic goals and 169 targets, the SDG agenda aspires to stimulate action in areas of crucial importance for humanity and the planet (United Nations, 2015). It is in this extension that on August 2, 2015, 193 countries adopted the 17 SDGs, issued by the UN Department of Social Affairs.

The 17 Sustainable Development Goals are: 1) Eradication of poverty; 2) Fight against hunger; 3) Access to healthcare; 4) Access to quality education; 5) Gender equality; 6) Access to safe water and sanitation; 7) Use of renewable energies; 8) Access to decent jobs; 9) Build resilient infrastructure and promote sustainable industrialization that benefits everyone and encourages innovation; 10) Reduction of inequalities; 11) Sustainable cities and communities; 12) Responsible consumption and production; 13) Fight against climate change; 14) Aquatic life; 15) Earth life; 16) Justice and peace; 17) Partnerships for achieving the goals.

With those 17 SDGs to be addressed (Figure 1, page 194), it appears that the current data abundance could support this endeavor.

2. Digitization and Innovation as a Means to Support SDGs

2.1 The Promises of Data

Starting in 2005, Big Data unfolded, bringing with it new promises for understanding all kinds of phenomena, including sustainable development. Thanks to the availability of open source software, it is now possible to manage large amounts of data. In 2009, the United Nations launched an innovative laboratory, the UN Global Pulse, to better envision a world where responsible and inclusive digital innovation would advance sustainable development and protect the planet. The laboratory becomes a meeting place for digital innovation and human sciences. To anticipate, respond and adapt to future challenges, the UN Global Pulse brings together multidisciplinary teams from data sciences, strategic foresight, behavioral sciences and digital technologies.

In 2012, a first report "Big Data for Development: Challenges & Opportunities" specified how to fully integrate digital technology into the global strategy of the United Nations, which will lead to the creation, by Ban Ki-moon in 2014, of an independent group (Independent Expert Advisory Group on a Data Revolution for Sustainable development, IEAG) responsible for putting Big Data at the service of sustainable development. This group of experts is behind the publication of the report "A World That Counts," which precedes the publication of the SDGs.

The data revolution is expected to become a revolution for equality. Open data ensures that knowledge is shared, accessible and creating a world of informed and empowered citizens that are capable of holding decision-makers accountable for their actions.

With the creation of a "Global Data Ecosystem" based on a "Global Consensus on Data," each country is expected to have the means to measure its progress towards sustainable development and to create the conditions for all empowered actors. An essential idea is the following: the global effort around sustainable development can only be effective if it is measured and measurable. Measurability becomes a necessary condition for transparency that allows the actors to align themselves. The United Nations thus takes data as the heart of the SDGs. To foster the move-

3. *https://www.un.org/en/development/devagenda/millennium.shtml.*

Figure 1: The 17 UN SDGs

ment, a list of categories of actors involved in the contribution to the SDGs was identified: the public/civil sphere (international organizations, national statistical agencies, ministries, territories and satellite programs, NGOs), the private sector (business) and the world of research (scientific and academic). Those multiple sources yet need to interconnect and measure overall progress, likely with novel approaches to data combination. This is the biggest challenge currently faced by scholars and practitioners and the role of instruments like the IP/SDGs award participate in that endeavor.

2.2 What Data Already Teaches Us

Before the adoption of the Corporate Sustainability Reporting Disclosure in Europe in January 2023, and which will be applicable in 2024, there exist no mandatory ESG standards that companies should apply to inform about their relationship with people and the planet. However, a long list of possible frameworks (initiatives) is available for companies desiring to serve sustainability goals. Blum and Russel (2022)[4] identified more than 40 of them that they classified along two axes, depending on whether they address collective or entity-based goals, and on whether they appear in financial statements, or aim at testifying of commitments (Figure 2, page 195). Most of the frameworks are specialized on a particular topic (climate change, biodiversity, etc.). Amongst what is often coined an "alphabet soup," a question follows: Which frameworks are adopted by companies in their corporate reports?

Many recent academic research works provide us with a deeper analysis on how often companies adopt those frameworks. Globally, although they differ in level estimations, they show a consistent picture of the preference for frameworks. They all converge in eliciting that the Global Reporting Initiative (GRI, founded in 1997), the SDG, and the Task Force on Climate-related Financial Disclosures (TCFD, issued in 2015) are the most used frameworks.

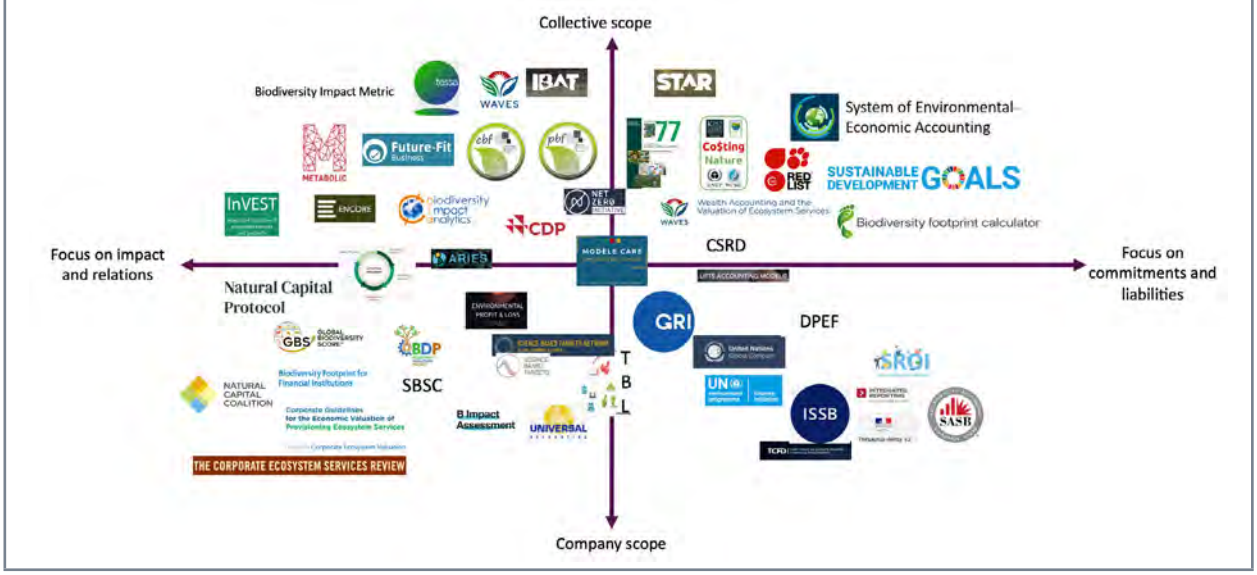
In its Sustainability Counts II report that surveys the 50 largest companies in 14 jurisdictions in the Asia-Pacific region, PwC observes that 78 percent of companies use SDGs as a framework for corporate reporting, while 81 percent refer to the (GRI), 69 percent use ISO, and 28 percent use UNGC.

Another survey conducted by IFAC[5] (International Federation of Accountants) examines 1,350 companies across 21 jurisdictions, selected because they belonged either to the 50 biggest market capitalization of 15 jurisdictions or to the top 100 companies in the six largest economies (the U.S., Germany, the UK, China, India, Japan). Results show that 79 percent of the companies refer to SDGs, and 74 percent of them refer to GRI.

4. *https://www.youtube.com/watch?v=mrMLuLzgbis&list=PLYUUkj5eOnt7Whu5zzKq0q_cm6DhXsT_f&index=10.*

5. *https://www.ifac.org/knowledge-gateway/contributing-global-economy/publications/state-play-reporting-and-assurance-sustainability-information-update-2019-2020-data-analysis.*

Figure 2: ESG-Related Frameworks



Shami (2023) examined a sample of 1,018 companies that belonged to more than 50 industries in 27 European countries (before Brexit), with at least 20 companies in each sector. Those were randomly drawn from the Eikon database. Thus, the sample includes relatively smaller size companies. His results suggest that 48 percent of the listed European companies mentioned some SDG in their annual reports. GRI again appears second with 31 percent of adopters, before the 21 percent of adopters of TCFD.

The narratives and quantitative information relating to the SDGs are included in different reports, according to jurisdictions. In the Americas, the preference goes to the sustainability report, with the exception of Brazil where integrated reports are favored. In Europe, the securities market authority encourages the publication of a Universal Registration Document (an exhaustive financial and extra-financial annual report) but it is not mandatory. In some jurisdictions, the sustainability report may be more exhaustive than the annual report.

3. ESG Rating as a Means to Simplify the Takeaways as a Surrogate

3.1 ESG Raters: Who Are They?

Because ESG covers various areas of expertise, all remote from the usual financial know-how, intermediaries services providers have addressed the challenge of making the ESG information intelligible and useful to stakeholders. The most prominent service providers are ESG rating agencies such as MSCI, Eikon, S&P Global, DBRS Morningstar, ISS, London Stock Exchange Group and Moody's ESG Solutions. The sector has dramatically shrunk in the past years, as a result of the consolidation of about 30 raters. The role of an ESG rating agency is very similar to that of a credit rating agency: it consists in providing a relative grade/score based on a series of indicators related to Environmental (E), Social (S), and Governance (G) metrics, or their aggregation (ESG). The sustainability metrics are most likely produced and aggregated in accordance with a proprietary. The ESG scores use the same substrate of public information, but also information collected through questionnaires or estimates made using proprietary algorithms. However, there is a significant difference between credit ratings and ESG ratings: if the first ones tend to converge across raters, the latter do not. Hence, recent research has scrutinized the important discrepancies between ESG rating agencies in order to explain those.

3.2 Divergence in ESG Ratings

A developing thread of research compares the ESG scores provided by various rating agencies in order to measure their divergences or convergences and explain those. Results concur in demonstrating the divergence in ratings. In their seminal work, Chatterji *et al.* (2009, 2016) demonstrated the lack of convergence between the six main social responsibility rating agencies. They pioneered a stream of academic research that has since then developed significantly and examined the consequences of the ratings divergences. Other authors pursue their work with the examination of a large number of ratings, whose names often changed due to the sector consolidation: KLD/MSCI Statts, MSCI, Asset 4/Refinitiv, S&P Global, Inrate, S-Ray/Arabesque, Truevalue Labs/Truvalue, IVA, Thomson Reuters/Eikon, Sustainalytics/Morningstar, Moody's/Vigeo Eiris, ISS, QS Inves-

tor, Bloomberg, Reprisk, Innovest, DJSI, FTSE4Good, Calvert, RobecoSam/S&P Global, and GES. Most studies examine correlation across ratings and break their analysis to the E, S or G levels or to the sector level; for example, Lopez *et al.* (2020) find that the energy sector experience a higher level of disagreement, whereas high levels of agreement among ratings are observable in activities such as financials, technology, and cyclical consumer goods and services.

Studies evidence several shortcomings of ESG ratings; some relate to the nature of the data, others to the construction of the rating instruments:

1. A lack of a *common theorization* resulting from a common definition of Corporate Social Responsibility (Chatterji *et al.*, 2016). This results in a dual phenomenon: i) companies publish different raw data to describe the same feature, ii) rating agencies use different approaches to collect supplemental raw data. Despite the potential noise and bias in data, scores are nevertheless supposed to capture the same phenomena, but the variance in the data quality hampers quality in results. Stackpole (2021) cites Pucker, former COO at Timberland and now senior lecturer at the Fletcher School at Tufts University when he explains the problem in a straightforward manner: *"A problem is garbage in, garbage out. The reporting is not complete, results are mostly unaudited, and they are not comparable, so ESG ratings often use bad data that's unaudited, extrapolated, and interpolated."* Moreover, Berg *et al.* (2021) find more correlations in ESG ratings than in the initial data, which makes ESG rating a magical catalyzer.
2. A lack of standardization or *lack of commensurability* manifests itself in the different methods, measures and units used to quantify features (Chatterji *et al.*, 2016). For example, in terms of CO2, Sustainalytics uses five GHG-specific criteria and Refinitiv uses five criteria; Moody's ESG and KLD use only one, while S&P Global and MSCI use none (Berg *et al.*, 2022). Kotsantonis and Serafeim (2019) exemplify the same issue with health and safety data: some metrics are absolute numbers; others are relative figures (percentages). Widyawati (2021) shows that KLD uses 123 quantitative indicators, whereas Thomson Reuters uses 215 qualitative indicators and 124 quantitative ones, and Bloomberg's rating profile is the opposite.
3. A lack of consistency in the categories that raters use, *i.e.*, in the selection of metrics that they use to produce their scores. For example, one rater may include gender diversity metrics under the social dimension whereas another rater may focus on health and safety issues. This is referred to as *scope divergence* (Kotsantonis *et al.*, 2019; Berg *et al.*, 2022). Also, the observation of past ratings and their components has allowed Lopez *et al.* (2020) to identify the 10 most predictive and contributing data in the raters' Environmental rating. For Thomson Reuters they find Target Emissions, Resource Reduction Policy, Emissions Policy, Environmental Supply Chain Management, Environmental Supply Chain Policy, Environment Management Training, and Energy Efficiency Policy. For RobecoSAM the most predictive variables are Target Emissions, Renewable Energy Use, and Resource Reduction Targets. Finally, for Sustainalytics, those are Target Emissions, Renewable Energy Use, Environmental Supply Chain Management, Policy Environmental Supply Chain, Resource Reduction Targets, and Energy Efficiency Policy. It follows that only Target Emissions—that measure a company's commitment and effectiveness in reducing environmental emissions in production and operational processes—form a common predictive variable to the three ratings examined. However, this does not testify to the real importance of the variable, but rather of the importance that the raters have granted to the variable in their model. Authors find no common predictive variable in the Social pillar and only one common predictive variable in the Governance pillar: Corporate Social Responsibility Reporting.
4. A lack of consistency in the peer-group definition that is used as a benchmark for score adjustments. This is referred to as a *measurement divergence* (Kotsantonis *et al.*, 2019; Berg *et al.*, 2022).
5. *Weight divergence* is another issue that describes the idea that raters allocate different weights to the different measures, because they have different views on the relative importance of the attributes present in their scores (Berg *et al.*, 2022). "As a result, even if a firm receives the same score value for its ESG performance, the ESG ratings generated by various rating providers might still differ significantly" (Capizzi *et al.* 2021).

Close to the latter modeling issue, Berg *et al.* (2019) have observed a "rater effect," describing the fact that a firm receiving a high score in one dimension is more likely to receive high scores in other dimensions.

3.3 The Constrained Reliance on ESG Ratings…

Berg *et al.* (2023) show that the individual scores of all rating agencies significantly correlate with the holdings of ESG funds in the U.S. (ESG ownership), with MSCI's score showing the highest correlation coefficient, which is persistent and increasing over time. The authors examined a sample of 3,665 listed U.S. corporations, with

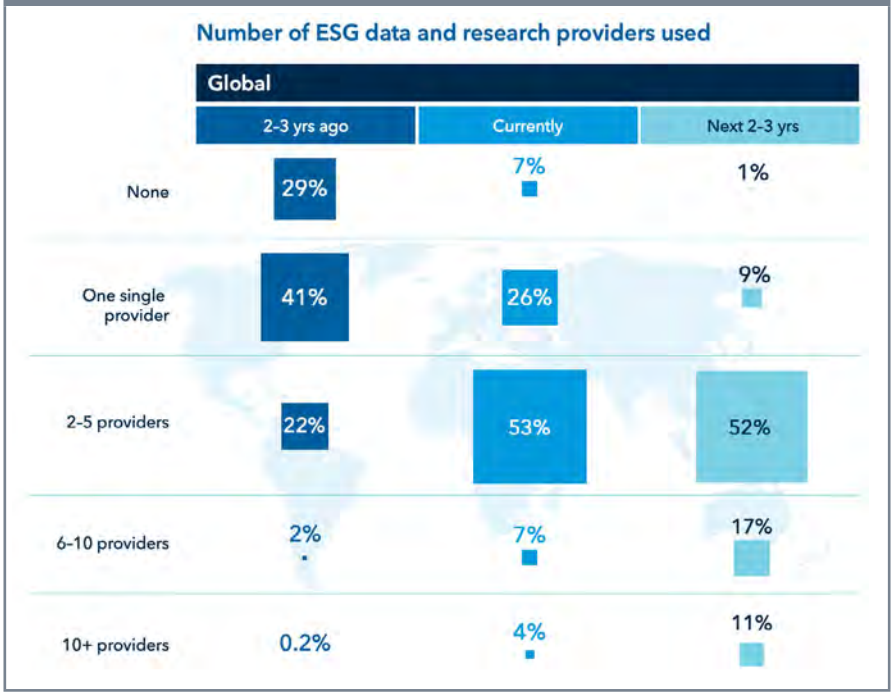
4,679 rating changes that take place between February 2013 and September 2020, and show that ratings downgrades lead to an abnormal return of -2.37 percent, whereas upgrades have a positive but weaker effect. Hence, ESG information has become instrumental in investment decision-making. LaBella *et al.*'s analysis (2019) further shows that there is less risk among companies that scored higher on ESG metrics. Those facts evidence that the market is pricing in company-specific ESG risk. Hence, despite the imperfections of the available ESG ratings, and knowing that initial data is seldom accessible (Blum and Mathon, 2023), ESG ratings remain the main source of sustainability diagnosis.

More surprisingly, ESG disagreement seems to be an advantage for some companies. Gibson *et al.* (2021) show that equity returns and ESG rating differences between the various agencies are positively correlated. Thus, the greater the disagreement between the ratings, the higher the profitability. Christensen, Serafeim, and Sikochi (2021) also demonstrate that the higher the number of data points published by companies, the higher the discrepancies across ratings. However, some high sustainability performance also results from an inflation of the ratings that they assign to companies (Bams & Van der Kroft, 2022). The authors even add that "Refinitiv, MSCI, and FTSE ESG ratings are inversely correlated with sustainable performance."

It follows that in the absence of a clear view, and in the absence of ESG information standards, there remains for significant "greenwashing" that can lead to misallocation of capital and missed opportunities (Antoncic, 2021).[6] To assess the effective impact of companies, responsible investors resort to a set of ESG rating providers that collects, gathers, estimates and processes ESG data provided by the rated companies or other external sources of information. Why do investors rely on multiple ratings?

As a consequence of those imperfections and inefficiencies, more and more responsible investors now resort to several providers. Figure 3 shows the result of a survey of 520 global institutional investors (pension funds, family offices, insurance companies, sovereign wealth funds, endowments and foundations) and 520 global wholesale investors (funds of funds, discretionary fund managers, private banks, broker/dealers, registered investment advisors, independent advisories and investment divisions of insurance). The multiple procurements are a direct consequence of the lack of harmonization of global standards, taxonomies and metrics, something that 45 percent of the surveyed practitioners deplore.

Figure 3 : Number of ESG Data Providers



https://www.capitalgroup.com/content/dam/cgc/tenants/eacg/esg/global-study/esg-global-study-full-report(en).pdf

3.4 …to Assess the Reach of SDGs

Recent research by Bekaert *et al.* (2023) establishes a positive connection between a portfolio's ESG ratings momentum and its SDG footprint. Hence, the authors suggest that there exists a positive relation between ESG ratings (and thereby their components) and the portfolio's SDG footprint. In order to measure the SDG footprint, the authors use Global AI Corp.'s (GAI) SDG scores. The score uses artificial intelligence to extract, screen and clean considerable amounts of structured and unstructured data. This includes self-reported company data, press and blog articles, NGO communication and surveys, and unstructured social media information. The data is collected in more than 100 countries and in 60 languages. Artificial intelligence

6. Antoncic, D. M. (2021). "Is ESG Investing Contributing to Transitioning to a Sustainable Economy or to the Greatest Misallocations of Capital and a Missed Opportunity?," *Journal of Risk Management in Financial Institutions*, 15(1), 6–12.

algorithms map this large variety of data to associate it with companies and their subsidiaries. Combinations are driven thanks to company names, tickers, and ISINs. The output consists of 17 SDG scores for each company, and a score measuring the overall SDG footprint of a company. The scores reflect sentiment or SDG fitness.

This approach is in line with the work from Kimbrough *et al.*(2022) who show that voluntary ESG reports resolve disagreement among ESG raters. Using textual analysis, authors show that longer (more disclosure), less positive (better textual quality), and less sticky ESG reports contribute to reducing disagreement among ESG raters. This also improves when firms obtain assurance from accounting firms. In the same vein, Shami (2023) shows that companies referring to double materiality tend to display less disagreement in their ESG ratings.

It is indeed relevant to break down the footprint for each of the 17 goals, as companies unequally communicate about those. Blum and Russell (2022) have examined the data collected by Shami (2023) to represent the presence of the 17 SDGs in companies' reports. In 2020, SDG number 14—Life Under Water—was the most cited in the examined sample of 1,018 companies (Figure 4). This can be explained by the global abandonment of plastic packaging that is aimed at reducing the amount of plastic that finds its way to the ocean. In our figure, the relative size of SDG14 is used as a benchmark, and the size of the other SDGs are proportional to their relative comparable presence in companies' reports.

3.5 ESG, SDGs and Innovation

The World Intellectual Property Organization (WIPO) is also of the following opinion: *"Intellectual property is an essential driver for innovation and creativity which, in turn, are necessary for the success of the Sustainable Development Goals (SDGs) of the United Nations. The examples of solutions imagined by inventors, companies and other organizations to meet social, economic, health and environmental challenges are powerful reminders of our collective capacity to achieve the SDGs and the role that intellectual property rights play in achieving this."* [7] The SDGs, linked to innovations, provide a goal to *"build resilient infrastructure, promote sustainable industrialization and foster innovation."* WIPO's former Director General Francis Gurry highlighted the relationship between the two and said that intellectual property *"exists to create an enabling environment and to stimulate investment in innovation."*[8] WIPO has identified that innovation is key to meeting SDGs 2, 3, 6, 7, 8,

Figure 4: Importance of SDGs in a Sample of 1,018 European Company Reports

7. *https://www.wipo.int/sdgs/en/index.html.*

8. *https://www .wipo.int/meetings/fr/doc_details.jsp?doc_id=538971.*

9. *https://www.wipo. int/sdgs/en/story.html.*

11 and 13, while SDG 9 directly addresses innovation.[9] Furthermore, the HRC and WIPO, in their joint publication, *i.e.,* "IP and Human Rights," have concluded that *"appropriate protection of intellectual property can contribute to the economic, social and cultural progress of the diversity of the world's population."*

Also, given the critical importance of the SDGs, the UN initiative has attracted considerable attention in policy debate and research in academia (for a meta literature review, see Pigatto *et al.*, 2022). However, despite a call for researchers (Bebbington and Unerman, 2018), the academic literature on corporate reporting remains very limited relative to SDG-related research in disciplines other than financial reporting (Bebbington and Unerman, 2020).

Beyond Global AI's tools that we exposed herein, new tools are developing that approach capturing these impacts in a different manner than ESG ratings do. For example, InTraCom examines the relationship between sustainability goals and intellectual property,[10] and LexisNexis maps patents that are explicitly related to the targets and indicators mentioned in SDGs in order to assess the sustainability compliance of entities from the perspective of patents.

LESI's SDG-IP Index addresses those gaps. Considering the limited scientific knowledge relative to the link between innovation, sustainable development and SDGs, and aware of the risks induced by data and rating models' inconsistencies, it was important to the committee that the identified and here before exposed pitfalls in data manipulation were avoided. It is in that mindset that the SDG-IP Index Committee decided not to rely exclusively on quantitative data.

4. Lessons Drawn by the SDG-IP Index Committee and Methodological Choice: the Qualitative Part

Hence, the SDG-IP Index is built in two stages: 1) a quantitative process described in Nakatomi *et al.* (2023) was employed as a first filter, and 2) a qualitative assessment refines the findings and verifies their robustness.

To circumvent possible greenwashing in reported and declarative information, the committee reunited several times during the winter 2022/2023 to identify methodological means to address the issue. The committee opted for an extended collection of information that aims at testifying to an effective ESG/SDG impact concern. The committee identified surveys in the form of interviews as the most appropriate approach to collect the required data. Because this is time-consuming and there is a will not to add to the burden of the multiple raters, the survey is only directed to companies that were well ranked in the quantitative stage of our selection. The questionnaire (see below) includes several themes in 24 questions: i) the existence of an alignment between R&D or R&I and SDGs, and the demonstration of proofs of such an alignment (in the budget, number of projects, the use of indicators or models targeting the SDG), ii) the link between IP strategy and SDGs, and iii) the link between IP exploitation and SDGs. Weights are associated to those dimensions. They were allocated on the basis of the committee members' relative perceived importance of each item after conducting pair comparisons. Notably, some of the questions survey the existence of baseline or roadmaps or trajectories. Indeed, it is now generally accepted that only baseline must constitute a reference point to an improved reduction of the impact on people and the planet, where a roadmap indicates some reflections and the existence of an action plan likely to allow the company to achieve its goals. Nevertheless, this point of attention is not expected to exclude companies: according to IFAC (2023), on average, 87 percent around the world have a transition plan with respect to emissions (Figure 5).

Figure 5 : Emissions Reduction Plans Around the World

10. *https://www.intracomgroup.com/sustainable-patents.*

The Qualitative SDG-IP Index Questionnaire					
	(1)	Best	Strong	Intermediate	Low
Link Between R&I And SDG Strategy					
How much is your R&D/R&I aligned with your SDG strategy?	1	Fully 4	Strongly 3	Half 2	Moderately 1
% of R&D budget spent on projects contributing to one or several SDG goals	1	90% 4	70% 3	50% 2	30% 1
% of R&D projects contributing to SDG goals	1	90% 4	70% 3	50% 2	30% 1
Do you use a scoring model to rank your R&D projects according to their societal and environmental impacts/alignment with SDGs?	4	Yes 1	Yes 1	Yes 1	No 0
What is the share of projects selected according to that ranking ?	1	100% 4	80% 3	60% 2	40% 1
Do you use individual project indicators explaining which SDG the projects help attain?	2	Yes 1	Yes 1	Yes 1	No 0
In case the answer to the previous question is "yes," how many indicators do you use?	0.5	>3 4	2 or 3 3	1 2	0 1
Are there other procedures in your company to identify or link SDGs to its R&D projects ?	2	Yes 1	Yes 1	Yes 1	No 0
In case the answer to the previous question is "yes,"please describe	0.5	4	3	2	1
How do you measure the commercial, societal and environmental impacts of your R&D/R&I?	1	Through a specialized 3rd party 4	Internally, quantitatively 3	Internally, qualitatively 1	(Mostly) Not measured 0
Link Between IP Strategy And SDGs					
How do you manage your IP with SDG potential?	1	We protect by patents 4	We protect as trade secrets 3	We publish and promote 2	We publish 1
When protecting your IP by patents, do you take the SDG potential of your IP into account when selecting its geographical scope of protection ? (e.g., filing patents in Africa)	1	We systematically obtain and maintain IP in SDG relevant territories. 4		Only if additional cost is minimal 2	Not at all 0
If you decide not to protect IP by patents in SDG-relevant jurisdictions, would you still consider valorizing it there ?	1	We systematically look for alternative ways of protection in those jurisdictions. 4		Maybe as a trade secret 2	No because it cannot be valued anymore 0
Do you repurpose (some of) your IP to attain SDG goals ?	1	This is part of our SDG evaluation strategy 4	Only if the original IP is not compromised 3	Only if suggested by stakeholder 2	Never 1
Do you ensure equitable access to IP protection to women inventors?	0.5	It's one of our strategy points 4	Sometimes 3	Only if required by stakeholder 2	Never 1
Do you pay special attention to the respect of grassroots inventors and creators?	0.5	It's one of our strategy points 4	Sometimes 3	Only if required by stakeholder 2	Never 1

The Qualitative SDG-IP Index Questionnaire Chart, continued on page 201

The Qualitative SDG-IP Index Questionnaire Chart, continued from page 200

Link Between IP Exploitation And SDGs					
How do you make a useful IP available?	3	Via impact licensing through an independent Special Purpose Vehicle (SPV) 4	Via external licensing to arm's-length third parties 3	Only via internal licensing to local affiliates 2	Publishing (and promotion) 1
Grant of exploitation rights made conditional to commitments in terms of gender equality, human rights and inclusion?	1	Yes and check by independent 3rd party 4	Yes and check by yourself 3	Yes, included in the agreements 2	No 0
Grant of exploitation rights associated to commitments in terms of working conditions	1	Yes and check by independent 3rd party 4	Yes and check by yourself 3	Yes, included in the agreements 2	No 1
Criteria: % Licenses with SDG contractual obligations for licensees	3	80% 4	60% 3	40% 2	20% 1
How do you differentiate the SDG goals in your licensing fee strategy ?		We license out for free to an SPV with the right to sublicense against a fee. 4	We license out to a third party at a lower fee with the right to sublicense. 3	We charge a lower fee for SDG beneficiaries. 2	We charge the same fees 0
How much of your SDG-IP is licensed out to 3rd parties?	1.5	80% 4	60% 3	40% 2	20% 1
Do you license out IP facilitating circularity, decreasing resource consumption, decreasing CO^2 emissions, decreasing impact on biodiversity, increasing the use of green energy?	1	Systematically 4	Often 3	Sometimes 1	No 0
Licensing-in strategy: Do you select technologies according to SDG criteria?	1	Systematically 4	Often 3	Sometimes 1	No 0
Authors: Andreas Zagos, Bruno Vandermeulen, Thierry Van Beckhoven, Véronique Blum.					

Conclusion

The main conclusion from this second entry in the series is that the assessment of sustainable IP value can only be properly assessed when one collects supplemental qualitative data. Because ESG ratings are not a reliable solution, and declarative information can be biased, a qualitative assessment has to be conducted. The data is collected thanks to surveys that cover and seek evidence of effective integration of SDGs as piloting tools and, moreover, with references to baselines, roadmaps or targets. Our dual approach makes the LESI SDG-IP Index a unique measure of companies' sustainability and innovation performance and impact. A third entry to this series of articles will cover concrete examples of the application of our Index. ■

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The Need For Efficient IP Management In A Market Increasingly Using Open Source: The OpenChain Specification 2.1

By Eleftheria Stefanaki, LL.M and Jimmy Ahlberg, LL.M

Imagine finding out that 90 percent of the software in your products is protected by third-party intellectual property (IP). You are relieved when you learn that such IP is licensed to your company. However, as soon as you start reading the agreements, you realize some of them contain terms you are not familiar with or have never even heard of before such as "source code," "binary," "object code," and "system libraries." Moreover, you cannot find any basic contractual provisions such as "governing law" or "jurisdiction" in the agreements. The reason, you are being told, is that your company had no chance to negotiate the terms, but was rather presented with "take it or leave it" standard template licenses, which differ from each other.

After this unsettling discovery, your journey may look similar to the five stages of grief: Firstly, you tell yourself that the above cannot be true (denial). Later on, you rightly become angry; "Surely someone must be responsible for this." So, you take the elevator down to the software development team to read them the riot act (anger). Once there, you promise to put a good word to their managers if they—please!—stop bringing in all this third-party IP under these strange software licenses (bargaining). If you are not outright laughed out of the room, they will reply that "this is not going to happen if the company wants to continue to ship any products at all. Our management is actually telling us to use even more of this stuff!" You go back to your office, perhaps passing by the coffee machine, dejectedly thinking that at least the coffee machine people do not have to deal with this issue (depression). You would be wrong though since the coffee machine uses the same kind of third-party IP under the same kind of licenses as whatever product your company develops. Hopefully, you will eventually come out on the other side, realizing that you must manage this strange third-party IP dependency. You can do it, you just need to be smart about it and come up with the right tools, processes, and strategies to do so (acceptance)! We are here of course talking about open source, and you have just passed the five stages of open source grief. In this article we would like to make the case that open-source management is a necessary part of IP management and provide you with a good starting point for a systematic approach to open source management.

■ Eleftheria Stefanaki, LL.M,
Senior IPR and
Open Source Researcher,
Ericsson,
Munich, Germany
E-mail: eleftheria.a.stefanaki@ericsson.com

■ Jimmy Ahlberg, LL.M,
Open Source Policy Director,
Ericsson,
Chair, OpenChain
Projects Governing Board
Gothenburg, Sweden
E-mail: Jimmy.ahlberg@ericsson.com

More than 10 years ago, Marc Andreessen commented that *software is eating up the world.*[1] The intervening period has proven him right. Nowadays one could even say that it is a particular flavor of software, *i.e.*, "open source," which is playing that role. If you think about it, you and I use open source every day. For instance, we wrote this article with the help of open source. And, unless you are holding the hardcopy version of *les Nouvelles*, you are also most likely using open source to read this. As you will soon discover, there are many other examples.

The term "open source" refers to software available under an open source license, usually without monetary compensation for its distribution, use, modification and re-distribution. Most of the applications that run in our smartphone or computer contain some open source.[2] For example, the Google Chrome browser—used by approximately 65 percent of internet browser users[3] —makes everyone an open source user because

1. Marc Andreessen, "Why Software Is Eating the World," *Andreessen.Horowitz*, August 20, 2011, *https://a16z.com/2011/08/20/why-software-is-eating-the-world/*.

2. "Readout of White House Meeting on Software Security," The White House, accessed 09 May 2023, *https://www.whitehouse.gov/briefing-room/statements-releases/2022/01/13/readout-of-white-house-meeting-on-software-security/*.

3. "Browser Market Share Worldwide," statcounter GlobalStats, accessed 09 May 2023, *https://gs.statcounter.com/browser-market-share#monthly-202205-202210-bar*.

it is based on the Chromium open source project.[4] Similarly, the popular Android operating system[5] is also based on an open source project. Even things we do not think about as being particularly "open," such as our smart washing machines, our home automation systems, or for that matter, parts of the telecom infrastructure equipment handled by carriers, are built upon open source software.

Telecommunication standards such as 4G and 5G allow us, amongst others, to communicate, play games, order our favorite meal with just a few clicks, attend a virtual doctor's appointment and work remotely. Every year billions of devices are becoming interconnected and part of the Internet of Things (IoT).[6] It is expected that between 2023 and 2024, an additional five billion devices will become IoT-connected.[7] There is little doubt that many will be using open source. In reality, the availability and combination of open standards, such as 4G and 5G, with open source will be necessary for these five billion new devices to become connected and part of the Internet of Things. This may support the estimation of the Linux Foundation[8] (a non-profit organization that assists open source communities and facilitates the creation and management of open source projects) that the value of annual working hours contributed to open source projects it hosts globally is more than $26 billion USD.[9]

In the meantime, companies have realized the relevant implications of open source for IP management, with the current industry trend of high accumulation of software in general and open source components in particular, in any given product. More often than not, open source gets entangled with IP rights such as copyright, trade secrets, trademarks, and patents. Companies indeed face major dependencies on third-party IP for their use of open source in their products. The reason is that, regardless of the industry they are active in, there are only a few products or value chains that do not incorporate any software elements.

Consequently, to succeed in the market, companies must address their open source dependency, not only from technology, security and trade compliance perspectives, but also from an IP management angle. Surprisingly, companies are oftentimes neither prepared nor well positioned to do so. Thus, the fulfillment of their license obligations and/or their deployment of products and/or services may be negatively impacted.

Against this background, this article describes the significance of IP management in the context of open source, and why it should be considered as an essential part of any quality IP management program. With this in mind, we would like to introduce you to the OpenChain Specification 2.1 (ISO/IEC 5230:2020)[10] on open source license compliance, and the benefits of implementing such a program in a corporate environment.

Breaking Down IP Management: What It Is And Why You Need It

We live in a world dominated by the knowledge economy, where innovations translated into intangible assets are the drivers of economic and societal development. In this regard, the success of a business is often linked with its ability to create and exploit IP for the purposes of generating income.[11] As important as it is for a company to commercialize its own IP, it also needs to utilize IP generated by others, such as partners and competitors. One of the powerful aspects of capturing innovation in the form of IP is the ability to share it with others through licensing agreements, effectively controlling access to it. That being the case, IP is considered an invaluable resource for innovation-oriented stakeholders regardless of their area of business, growth or method of operation. Despite the incremental economic relevance of IP, many companies have not yet adopted systematic and reliable IP management processes.

Each company creates its own individual business strategy that corresponds to its objectives. Such a strategy should include IP, meaning, among other things, the manner according to which the IP assets of the company are created and managed. There should be two foundations to this end: (i) the establishment of processes for adhering to regulatory and/or contractual obligations (*e.g.*, through the operation of a system for

4. "Home," The Chromium Project, accessed 09 May 2023, *https://www.chromium.org/chromium-projects/*.

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10. "Learn More About OpenChain ISO/IEC 5230:2020," OpenChain, accessed 09 May 2023, *https://www.openchain-project.org/license-compliance*.

11. Alexander J. Wurzer and Stephan Hundertmark, "IP Management—Key Skills in a Knowledge Economy," *Journal of Korean Law 8*, no. 1 (December 2008): 186, *http://aplaweng.snu.ac.kr/34/?q=YToyOntzOjEyOiJrZXl3b3JkX3R5cGUiO3M6MzoiYWxsIjtzOjQ6InBhZ2UiO2k6MTM7fQ%3D%3D&bmode=view&idx=3423582&t=board*.

IP screening and archiving) and (ii) the establishment of training programs to improve IP awareness within an organization. The aim of an IP management program is better served following a high-level set of requirements that are implemented in a manner suitable for the needs of each company.

In short, IP management is a set of structured processes designed to handle the IP that is part of a company's product or research and development (R&D) flow. Its goal is to maximize the capture and utilization of one's own IP and mitigate the risks associated with the use of third-party IP.[12]

1. Risk Management

A structured IP management process can generate multiple positive effects for a business. Firstly, it increases the certainty within the organization in a two-fold manner: (i) its own IP rights can be precisely defined and adequately protected; and (ii) third-party IP is successfully identified so that the necessary rights of use can be secured. Moreover, efficient risk management often leads to reduced liability, minimization of future errors and increased efficiencies in terms of IP handling.

A case in point: it is standard practice in technology transfer licenses for the licensee to be subject to annual (or even biannual) audits to ensure compliance with the conditions of the license. In the case of such audits, a company with successful management procedures in place should respond swiftly and efficiently. Similarly, such management procedures could be of benefit, for example, during supplier audits. Additionally, good IP management mechanisms can be vital in a merger and acquisition (M&A) framework, both for the buyer and the target company. The due diligence process is expected to run much more smoothly when the IP-related risks are reduced or are easily diagnosed and resolved.

2. Housekeeping

In addition, the implementation of comprehensive processes for managing business input and output with respect to IP should be considered as best practice for corporate-level housekeeping. Independent of the company's size, automated and well-established procedures can optimize the day-to-day handling of IP-related issues. Thorough documenting and recordkeeping of such processes would also facilitate the automatization and streamlining of workflow. These benefits are particularly crucial for start-ups and small and medium enterprises (SMEs) that lack expertise and resources to keep track of their own, or third-party IP, especially in technology-intensive industries. To phrase it slightly differently, one needs to understand the IP in their possession in order to utilize it properly (*e.g.*, through cross-licensing). Similarly, one requires understanding the third-party IP they rely on so as to be able to exploit it effectively and secure the necessary access and use rights.

3. Education

For an IP management system to become an integral part of a business, it is important to invest in educating the employees about the significance of IP and the merits of IP management, as well as the relevant company processes. Employees with a legal background might indeed be receptive towards IP and its many benefits; but IP management is interdisciplinary. Therefore, supplying continuous training to all relevant employees is expected to raise IP awareness as well as build an innovation-oriented mindset, helping the organization to capture and harness its innovations. [13]

4. Impact in External Relations

We only get one chance to make a first impression. For this reason, the adoption of a well-structured IP management program will naturally impact how the organization's partners, clients, investors, and other industry participants (even potential buyers) view the company. A balanced and effective management system will likely increase productivity and provide certainty within an organization. This in turn is expected to lead to better results in collaboration with third parties. Building trust is the quintessential requirement for any company that engages in open innovation and aims to reap the advantages of R&D collaboration. Respectively, this is expected to enhance the organization's position and reputation within the industry as a dependable partner and a company that values IP. Likewise, the valuation of the intangibles—including IP—becomes easier if the company has a structured approach to the management and capture of IP in an established framework.

5. Innovation Management

Lastly, IP management is fundamental to being able to measure the innovation output of an organization. Without an IP management system, it is very hard to adequately track the results of R&D investments in terms of IP generated. Having an established IP management program enables a company to extract and follow metrics and key performance indicators to better steer IP generation.

IP Management as a Widespread Corporate Governance Best Practice

Companies need to attend to IP management in a

12. Wurzer and Hundertmark, "IP Management—Key Skills in a Knowledge Economy," 195-197.

13. Thomas Bereuter, Adéla Dvořáková, Juergen Graner, Bowman Heiden and Ruud Peters, "People As Enablers: The Role Of The Human Factor In Intellectual Asset Management Of Technology," Volume LV *les Nouvelles—Journal of the Licensing Executives Society*, No. 2 (June 2020): 99, *https://ssrn.com/abstract=3582079*.

methodical way to reap its many benefits. This demand for a systematic approach, together with the extensive digitalization of the business and innovation landscape, have ignited an interest in a more uniform handling of IP at an international level. Nevertheless, initiatives limited in terms of geography or content might not have the desired impact due to lack of consistency. Moreover, resorting exclusively to legally binding measures does not address the need for prompt global action.

For this reason, soft law instruments such as standards and norms are ideal for the promotion of IP management on a voluntary basis. Several IP and innovation management standards have been developed in recent years within national and international standard development organizations and consortia. For the purpose of helping businesses overcome the modern IP challenges, the International Organization for Standardization[14] has introduced a family of standards that create the necessary framework applicable to innovation management (ISO 5600X).[15] This framework expands from the creation and acquisition of IP to cover commercialization and risk management, introducing a full-scale innovation and IP management system.

For technology-intensive industries, successful IP management would not only have a tremendous impact on an organization's output, but also on the protection of its own and any third-party IP. The establishment of structured and well-functioning management procedures stems from a conscious business decision that an organization wishes to be an active IP owner. Specifically, deploying its resources and staff to manage its own and third-party IP will most likely generate benefits in terms of IP commercialization. Leveraging IP assets is facilitated, because they are now both easier to handle in the course of commercial transactions and they can even become the basis of such transactions. Conversely, when there is no IP management system or process, a company becomes a passive owner of IP and misses opportunities to exploit the full potential of these rights. The lack of an IP management program would also result in a suboptimal use of third-party IP where available, including potential security vulnerabilities and unfavorable access terms to such rights.

Omnipresence of Open Source and Subsequent Risks

In the knowledge economy, the information and communication technology (ICT) industry holds a prominent role in driving innovation, responding to the need for ubiquitous connectivity of economies and people worldwide. Although ICT products and services traditionally depended almost exclusively on proprietary technologies, today this is no longer the case.

In its 2022 OSSRA report, Synopsis[16] found that of the 2.409 codebases[17] it audited for the purposes of the report, 97 percent contained open source.[18] In the same report, it was revealed that among 17 industry sectors, such as energy and computer hardware, the presence of open source in their codebases was between 93 percent and 100 percent. Due to the undeniable value and usefulness of open source solutions, their uncontrollable diffusion raises concerns regarding security and license compliance. A recent example is the Apache log4j vulnerability;[19] almost no one in the IT industry could have avoided its impact in the security space, due to the wide-spread use of the log4j library by a variety of software applications and online services. As a result, many systems were vulnerable to log4j attacks, allowing an attacker to inject malicious code into the system.

"Escaping" the use of ready-made open source components is neither possible nor desirable. To accomplish such an endeavor, a company would need to develop proprietary software solutions with the corresponding immense amount of time and money and no additional value. Meanwhile such a strategy would halt further innovation and market differentiation, since each company would dedicate disproportionate resources for developing software that already exists instead of striving for new and cutting-edge components.

The logic behind applying open source solutions is identical to the one around collaborative standards: an organization could, *e.g.*, develop a proprietary communication technology similar to 3G, but the ultimate question is whether this would make business sense at all. The development of a proprietary technology by one stakeholder requires vast resources and does not guarantee the network externalities offered by a stand-

14. "About," International Standardisation Organisation, accessed 09 May 2023, *https://www.iso.org/about-us.html*.

15. "ISO 56000:2020—Innovation management—Fundamentals and vocabulary," International Standardisation Organisation, accessed 09 May 2023, *https://www.iso.org/standard/69315.html*.

16. "About us," synopsys, accessed 09 May 2023, *https://www.synopsys.com/company.html*.

17. Definition of codebase: "An implementation of source code for an operating system or application. The term may be used generically to contrast platforms; for example, a *Linux codebase vs. a Windows codebase*. It may also refer to a different branch or version of the same software, the implication being that the different versions continue to be developed separately for different purposes." At "codebase," *PCmag*, accessed 09 May 2023, *https://www.pcmag.com/encyclopedia/term/codebase*.

18. "2023 OSSRA: A deep dive into open source trends," synopsys, accessed 09 May 2023, *https://www.synopsys.com/blogs/software-security/open-source-trends-ossra-report/*.

19. "Log4j vulnerability—what everyone needs to know," National Cyber Security Centre, accessed 09 May 2023, *https://www.ncsc.gov.uk/information/log4j-vulnerability-what-everyone-needs-to-know*.

ardized technology,[20] preferable to consumers. Moreover, the quality would most probably be far lower than the one created by hundreds of stakeholders (which is the case of 3G to 5G). By analogy, using open source as an alternative to proprietary software appears as the best possible solution; not re-inventing the wheel while also saving money and time. When organizations consume open source, it is of utmost importance that they take steps towards structured open source management within their organization and supply chain to ensure the secure, compliant, and strategic deployment of open source to avoid or mitigate potential risks associated with the use of third-party IP.

Open Source Versus IP Management: Overlap and Divergence

We described above what we consider necessary for an all-encompassing IP management system. In a similar fashion, an open source management program deals with open source which is protected by copyright, making it an IP asset. Open source management, as a subcategory of IP management, needs to cover the same four important aspects: (i) risk management/compliance; (ii) housekeeping, (iii) education/training; and (iv) external relations. The operation of an open source compliance program has the potential to facilitate the productive use of open source solutions in the products of an organization and—if intended—allow the organization to participate and make contributions in open source communities. As a result, the organization will be more likely to fully capture the added value of open source adopted internally, bringing about enhanced efficiencies in its operational activities.

However, regardless of these similarities, open source is inherently different from any other form of IP-protected technology asset. That makes its management more challenging and, in some respects, more sophisticated. During an open source compliance review, it is crucial to identify the open source components as well as the licenses they carry. The open source user is expected to identify the rights and obligations corresponding to each license to avoid unwanted mistakes. While checking these dependencies, security concerns may arise as well. That is why vulnerability management,[21] *i.e.*, examining the code quality and detecting for vulnerabilities and exposures in the used code, plays a pivotal role for open source management in general.

Creating an open source management system within each individual company from scratch can lead to complications in terms of scope, objectives and structure that each company might not be able to overcome. In addition, should this individual approach be followed, companies would not be able to perform a uniform assessment of their maturity and compliance level. On the other hand, the adoption of a standardized approach in open source management is expected to increase the likelihood of generating a consistent and qualitative result throughout the industry.

This is important when looking at the software supply ecosystem, where even "commercial" software contains open source. The benefits of consistent high-quality management programs thus propagate in the entire software supply chain, meaning the users will not have to "waste" time and resources managing the "commercial" software they consume.

The OpenChain Specification on Open Source License Compliance (ISO/IEC 5230:2020)

Responding to the challenge of bringing global industry solutions in the open source compliance realm, the OpenChain Project[22] developed the OpenChain Specification version 2.1 on open source license compliance.[23] The OpenChain Project is an international community of companies hosted by the Linux Foundation, dedicated to optimizing open source compliance and reinforcing trust in the open source supply chain. The OpenChain Specification has also been recognized as an ISO standard (ISO/IEC 5230:2020).[24]

The development of this specification was the result of an open and collaborative initiative involving over 100 corporate contributors with the goal of creating a cross-industry standard on how to manage open source in an organization. The community members that participated in the development process were given the freedom to offer feedback and build the specification from the ground up.[25] Consequently, the specification contains the minimum requirements considered essential in the industry for an organization to establish and maintain a high-quality open source license compliance program.

The two main axes of the specification are documentation and awareness. Firstly, the implementing companies are requested to produce the necessary documen-

20. See Joseph Farrell and Garth Saloner, "Standardization, compatibility and innovation," 16 *Rand Journal of Economics*, No.1 (Spring 1985): 1-2, *http://neconomides.stern.nyu.edu/networks/phdcourse/Farrell_Saloner_Standardiization_compatibility_and_innovation.pdf.*

21. "Vulnerability Disclosures," OpenSSF Vulnerability Disclosures Working Group GitHub, accessed 09 May 2023, *https://github.com/ossf/wg-vulnerability-disclosures.*

22. "Who We Are," OpenChain Project, accessed 09 May 2023, *https://www.openchainproject.org/community.*

23. "OpenChain Specification Version 2.1," theopenchainproject Github, accessed 09 May 2023, *https://github.com/OpenChain-Project/License-Compliance-Specification/blob/master/Official/en/2.1/openchainspec-2.1.pdf.*

24. "Learn More About OpenChain ISO/IEC 5230:2020," OpenChain Project, accessed 09 May 2023, *https://www.openchainproject.org/license-compliance.*

25. *Ibid.*

tation and to create documented procedures to form a fully-fledged compliance management system. Therefore, the need for documentation and record-keeping covers a variety of open source software management processes and tasks. For example, each organization is expected to have set down its process for responding to any third-party open source license compliance query (*e.g.*, identifying the legal experts to address these matters, identifying the process for handling non-compliance cases, etc.) (Section 3.2.1).[26] As for raising awareness, the specification recognizes the significance of critical employees being educated on open source and on the company's compliance management processes. To that end, the organization's written open source policy and open source contribution policy need to be accessible to the employees as part of their education (Sections 3.1.1 and 3.5.1).[27]

Additional pivotal action points of the OpenChain Specification relating to open source compliance and management are:

- Identification of roles and responsibilities for the employees working with or being responsible for open source in the organization (Section 3.1.2);[28]
- Establishment of procedures for reviewing the obligations, restrictions and rights of open source licenses identified in the inbound software (Section 3.3);[29]
- Creation and management of a 'Software Bill of Materials' (SBOM)[30] (Section 3.3);
- Management of different use cases (*e.g.*, in source or binary form, containing modified open source, etc.) (Section 3.3);
- Setting up a process for preparation and distribution of the required compliance artifacts according to the identified licenses (Section 3.4);[31] and
- Setting up review processes for open source to be contributed "upstream,"[32] ensuring that the intended contribution does not impact the organization's IP rights, such as patents (Section 3.5).[33]

26. "OpenChain Specification Version 2.1," theopenchainproject Github, 4.

27. *Ibid*, 2 and 6.

28. *Ibid*, 2-3.

29. *Ibid*, 5.

30. "Software Bill of Materials," National Telecommunications and Information Administration, assessed 09 May 2023, *https://ntia.gov/page/software-bill-materials*.

31. "OpenChain Specification Version 2.1," theopenchainproject Github, 5-6.

32. Definition of upstream: From the consumer to the provider. At "upstream," *PCmag*, accessed 09 May 2023, *https://www.pcmag.com/encyclopedia/term/upstream*.

33. "OpenChain Specification Version 2.1," theopenchainproject Github, 6.

The OpenChain Project supplies a questionnaire that assists the implementers with the conformance assessment and serves as a self-certification (with commercial certifiers offering third-party certification as well).[34] The specification functions as a tool that accommodates three major items: (1) gauging the maturity of open source software management and compliance within an organization, (2) identifying potential weak points, and (3) pinpointing recommended actions for achieving the desired level of maturity. On a larger scale, the specification aspires to set the industry's minimum requirements for open source compliance and management, accomplishing a certain level of trust between implementing organizations. Ultimately, the intention of the specification is to reduce the burden of compliance in the entire value chain.

The OpenChain Specification as a Useful IP Management Tool

The omnipresent nature of open source creates complications both in terms of managing the software itself as well as managing the IP rights it is intertwined with. For this reason, the OpenChain Specification offers an effective and industry-approved way of receiving and handling a variety of IP and technology assets, mainly, consumed open source.

As with all IP management implementations, a crucial point is to understand what IP is being used by the company and securing adequate access and control thereto, regardless of whether that IP was generated in the R&D lab or by a third party. The OpenChain Specification contains useful check points on how to, in a consistent and risk-minimizing way, bring third-party IP (in this case, in the form of open source) into an organization.

Furthermore, the specification assists with a primary concern in IP management, *i.e.*, compliance with legal and contractual obligations for the purpose of avoiding potential legal risks. Should an organization implement this specification, it helps mitigate risks related to inbound and outbound open source. The specification provides the necessary safeguards and processes in place from the moment the code is introduced into the company and throughout the life cycle of the product in which this code is used.

A further complication in an open source setting is the very real risk of the organization losing its "reputation" as a good open source citizen. Such an impact on its credibility is not a mere write-down of goodwill, but directly impacts an organization in multiple ways.

34. "OpenChain Self Certification," OpenChain Project, accessed 09 May 2023, *https://www.openchainproject.org/community*.

For example, it might be harder to recruit talent, obtain support from the open source community and, ultimately, get its contributions accepted into open source projects (meaning it cannot steer their direction).

A Guide to the OpenChain Specification

The OpenChain Specification spells out multiple requirements and action points that eventually aim to ensure the much-needed evaluation of the open source introduced for consumption in the company, and the conformance with their respective licenses. As we keep returning to in this article, it is key to understand what is being introduced as well as where, how and by whom it is being used within the organization. Only with that understanding is it possible to guarantee compliance with third-party IP, track vulnerabilities, and make sure that open source is introduced and consumed in accordance with the organization's policies.

The layout of the specification is simple, its main outline being the following:

- **What do you need?** Identification of an organization's open source responsibilities (Section 3.1 of the OpenChain Specification);[35]
- **Who do you need?** Resources and responsibilities assignment for open source compliance (Section 3.2);[36]
- **What should they do?** Review and approval of inbound open source content (Section 3.3);[37]
- **How do you show it?** Compliance artifacts (Section 3.4);[38]
- **How do you manage contributions?** (Section 3.5);[39] and
- **Are you compliant?** Adherence to the specification requirements (Section 3.6).[40]

In the following part, we will provide a brief description of the main requirements and examine in more detail how they assist in reducing potential risks and how they translate to a quality IP management program.

Open Source Compliance and IP Management Tool

1. Risk Management—Compliance

Risk management and compliance in the context of open source appear to be two sides of the same coin; on the one hand, organizations manage the risk of losing their own IP rights while, on the other hand, avoid infringing third-party IP by breaching the obligations set by each open source license that covers each open source component. Risks can be averted and legal obligations can be safely and confidently met when a company adopts a comprehensive open source management program, like the one described in the OpenChain Specification.

The first 'order of business' is to consider and document the organization's open source policy. A policy document usually includes guidelines, recommendations, or instructions on how an organization approaches or should approach a certain matter. Thus, an open source policy entails the high-level 'dos and don'ts' concerning open source consumption and contribution in an organization as well as general directions on the same topics. Establishing and making available an open source policy (Section 3.1.1)[41] is the first step towards a successful open source compliance management program.

Through official written processes regarding the response to internal or external license compliance queries (Section 3.2.1)[42] and through the articulation of the rights and obligations of the identified licenses (Section 3.1.5),[43] the organization guarantees compliance therewith as well as full exploitation of its IP. It is of great importance to make sure that a business complies with its licensing obligations without "infecting" its own intangible assets. The "infection" of an organization's intangible assets refers to the inadvertently granting royalty-free licenses of its IP (*e.g.*, copyright on proprietary code or patented inventions) by signing an open source license. For example, the establishment of a Software Bill Of Materials, so called SBOMs (Section 3.3.1)[44] allows the organization to have a clear overview of the open source components it is introducing and using commercially.

Relatedly, an open source management program pays special attention to the open source contribution policy of each organization and the need for, *e.g.*, developers participating in open source projects to be fully aware of the dos and don'ts of their organization when it comes to contributing code upstream (Section 3.5.1).[45] By following this policy, no IP rights of the company will likely be jeopardized from said contributions.

Another crucial element of the OpenChain Specification is the maintenance of open source "hygiene" within an organization. This implies having procedures in place so that when code is introduced, it is additionally scanned to ensure that the software components are adequately secure. Such procedures have the beneficial

35. "OpenChain Specification Version 2.1," theopenchainproject Github, 2-4.
36. *Ibid*, 4.
37. *Ibid*, 5.
38. *Ibid*, 5-6.
39. *Ibid*, 6.
40. *Ibid*, 6-7.
41. *Ibid*, 2.
42. *Ibid*, 4.
43. *Ibid*, 3-4.
44. *Ibid*, 5.
45. *Ibid*, 6.

side effect of being particularly useful for vulnerability management of the inbound software, which occurs in a consistent and detailed manner throughout the product life cycle.

2. Housekeeping—Innovation Management

Besides being an appropriate IP risk management tool, the OpenChain Specification provides a comprehensive baseline for housekeeping within an organization. The specification requirements introduce processes that function as checks and balances between different departments for the harmonious and effective management of open source solutions. Special emphasis is given to the establishment of multi-layered, automated procedures for coping with a variety of challenges potentially encountered in the use of open source. One example is the establishment of procedures for handling the review and remediation of cases where compliance issues exist regarding certain open source obligations (Section 3.2.2.5).[46] This essentially means that a company must have a Plan B in case of license breaches (*i.e.*, not complying with an open source license obligation), including how to deal with those and mitigate their fallout.

For the purpose of continuity, consistency and reliability, these procedures are requested to be documented and, oftentimes, made available to the organization's employees. As a result, the employees can speak 'the same language' and have a common understanding when it comes to open source via the homogenous and well-established processes within the company.

'Running a tight ship' in terms of open source is imperative for the achievement of compliance targets and for a long-term, holistically higher performance within an organization. Along the same lines, during an M&A process, due diligence could be facilitated and the parties benefited by an efficient open source management program.

What is more, housekeeping is tightly related to innovation management for organizations that heavily rely on ground-breaking technologies for releasing products and generating revenue. The procedures previously discussed in the context of open source compliance management result in the creation of a log that contains all the open source components and related IP brought in and used by the organization. Consequently, the organization can direct its R&D efforts accordingly, as well as manage any commercial contracts involving software.

3. Education

To optimize risk management and housekeeping, it is beneficial to provide the employees with the tools needed to appreciate the benefits and complexities of open source. For this reason, education and awareness are at the forefront for the OpenChain Specification (Sections 3.1.1.1, 3.1.2.3, 3.1.3.1 and 3.5.1.3).[47] An organization should guarantee that its employees working with open source are competent for their role and are aware of what is expected from them. In addition, all relevant employees should have a fundamental level of knowledge around internal processes for them to be in sync and collaborate seamlessly. For this reason, it is critical to provide training to the professionals within the company on the importance of open source as well as on the policies and procedures covering its management. A key point of emphasis is that developers need to be conscious of the open source policy and open source contribution policy of their organization in order to make informed executive and/or technical decisions, *i.e.*, Sections 3.1.1.1[48] and 3.5.1.3.[49]

4. External Relations—Contributions

Considering the increasing influence of open source solutions across industries, higher business performance means capitalizing on the incremental value of open source. This can only occur in a secure environment that acknowledges its relevance. The implementation of OpenChain Specification views open source management in an integrated manner. Namely, it focuses on compliance and consumption, without neglecting the need to contribute back to open source projects (Section 3.5).[50]

Being involved in open source communities is not a priority for many organizations since it does not fit all business models. On the other hand, an organized and target-oriented participation can produce short- and long-term benefits for open source users. Firstly, they can actively engage in the 'give and take' of the community in terms of code development,[51] bug fixes,[52] and support, and secondly, get the opportunity to have a say in future open source projects. Therefore, instead of simply consuming software components for their products and services, implementers of the OpenChain Specification might optionally elect to give back to open source communities and enhance the value of open source for their business.

46. *Ibid*, 4.

47. *Ibid*, 2, 3, 3 and 6, respectively.

48. *Ibid*, 2.

49. *Ibid*, 6.

50. *Ibid*, 6.

51. Definition of code: A set of machine symbols that represents data or instructions. See data code and machine language. At "code," *PCmag*, accessed 09 May 2023, *https://www.pcmag.com/encyclopedia/term/code.*

52. Definition of bug fix: A revised program file or patch that corrects a software bug. At "bug fix," PCmag, accessed 09 May 2023, *https://www.pcmag.com/encyclopedia/term/bug-fix.*

Therefore, apart from the need to map out an advisory open source contribution policy (Section 3.5.1.1),[53] conformance with the OpenChain Specification means that an organization must establish a documented procedure to advise developers regarding corporate approaches to contributing to open source projects and to guide them through the contribution process (Section 3.5.1.2).[54] Such procedure also needs to be communicated to all relevant employees (Section 3.5.1.3).[55]

Finally, the implementation of the OpenChain Specification could be advantageous at the macro level as well. Apart from facilitating housekeeping and decision-making, it might act as a springboard for cultivating the open source culture within the company. The possibility to further educate employees on the intricacies of open source will benefit the immediate operations and, gradually, the overall large-scale strategic targets of the company. On an industry level, the more organizations that actively exercise and implement this standard, the closer the industry will get to healthier open source management. Following the objective set out in the specification itself, the establishment of a robust open source license compliance management system plays a seminal role in building trust between organizations across different industries.

Conclusion

In the era of 5G and "smartification," the all-connected world overflows with new and innovative products and services. Although capturing innovation through IP is key, stakeholders in hi-tech industries need to monetize their IP to get necessary returns on their investment. The innovation circle can only function and generate benefits for a business if supported by a robust IP management system.

IP management is equally decisive when dealing with software, especially in the form of open source compliance management. For this reason, software-driven companies are encouraged to adopt an open source management program to ensure conformance with their legal obligations. It follows that the value of open source within a company will be maximized, and these internal benefits will be externalized by means of improved collaboration with third parties and an enhanced role in the open source community.

This is where the OpenChain Specification comes along. By implementing this specification, which identifies the basic requirements for open source IP management, you might not be able to answer the question of which Linux kernel[56] distribution is best for your embedded products; that decision will remain in the domain of the Chief Technology Officer of your company (CTO). But you can rest assured that:

- Legal risks are minimized;
- The relevant stakeholders have the right training and the right resources;
- Compliance is done systematically; and
- The organization has increased visibility into security issues that may arise, facilitated through the identification of any third-party IP used.

Should engineers wish to contribute bug fixes or new features upstream, there are processes within the organization to address this. It is all about putting processes in place that guarantee fewer risks and less friction down the line.

Due to these evident advantages of open source management, the OpenChain Specification has so far been adopted by many companies of different sizes and from different industries, *i.e.*, large multinational companies such as ARM, Google, Qualcomm and Toyota, as well as smaller companies.[57]

Perhaps, it is time for your organization to take the plunge, get ahead of the curve and include open source management as part of its IP management practices as well. This way you can make both IP and open source management safe and boring. ■

53. *Ibid*, 6.
54. *Ibid*, 6.
55. *Ibid*, 6.

56. Definition of Linux kernel: The nucleus of the Linux operating system. The Linux kernel, which was developed by Linus Torvalds, was integrated with software from the GNU Project and other sources to create the actual Linux operating system. At "Linux Kernel," *PCmag*, accessed 09 May 2023, *https://www.pcmag.com/encyclopedia/term/linux-kernel.*

57. "ISO/IEC 5230 Conformant Programs Announced Via Our Website," OpenChain Project, accessed 09 May 2023, *https://www.openchainproject.org/community-of-conformance.*

Public And Private Initiatives To Accelerate The Development And Diffusion Of Green Tech Part I

By Aileen M. Sanguir

Abstract

Global average temperature increase is still likely to exceed 1.5°C despite State commitments, and we can see its disastrous effects through extreme weather phenomena around the world. Systems should be overhauled to combat climate change, and massive investment in green technology is crucial for this.

Patents incentivize investment in green tech by allowing patentees to protect investments, leverage for cross-licensing, generate royalties, and attract funding. Public initiatives are equally necessary to accelerate development and diffusion, and some measures adopted are fast-tracking patent applications, subsidies, and tax incentives. Some regional initiatives, *e.g.*, the EU Emissions Trading System and the International Solar Alliance, are also in place to aid in the zero-carbon transition. As for the private sector, some are moving towards a circular economy, aiming to increase the use of renewable materials. Other innovative approaches to boost green tech are open-source software, platforms for collaboration (*e.g.*, WIPO Green), and standardization. Open source allows different entities to integrate green tech products. Standardization involves the development of technical specifications for products and processes, aimed at interoperability and minimum performance levels. It has driven innovation in the mobile telecommunications, consumer electronics, automotive, and electricity industries. Standardizing green tech solutions may be beneficial, including in the energy, manufacturing, and transport sectors.

Climate change requires a fundamental re-orientation of existing structures. For this, public and private efforts should be channeled towards green tech development and diffusion, supported by robust patent policy, and global regulatory, trade, and financial regimes conducive to investment and innovation.

I. Introduction

In the Paris Agreement of 2015,[1] 196 Member States[2] of the United Nations Framework Convention on Climate Change (UNFCCC) bound themselves to certain obligations, one of the goals being to limit the increase in global average temperature to 1.5°C above pre-industrial levels.[3] To the casual reader, 1.5°C may not seem large—but the rise in temperature of almost one degree at present has already drastically altered human and natural systems, leading to sea level rise, biodiversity loss, and extreme weather such as droughts and floods.[4]

■ Aileen M. Sanguir,
IPR and Licensing Manager,
Ericsson AB,
Stockholm, Sweden
E-mail: aileensanguir@gmail.com

Indeed, 2022 has witnessed remarkable weather occurrences all over the world. Last summer, Pakistan recorded its worst flooding in at least a decade.[5] From June to August, Pakistan received 190 percent of its annual normal rainfall, and there have been 1,160 deaths and 3,500 injuries as a consequence of the devastating floods.[6] Researchers say that last summer's monsoon season was intensified by climate change.[7]

1. Conference of the Parties, Adoption of the Paris Agreement (12 December 2015) UN Doc FCCC/CP/2015/L.9/Rev/1 (Paris Agreement).

2. United Nations Climate Change, "The Paris Agreement" (*United Nations Climate Change* undated) <*https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement*> accessed 19 November 2021.

3. Paris Agreement, art. 2(1)(a).

4. Myles Allen, Opha Pauline Dube, William Solecki, Fernando Aragón-Durand, Wolfgang Cramer, Stephen Humphreys, Mikiko Kainuma, Jatin Kala, Natalie Mahowald, Yacob Mulugetta, Rosa Perez, Morgan Wairiu, Kirsten Zickfeld, "Framing and Context" in Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds), *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (Intergovernmental Panel on Climate Change 2019) 49, 53.

5. Kasha Patel, "Why Pakistan's Record-Breaking Monsoon Season is so Devastating" (Washington D.C., 31 August 2022) <*https://www.washingtonpost.com/climate-environment/2022/08/31/monsoon-pakistan-flooding-explainer/*> accessed 10 February 2023.

6. *ibid.*

7. *ibid.*

On the other end of the weather spectrum, the Horn of Africa has been experiencing one of the longest and most severe droughts towards the end of 2022.[8] This is causing food insecurity for over 21 million people in Somalia, Kenya, and Ethiopia.[9] The four consecutive dry rainy seasons have been correlated to human-induced warming, Indian Ocean sea surface temperatures, and La Niña.[10.] Similarly, drought and severe heat waves have hit Europe, with wildfires occurring in Portugal, France, Italy, and Romania in August.[11] This negatively impacted the crop yield and Europe's energy crisis, hindering hydropower generation and the normal functioning of nuclear plants.[12]

Despite lying in another continent, the United States is not insulated from the effects of sea level and temperature rise. In 2022, California experienced its third year of severe drought and the driest on record as part of a climate-change fueled "megadrought."[13] The rising temperatures are adversely affecting the region's water supply.[14] In South America, parts of Argentina, Bolivia, central Chile, and most of Paraguay and Uruguay experienced two consecutive heatwaves in late November and early December 2022, reaching record-breaking temperatures. [15]

The UK was also hit with severe drought, with its highest temperature recorded at 40.3°C on the 28th of July.[16] This caused fires to break out and disrupted rail transport.[17] All of these events glaringly show the impacts of climate change in every region of the world.

Against this backdrop, the United Nations' annual global climate change summit "Conference of the Parties" was held in Sharm el-Sheikh, Egypt in November 2022 (COP27).[18] In COP27, countries reaffirmed their commitment to limit global temperature rise to 1.5°C above pre-industrial levels, following the Paris Agreement in 2015.[19] Among the decisions reached in COP27 is the creation of a specific fund for loss and damage for developing countries stricken by climate disasters.[20] Other highlights include the creation of the Sharm el-Sheikh Adaptation Agenda, with the primary aim of developing resiliency-building projects, and nations' agreement to provide additional funding for the UN's Adaptation Fund, intended to help communities adapt to climate change.[21]

Steps taken on a national and regional scale include the U.S. passing new laws confronting climate change, including a bill that aims to make green energy the default in major sectors like electricity, transport, and industry.[22] Australia submitted increased targets for the reduction of its emissions to the UN, from its previous target of 26 percent to 43 percent by 2030.[23] As for the European Union, it targets to raise its share of renewable energy from 40 percent to 45 percent by 2030, encapsulated in the REPowerEU plan.[24]

That said, it was noted that progress since COP26 has been slow due to the global energy and financial crises.[25] In addition, the COP 27 decision text does not

8. Emily Cassidy, "Worst Drought on Record Parches Horn of Africa" (California, December 2022) <*https://earthobservatory.nasa.gov/images/150712/worst-drought-on-record-parches-horn-of-africa*> accessed 10 February 2023.

9. *ibid.*

10. *ibid.*

11. Marianne Lehnis, "2022 Was a Year of Record-Breaking Extreme Weather Events" (New York City, 29 December 2022) <*https://www.forbes.com/sites/mariannelehnis/2022/12/29/2022-was-a-year-of-record-breaking-extreme-weather-events/*> accessed 10 February 2023.

12. *ibid.*

13. Diana Leonard, "California is Supposed to Enter a Wet Season. More Drought is Forecast" (Washington D.C., 25 October 2022) <*https://www.washingtonpost.com/climate-environment/2022/10/25/california-drought-forecast-record-dry/*> accessed 10 February 2023.

14. *ibid.*

15. United Nations, "WMO Releases 'Tell-Tale Signs' of Extreme Weather Conditions Around the World" (New York City, 23 December 2022) <*https://news.un.org/en/story/2022/12/1131992*> accessed 16 February 2023.

16. Marianne Lehnis, "2022 Was a Year of Record-Breaking Extreme Weather Events" (New York City, 29 December 2022) <*https://www.forbes.com/sites/mariannelehnis/2022/12/29/2022-was-a-year-of-record-breaking-extreme-weather-events/*> accessed 10 February 2023.

17. *ibid.*

18. United Nations Climate Change, "Sharm El-Sheikh Climate Change Conference—November 2022" (*United Nations Climate Change* undated) <*https://unfccc.int/cop27*> accessed 13 February 2023.

19. United Nations Climate Change, "COP27 Reaches Breakthrough Agreement on New 'Loss and Damage' Fund for Vulnerable Countries" (*United Nations Climate Change*, 20 November 2022) <*https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries*> accessed 14 February 2023.

20. *ibid.*

21. David Carlin, "COP 27 Recap: The Good, The Bad, And What's Next After The Climate Conference" (New York City, 16 December 2022) <*https://www.forbes.com/sites/davidcarlin/2022/12/16/cop-27-recap-the-good-the-bad-and-whats-next-after-the-climate-conference/*> accessed 16 February 2023.

22. Georgina Rannard and Esme Stallard, "COP27: What have global leaders done on climate change in 2022?" (London, 20 November 2022) <*https://www.bbc.com/news/science-environment-63458945*> accessed 16 February 2023.

23. *bid.*

24. *ibid.*

25. *ibid.*

include language phasing out fossil fuels, and in that sense, it does not effectively limit warming. [26]

The foregoing events show the need not only to mitigate the environmental damage already caused, but also to overhaul and adapt systems and processes to operate sustainably. The development and use of new technology are crucial for this, and society must consider environmental objectives when developing and choosing new technologies.[27] The development of climate policy requires large investments in technology and implementation in all sectors, *e.g.*, transport, construction, energy, agriculture, shipping, tourism, etc.[28] To illustrate, it has been estimated that an additional USD $44 trillion of investment would be needed to decarbonize energy systems by 2050 to meet global climate targets.[29] To achieve green growth, the participation of different private and public actors and institutions within the economy—consumers, firms, policymakers—is required in addition to substantial investments.[30] In other words, the planet urgently needs a successful green tech plan.

This paper, divided into two parts, analyzes how public, private and hybrid initiatives toward green technologies could accelerate the development of cutting-edge solutions for the purpose of lessening the impact of climate change. This first part attempts to define green technology and discusses the role of patents in green tech development and identifies some public initiatives in support of this development.

II. What is Green Tech?

Green technology (also known as green tech) is broadly one that enables users to promote environmental sustainability while maintaining economic growth.[31] One example is climate change mitigation technologies (CCMT) such as carbon capture and storage[32] or radiative cooling.[33] It bears noting however, that there is no uniform definition for green tech. Instead, different terms are used in literature, although all are aimed at similar objectives.

For example, the United Nations has defined "environmentally-sound technologies (EST)" as those that "protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes."[34] This definition has likewise been cited by the World Intellectual Property Organization (WIPO).[35]

From a patent point of view, the European Patent Office (EPO) in 2010 established a dedicated tagging scheme to identify applications that cover technologies involving climate change mitigation,[36] known as "Y02/Y04S."[37] Whenever a document concerning sustainable technology is added to its databases, the EPO assigns either a Y02 (for CCMT) or Y04S (for smart grids[38]) sym-

26. UN Environment Programme Finance Initiative (FI), "COP27—'Loss and damage' success tempered by lack of implementation" (*UN Environment Programme FI* 7 December 2022) <*https://www.unepfi.org/themes/climate-change/cop27-loss-and-damage-success-tempered-by-lack-of-implementation/*> accessed 15 March 2023.

27. Robert Anex, "Stimulating Innovation in Green Technology: Policy Alternatives and Opportunities" (2000) 44(2) *American Behavioral Scientist* 188, 191.

28. Emma Tompkins and W. Neil Adger, "Defining response capacity to enhance climate change policy" (2005) 8 *Env Sci & Pol'y* 562, 568-569.

29. Kristina Lybecker and Sebastian Lohse for the World Intellectual Property Organization, "Innovation and Diffusion of Green Technologies: The Role of Intellectual Property and Other Enabling Factors (Global Challenges Report)" (WIPO 2015) 20, citing IEA 2014.

30. Grazia Cecere, Nicoletta Corrocher, Maria Luisa Mancusi, "Financial constraints and public funding of eco-innovation: empirical evidence from European SMEs" (2020) 54 *Small Bus Econ* 285, 287.

31. Anex (n 27) 191.

32. Carbon capture and storage (CCS) aims "to reduce anthropogenic carbon emissions by storing CO2 in the subsurface instead of emitting it into the atmosphere." CCS has three major parts: (1) capture of CO2 from a large stationary source, (2) transport to a storage site, and (3) storage. Karl W. Bandilla, "Carbon Capture and Storage" in Trevor M. Letcher (ed.), "Future Energy: Improved, Sustainable and Clean Options for Our Planet 3rd ed" (Elsevier 2020).

33. Radiative cooling enables objects to dissipate heat into outer space in the form of electromagnetic waves and to achieve cooling without any external energy input. It is useful for energy saving applications. Bin Zhao, Mingke Hu, Xianze Ao, Nuo Chen, Gang Pei, "Radiative cooling: A review of fundamentals, materials, applications, and prospects" (2019) 236 Applied Energy 489.

34. United Nations Conference on Environment and Development (1992) Agenda 21, Rio Declaration, Chap 34, 34.1.

35. See Lybecker and Lohse (n 29) 5.

36. Stefano Angelucci, F. Javier Hurtado-Albir, Alessia Volpe, "Supporting global initiatives on climate change: The EPO's 'Y02-Y04S' tagging scheme" (2018) 54 World Patent Information S85.

37. The Y02 subclasses relate to specific clean energy technologies, buildings, transportation, and others. The Y04S subclass on smart grids covers remote network operation, smart metering, electric and hybrid vehicles interoperability, and energy trading and marketing. European Patent Office, "Sustainable Technologies" (*European Patent Office* undated) <*https://www.epo.org/news-events/in-focus/classification/classification.html*> accessed 11 May 2022.

38. Smart grids are "automated, widely distributed energy delivery networks with a two-way flow of electricity and information," which are capable of responding to changes that range from the power source, user preferences, or even individual appliances. European Patent Office, "Finding sustainable technologies in patents (brochure)" (EPO undated) 3.

bol.[39] The EPO describes CCMT as technology focused on "controlling, reducing or preventing the anthropogenic emissions of greenhouse gases, as covered by the Kyoto Protocol."[40] Nonetheless, the EPO has clarified that the Y02/Y04S scheme is based on an ad hoc definition of "green" and neither sets an official definition for the term nor certifies technologies as green.[41]

In sum, there is no official definition of green technology. To date, it remains unclear which technologies would specifically be considered green or not.[42] As for the private sector, it has been observed that companies pay little attention to green tech definitions, but rather focus their efforts on the development and assessment of the quality of technologies for patenting purposes.[43] Given this patent focus, it would be useful to evaluate the role patents play not only in the development of technology in general, but also of green tech in particular.

III. Role of Patents

Patents have been key for the growth of the innovation ecosystem and will continue to play a vital role in incentivizing the development of green technologies. By granting a limited period of exclusivity, patents allow inventors to obtain some of the social value of their discoveries while providing incentives for continued investment in research and development (R&D).[44]In addition, patents facilitate technology transfers and collaboration in different industries, allow companies to focus their R&D efforts towards new and unpatented ideas, and enable such innovative ideas to reach society faster.[45]

This is especially true for small and medium-scale enterprises (SMEs), which normally have more flexibility to innovate and can rely on patents when facing larger players, both to protect their technologies and to have avenues for cross-licensing.[46] Nonetheless, a strong patent portfolio is also important for large established companies, as a way of protecting their investments, establishing a competitive advantage in the market, as leverage for cross-licensing, and as a source of licensing royalties.[47]

As for academic and research institutions, patents allow them to "transform their innovations into licensing income streams," which could in turn fund future research.[48] The foregoing is true not only in developed countries, but also in emerging economies, where a strong intellectual property (IP) rights system would help attract foreign investors to partner with local entities, aiding in the introduction of new technologies and in the promotion of social and economic growth.[49]

IP rights, including patents, also play a key role for obtaining financing or capital, especially for SMEs.[50] Quality patents help businesses send a positive signal to possible collaborators and investors regarding the value of their inventions.[51] Indeed, it has been observed that effective IP protection is a precondition before most private funding becomes available.[52]

Regarding green tech in particular, the publication of patent applications may serve as a catalyst for technology-centric cooperative arrangements such as acquisitions, partnerships, and licensing.[53] Perhaps this is why innovation in green tech is measured by some through the number of patent applications.[54] Indeed, patent

39. *ibid* 7.

40. *ibid* 3.

41. Yann Ménière (EPO, Chief Economist), "Green Technologies" (Advanced Lecture Series on Green Technologies—Lecture 1, Munich, November 2021).

42. Philipp Hoff, "Greentech Innovation and Diffusion: A Financial Economics and Firm-Level Perspective" (1st ed, Gabler Verlag 2012) 7.

43. Isak Lind and Rasmus Kockgård, "Spreading green IoT tech through mechanisms of sharing intellectual property" (Master's thesis, Chalmers University of Technology 2021) 35.

44. Hon. Maureen K. Ohlhausen, "Patent Rights in a Climate of Intellectual Property Rights Skepticism" (2016) 30(1) *Harv JL&T* 103, 105.

45. 4iP Council in collaboration with ASTP, European IP Helpdesk, EPO, France Brevets, GRUR, IPAN and Intellectual Property Institute Luxembourg, "4 Reasons to Patent" (undated) *<https://www.4ipcouncil.com/4smes/4-reasons-patent>* accessed 11 January 2022.

46. Nyske Blokhuis (EP&C Patent Attorneys Netherlands, Associate Partner), "IP Strategy for Green Tech" (Advanced Lecture Series on Green Technologies—Lecture 2, Munich, November 2021).

47. *ibid.*

48. World Energy Council, "Energy Sector Environmental Innovation: Understanding the Roles of Technology Diffusion, Intellectual Property Rights, and Sound Environmental Policy for Climate Change" (*World Energy Council*, 2011) 11 citing Idris K, Arai H. "The Intellectual Property-Conscious Nation: Mapping the Path from Developing to Developed" (*WIPO*, 2006) 27) *<https://www.worldenergy.org/assets/downloads/wec_rules_of_trade__ipp_paper.pdf>* accessed 9 May 2022.

49. *ibid* 19.

50. Lybecker and Lohse (n 29) 10.

51. ibid 11; Investors consider patents "a measure of value and a method of communication for business development." *See* 4iP Council, Interview with Didier Tranchier, Founder and President of ADELIT (Brussels, 25 September 2015) *<https://www.4ipcouncil.com/features/investors-perspective>.*

52. Lybecker and Lohse (n 29) 22.

53. World Energy Council (n 48) 10.

54. See Lybecker and Lohse (n 29) 7; see also Francesco Pasimeni, Alessandro Fiorini, Aliki Georgakaki, "International landscape of the inventive activity on climate change mitigation technologies. A patent analysis" (2021) 36 *Energy Strategy Reviews* 1.

data has been used to provide an overview of global inventiveness in CCMTs.[55] Moreover, a strong patent portfolio could be essential for green tech SMEs to attract venture capitalists, which, beyond assessing the value of technology, would also consider whether there is adequate protection against "free-riding."[56]

Without patent protection, firms would either have no incentive to continue innovating or would likely direct their R&D funds into technologies protectable under trade secrets.[57] This, in turn, would prevent market participants from building on existing technology and stifle the development of an open innovation[58] culture. Firms would then tend to restrict access to competitively relevant information as a form of self-help to substitute for IP protection.[59] Further, there is evidence that inadequate IP protection hinders technology diffusion.[60] This is because the patent system requires and incentivizes the publication of key results and scientific data, which enables further innovation and the development of new and derived products.[61] Specifically on the development of green technologies, it has been opined that "[g]iven the complexity of the technology involved and the global nature of climate change, open innovation is especially relevant for environmental innovation."[62]

Despite the foregoing advantages, some have raised concerns that patents allow their holders to charge users higher prices, and that the benefits derived from some patented technologies are unclear or are difficult to measure.[63] In the same vein, some believe that the market and pricing power conferred by IP protection could hinder the diffusion of technologies whose creation IP is meant to encourage, particularly if prices of products or license fees for patented technology are prohibitive.[64] If there is a lack of access, it is argued that IP protection may hinder subsequent innovators from building on protected technologies.[65]

The foregoing criticisms may not be entirely applicable to green tech. It should be noted, in this regard, that patents of most basic CCMTs have already expired, and the technologies have become publicly available and are widely used, *e.g.*, wind turbines and photovoltaic cells.[66] In addition, green tech patents typically involve incremental improvements or additional features of existing solutions.[67] Any perceived negative impact resulting from patents may thus be overstated. For these reasons, the arguments against patent protection might not outweigh its advantages in terms of green tech development.

Thus, patent protection remains crucial to incentivize the private sector to invest in and develop green technologies. However, additional public initiatives are equally necessary for the development and diffusion of such technologies because diffusion requires considerable financing, physical infrastructure, incentive policies, and legal safeguards that foster investment.[68] Consequently, beyond patent policy, global regulatory, trade, and financial regimes should be put in place to enable investment, innovation, and technology development and uptake.[69] It is only through these that private commitment to green tech can be secured and sustained.[70]

Some of these initiatives, the private efforts they have spurred, and other mechanisms that could be adopted to complement and/or enhance their effectiveness, shall be discussed in the next sections.

IV. Public, Private, and Hybrid Initiatives

1. Public Initiatives

Transnational or government authorities can promote the development and diffusion of green tech by establishing market-based national (or regional) systems of innovation.[71] Some options available for this purpose are: 1) carbon pricing, 2) subsidies, 3) funding grants, and 4) public-private partnerships.[72]

55. Pasimeni, Fiorini, Georgakaki (n 54) 2.

56. Lybecker and Lohse (n 29) 21.

57. Ohlhausen (n 44) 130 citing Petra Moser, "How do Patent Laws Influence Innovation? Evidence from Nineteenth-Century World's Fairs" (2005) 95 *Am Econ* Rev 1214, 1214.

58. Under open innovation, companies collaborate with external firms or organizations in developing innovative processes. Lybecker and Lohse (n 29) 11.

59. World Energy Council (n 48) 12.

60. Lybecker and Lohse (n 29) 10.

61. World Energy Council (n 48) 10.

62. Lybecker and Lohse (n 29) 11.

63. Ohlhausen (n 44) 105.

64. Bronwyn Hall and Christian Helmers, "Innovation and diffusion of clean/green technology: Can patent commons help?" (2013) 66 *J Env E&Mgmt* 33, 34.

65. *ibid.*

66. World Energy Council (n 48) 15 citing Khor M. "Challenges of the Green Economy Concept and Policies in the Context of Sustainable Development, Poverty and Equity" in UN-DESA/UNEP/UNCTD "The Transition to a Green Economy: Benefits, Challenges and Risks from a Sustainable Development Perspective" (UNDESA DSD, UNEP, UNCTAD, 2011) 87 and UNFCCC, "Technologies for Adaptation to Climate Change" (Bonn. 2006) 9.

67. *ibid* citing Barton JH, "Intellectual Property and Access to Clean Energy Technologies in Developing Countries" in ICTSD Trade and Sustainable Energy Series Issue Paper 2 (2007) 4.

68. *ibid* 21.

69. *ibid* 2.

70. *ibid* 21.

71. Lybecker and Lohse (n 29) 3.

72. Other options cited in literature are mandates as well as environmental and technical standards and regulations. Lybecker and Lohse (n 29) 23.

Policy could also spur innovation by providing incentives for collaborative arrangements and creating networks for information transfer.[73] The key, in this regard, is to find the right balance between technology policy (whose role is to facilitate and incentivize the development of green tech)[74] and environmental policy (aimed at encouraging the diffusion of the technologies developed).[75] In finding this balance, policymakers should carefully study the conditions of the country (local context) and the industry at which the regulations are aimed.[76]

a) National Initiatives

Some examples of options implemented on a national level—fast-tracking of patent applications, funding grants, and tax incentives—are discussed in this section.

Accelerated Processing of Patent Applications

Recognizing the value of patent protection, some countries have initiated programs that permit the faster examination of patent applications related to green tech. For example, since 2011, the Canadian IP Office has permitted the submission of requests at no cost for the faster processing of green technology, *i.e.*, those that if commercialized would help "resolve or mitigate environmental impacts or conserve the natural environment and resources."[77] Once a request is processed, a first office action can be expected after three months as compared to 13 months under the normal process.[78] It has been observed that in practice, it takes as little as two to four weeks from processing of the request for applicants to receive a first office action,[79] and that the patent grant rate is remarkably high—around 88 percent of the applications filed through the accelerated process in 2018 have been granted as of June 2021.[80]

Similar acceleration programs are in place in the UK (introduced in 2009),[81] Japan (green tech made eligible in 2009),[82] Australia (2009),[83] Israel (2009),[84] South Korea (2009),[85] Brazil (piloted in 2012 and upgraded in 2020),[86] China (2012),[87] and Taiwan (green energy tech made eligible in 2014).[88] Despite the availability of these programs, only a small percentage of green patents applicants opt to request accelerated examination.[89] There may be several reasons for this, including lack of awareness of the acceleration programs,[90] or a business strategic decision. An applicant may even wish to delay the patent grant when the market is not

73. Anex (n 27) 195.

74. Lybecker and Lohse (n 29) 25.

75. *ibid.*

76. *ibid* 29.

77. Canadian Intellectual Property Office, "Advanced examination for green technologies" (*Canadian IPO* 8 June 2021) <*https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr04746.html*> accessed 7 December 2021.

78. *ibid.*

79. Isi Caulder and Justin Philpott, "Fast-Tracking Your Green Technology at the Canadian Patent Office Has Never Been Better" (*Bereskin & Parr LLP* 13 October 2020) <*https://www.bereskinparr.com/doc/fast-tracking-your-green-technology-at-the-canadian-patent-office-has-never-been-better*> accessed 7 December 2021.

80. Brion Raffoul, "Fast Track to a Cleaner Future: Accelerating Green Technology at the Canadian Patent Office" (*Brion Raffoul IP Law 7* June 2021) <*https://bripgroup.com/2021/news/fast-track-to-a-cleaner-future-accelerating-green-technology-at-the-canadian-patent-office/*> accessed 7 December 2021.

81. United Kingdom Intellectual Property Office, "Patents: accelerated processing" (*UKIPO* 18 December 2019) <*https://www.gov.uk/guidance/patents-accelerated-processing*> accessed 7 December 2021.

82. For this purpose, a green invention is one that "has an energy-saving effect and contributes to CO2 reduction." Administrative Affairs Division, Japan IPO, "Outline of Accelerated Examination and Accelerated Appeal Examination" (*Japan IPO* 24 September 2021) <*https://www.jpo.go.jp/e/system/patent/shinsa/jp-soki/*> accessed 7 December 2021.

83. Sterne Kessler Goldstein & Fox PLLC, "Global initiatives to accelerate examination of cleantech patent applications" (*Lexology* 11 March 2015) <*https://www.lexology.com/library/detail.aspx?g=ab9bb966-0b9c-4ca1-9192-35fb105f2f55*> accessed 7 December 2021.

84. *ibid.*

85. The program provides that the first office action shall be issued within one month from request. Unlike programs of other countries, only technologies funded or certified by the Korean government as "green" or designated as such in environmental legislation are eligible under the super-accelerated examination system. Trade and Cooperation Division, Korean Intellectual Property Office, "IP Policies: Three-track Patent and Utility Model Examination System" (*Korean IPO* 24 May 2016) <*https://www.kipo.go.kr/en/HtmlApp?c=100000&catmenu=ek02_01_02_01*> accessed 7 December 2021.

86. Pedro Moreira in collaboration with WIPO Magazine, "Updated Landscape on Expedited Protection of 'Green' Inventions in Brazil" (*WIPO Green* 18 May 2021) <*https://www3.wipo.int/wipogreen/en/news/2021/news_0016.html*> accessed 7 December 2021.

87. Eligible technologies cover not only green tech, but also new generation of information technology, biology, high-end equipment manufacturing, and new material. Examination shall be completed within one year from approval of the acceleration request. Antoine Dechezleprêtre for the International Centre for Trade and Sustainable Development, "Fast-tracking Green Patent Applications: An Empirical Analysis," Issue Paper No. 37 (ICTSD 2013) 4-5.

88. "Green energy technologies" was recently amended to "green technologies," effective on 1 January 2022. International Affairs and Planning Division, Taiwan Intellectual Property Office, "Accelerated Examination Program (AEP)" (*Taiwan IPO* 2 November 2021) <*https://www.tipo.gov.tw/en/cp-824-873219-841ee-2.html*> accessed 7 December 2021.

89. Dechezleprêtre (n 87) 6.

90. *ibid.*

mature enough or the company cannot immediately commercialize the technology, when product design has not been finalized so it would be beneficial to have flexibility in amending the patent claims, or to prevent the exposure of their R&D to competitors.[91]

That said, the faster grant of patents also offers various advantages, including ease in raising capital (as earlier discussed), possibilities for licensing, and having the capacity to commence legal actions for infringement.[92] Indeed, fast-tracking programs seem appealing to start-up green tech companies engaged in raising capital but still generating small revenue,[93] proving the point on the crucial role of patents for start-ups wishing to obtain support for their innovative technologies.

One of the main objectives of these fast patent granting programs is to speed up the diffusion of green tech knowledge in the economy.[94] Although their long-term results remain to be seen, the programs seem to be effective at first glance.[95] Patent citations[96] show that green tech fast-tracking programs appear to "accelerate the diffusion of knowledge in green [tech] in the short run—*i.e.*, during the first years following the publication of the patents."[97]

Government Funding and Financial Support

Public funding for environmental R&D, especially at the pre-commercial stage, may play a crucial role in making up for insufficient investment by private companies.[98] Eco-innovation activity requires at least some public funding because green tech is less competitive than alternatives, and the effects of regulation and other public policy mechanisms are uncertain.[99] Funding is particularly important for SMEs, which often neither have enough financial resources nor other assets to use as collateral.[100]

In the United States, for example, there is a Small Business Innovation Research (SBIR) Program and one of the participating federal agencies is the Environmental Protection Agency (EPA).[101] EPA's SBIR focuses on the areas of "clean and safe water, air quality, land revitalization, homeland security, sustainable materials management and safer chemicals."[102] Every year, EPA solicits research proposals on specific topics and selects companies for the award of research grants.[103] The SBIR Program has two phases: Phase I entitles awardees to USD $100,000 for six months to come up with a "proof of concept" of the proposed technology, while Phase II awards USD $400,000 for the further development and commercialization of technology.[104]

The EPA SBIR aims to "foster game-changers that reduce or eliminate pollution" as opposed to technology aimed at cleaning up or containment systems.[105] Some companies whose research and products have been funded by the EPA under the SBIR Program are AethLabs, KWJ Engineering, and Intellisense Systems, Inc., all involved in developing sensor technology for monitoring air quality during fire events.[106] This is particularly relevant given the prevalence of wildfires in the United States in recent years.

Other examples of financial support can be found in Brazil, where a subsidized credit program focused on innovation was launched in 2013, administered jointly by the Brazilian Innovation Agency (Finep) and the National Bank for Economic and Social Development (BNDES).[107] Further, the Brazilian Company for Industrial Research and Innovation was created in 2014, which administers a fund allowing accredited research institutions working on technological projects to receive public subsidies covering up to a third of their total costs.[108] It was reported that the innovation credit programs of Finep and BNDES funded around U.S. $2 billion worth of new contracts in 2018.[109]

The ability of government financial support to effectively spur green tech innovation depends on several factors, including the gap between the financing required and the public funding available, the capacity of the technology to compete for public funds with

91. Interviews with IP professionals, however, revealed that the last factor is not a large issue in practice. *ibid* 8.

92. *ibid* 7.

93. *ibid* 16.

94. *ibid* 12.

95. Dechezleprêtre (n 87) 12.

96. These are those cited when a patent application is filed, which show the previous patents that the inventor built on to develop the new technology. *ibid.*

97. *ibid.*

98. Lybecker and Lohse (n 29) 20.

99. Cecere, Corrocher, Mancusi (n 30) 286.

100. Lybecker and Lohse (n 29) 21.

101. United States Environmental Protection Agency, "About the SBIR Program" (*EPA* 30 August 2021) <*https://www.epa.gov/sbir/about-sbir-program*> accessed 8 December 2021.

102. *ibid.*

103. *ibid.*

104. *ibid.*

105. *ibid.*

106. United States Environmental Protection Agency, "EPA's SBIR: Novel Technologies to Monitor Air Quality from Wildland Fires to Protect Public Health" (*EPA* 15 November 2021) <*https://www.epa.gov/sbir/epas-sbir-novel-technologies-monitor-air-quality-wildland-fires-protect-public-health*> accessed 8 December 2021.

107. Robson Braga de Andrade, "Financing Innovation in Brazil" in Soumitra Dutta, Bruno Lanvin and Sacha Wunsch-Vincent (eds), "Global Innovation Index 2020 Who Will Finance Innovation"? (Cornell University, INSEAD and WIPO 2020) 149, 150.

108. *ibid.*

109. *ibid.*

competing projects, the probability of failure or success, and the type of investor involved.[110] Still, access to public funding or fiscal incentives has empirically been found to have a positive effect on the development of eco-innovations, supporting the view that direct public intervention plays an important role in transitioning to a low-carbon economy.[111]

Tax Incentives

Aside from direct grants/subsidies, some governments have legislated to grant tax incentives for engaging in R&D in innovative technologies. For example, the UK has had R&D reliefs in place since 2000,[112] where eligible companies can avail of tax deductions (of up to 230 percent of qualifying costs for SMEs) for taking part in a "specific project to make an advance in science or technology."[113] Aside from the UK, tax relief for R&D expenditures are in place in 34 out of 38 Organisation for Economic Co-operation and Development countries, 22 out of 27 EU countries, and others.[114]

On the effectiveness of these incentives, an empirical study of the UK scheme was conducted (covering 2008-2015) by examining the effect of an increase in thresholds for determining whether an entity qualifies as an SME (and is thus entitled to higher tax deductions).[115] The results of the study showed that there was a significant increase in patenting and R&D activity following the implementation of the policy, and this supports the view that it has a positive effect on innovation.[116] It was further observed that the R&D tax policy not only stimulates innovation of firms that directly benefit from the incentives, but also has spillover effects for other firms.[117]

110. Cecere, Corrocher, Mancusi (n 30) 288 citing Olmos, L, Ruester, S, & Liong, S-J, "On the selection of financing instruments to push the development of new technologies: application to clean energy technologies" (2012) 43 *Energy Policy* 252.

111. *ibid* 293.

112. Antoine Dechezleprêtre, Elias Einiö, Ralf Martin, Kieu-Trang Nguyen, John Van Reenen, "Do tax incentives increase firm innovation? An RD Design for R&D" (2020) Working Paper 4 <*https://as.nyu.edu/content/dam/nyu-as/econ/misc/Do%20tax%20incentives%20increase%20firm%20innovation.pdf*> accessed 9 December 2021.

113. HM Revenue & Customs, "Guidance: Claiming Research and Development tax reliefs" (*UKHMRC* 20 March 2020) <*https://www.gov.uk/guidance/corporation-tax-research-and-development-rd-relief*> accessed 9 December 2021.

114. Silvia Appelt, "OECD R&D tax incentives database, 2021 edition" (OECD 2021) 4 <*https://www.oecd.org/sti/rd-tax-stats-database.pdf*> accessed 9 December 2021.

115. Dechezleprêtre, Einiö, Martin, Nguyen, Van Reenen (n 112).

116. *ibid* 29.

117. *ibid* 30.

b) Regional Initiatives and Inter-state Cooperation

Given the magnitude and pervasive effect of climate change, initiatives have unsurprisingly transcended national borders and spurred regional and even international collaborations. Indeed, cross-country cooperation in respect of CCMT has increased over time.[118] For example, the EU Emissions Trading System and the International Solar Alliance, discussed below, are both targeted towards emission reduction and a shift to environmentally friendly energy sources.

EU Emissions Trading System

Set up in 2005, the EU Emissions Trading System (ETS) has been referred to as "a cornerstone of the EU's policy to combat climate change" and "the world's first major carbon market."[119] It is a "cap-and-trade" system, which means that it imposes a cap on the total volume of greenhouse gas emissions of identified sectors accounting for most of the emissions within the EU (*e.g.*, energy-intensive industry sectors and commercial aviation[120]), and allows the trading of emission allowances[121] so that industry players themselves can allocate the credits to those that expect to have more emissions. An allowance represents a right to "emit one tonne of carbon dioxide equivalent during a specified period" and is transferable in accordance with the provisions of the relevant EU directives.[122] These allowances or permits have been referred to as the "currency in carbon markets."[123] The level of the cap dictates the number of allowances made available in the system and is designed to decrease annually starting in 2013.[124]

An enterprise covered by the ETS and which has obtained a greenhouse gas emissions permit is obliged to surrender a total number of allowances per year that corresponds to its total emissions for the same calendar year.[125] Allowances are either sold (usually through auction) or given for free to certain participants, in sectors where the risk is high that production would be shifted

118. Pasimeni, Fiorini, Georgakaki (n 54) 2.

119. European Commission, "EU Emissions Trading System (EU ETS)" (EC undated) <*https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en*> accessed 20 December 2021.

120. *ibid*.

121. European Commission, EU ETS Handbook (European Union 2015) 4.

122. Council Directive (EC) 2003/87 of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC [2003] OJ L275/32 (ETS Directive), art. 3(a).

123. Patrick Bayer and Michaël Aklin, "The European Union Emissions Trading System reduced CO2 emissions despite low prices" (2020) 117(16) PNAS 8804.

124. European Commission (n 121) 16.

125. ETS Directive, art. 5(2)(e).

elsewhere if the full cost of allowances is shouldered by the enterprises.[126] In the event an enterprise does not have enough allowances to cover its emissions for a given year, it could either reduce its emissions or purchase additional allowances by auction or from other market participants.[127] A company that surrenders insufficient allowances to cover its emissions shall be liable for a penalty of €100/ton of CO2 equivalent, the payment of which does not release the company from its obligation to surrender the remaining allowances within the following calendar year. [128]

A cap-and-trade system was chosen by the EC to address the concerns that directly limiting emissions would not provide the flexibility for companies to allocate reductions themselves, and imposing carbon taxes would require uniformity of rates across countries and would not ensure the achievement of the target level of emissions.[129] In other words, trading allows companies within the relevant industries to determine the best and least-cost way for them to jointly meet the imposed system cap.[130] That a system cap is set over a period of time also helps the EU keep track of and meet its international environmental emission goals.[131]

Some concerns have been expressed that the implementation of the ETS may adversely affect EU firms' competitiveness and may cause carbon leakage, *i.e.*, the displacement of emissions into regions outside the EU due to their regulation instead of their overall reduction.[132] Firm competitiveness may be reduced because firms are forced to incur costs associated with pollution abatement and with the purchase of emission allowances.[133] That said, studies that take into account profits, exports, sales, employment, productivity, and stock prices have found that the ETS does not seem to have any negative statistical effect on firms' competitiveness and does not cause carbon leakage.[134]

Another study—using a statistical model that compares the current level of emissions against the level that would have prevailed if the EU ETS were not introduced—found that the ETS's implementation caused a reduction in CO2 emissions of around 1.2 billion tons from 2008 to 2016, representing 3.8 percent of total emissions for those years.[135] This supports the view that the introduction of carbon markets in other countries or regions may be an effective strategy, as long as they are supported by long-term political will.[136] Despite promising results, it has been opined that to mitigate any potential adverse effects, carbon pricing policies such as the EU ETS may be accompanied by other policy measures.[137]

International Solar Alliance

The International Solar Alliance (ISA) was conceived by India and France in 2015 during COP21 and is aimed at deploying solar energy solutions to combat climate change.[138] As of 2020, 101 countries have signed the ISA Framework Agreement and 80 have ratified it to become full members of the ISA.[139] By mobilizing USD $1 trillion by 2030 and in cooperation with development banks and civil society organizations, ISA intends to develop and use solar energy solutions to help its member countries transition towards low-carbon growth, with particular focus on those classified as least developed countries and small island developing states.[140]

Some of its programs are: (1) scaling solar applications for agricultural use, focused on decentralizing solar applications in rural settings; (2) scaling solar mini-grids, catering to needs of members in areas with unreliable or no grids; (3) scaling solar e-mobility and storage, to establish ecosystems for the large scale deployment of energy storage systems; and (4) solar for green hydrogen, aimed at accelerating green hydrogen production and use among member countries.[141]

As regards performance, it has been observed that whether ISA is achieving its goals is difficult to gauge inasmuch as its formation and the solidification of its membership have taken some time.[142] In addition, a

126. European Commission (n 121) 16.

127. *ibid.*

128. ETS Directive, art. 16(3).

129. European Commission (n 121) 5.

130. *ibid.*

131. *Ibid.*

132. Stefano F Verde, "The impact of the EU Emissions Trading System on competitiveness and carbon leakage: the econometric evidence" (2020) 34(2) *Journal of Economic Surveys* 320, 321.

133. Eugénie Joltreau and Katrin Sommerfeld, "Why does emissions trading under the EU Emissions Trading System (ETS) not affect firms' competitiveness? Empirical findings from the literature" (2019) 19(4) *Climate Policy* 453.

134. Verde (n 132) 335.

135. Patrick Bayer and Michaël Aklin, "The European Union Emissions Trading System Reduced CO2 Emissions Despite Low Prices" (2020) 117(16) PNAS 8804, 8809.

136. *ibid* 8809.

137. Verde (n 132) 321.

138. International Solar Alliance, "About ISA" (*ISA* undated) <*https://isolaralliance.org/about/background*> accessed 26 January 2022.

139. *ibid.*

140. *ibid.*

141. International Solar Alliance, "Our Work" (*ISA* undated) <*https://isolaralliance.org/work/scaling-solar-application-agricultural-use*> accessed 26 January 2022.

142. Matthew Rimmer, "Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice" (2019) 8 *Laws* 7, 16.

weakness has been cited that there is no discussion of intellectual property, law, and practice in the ISA Framework Agreement.[143]

V. Conclusion—Part I

Despite the lack of consensus on the definition of green technology, acting towards the development of technologies to fight against climate change is much more crucial than any theoretical debate. Whether it is through private or public sector initiatives, striking a balance between sound technology and effective environmental policy should be a major focus of legislators, policy makers and the industry. The relevance of IP and especially patents is prevalent in this context, considering the leading role of innovation and ground-breaking inventions for sustainability.

In Part I, this article described the different definitions for green technology adopted by different international institutions such as WIPO and EPO and explored the role of patents in an environment increasingly interested in sustainability. Companies that invest in technology innovation would be staunch supporters and drivers of environmentally friendly technological progress, given the proper incentives. These incentives include robust IPR protection and return on investment that would lead to additional innovation in line with sustainability policies. For the desired results to occur, however, public, private and hybrid initiatives are required. In this Part, the reader learned more about public initiatives, taken at both national and regional levels.

Part II, to be published in the next edition, will continue to explore in detail the private and hybrid initiatives that are currently underway with the aim of tackling climate change and promoting environmental R&D and sustainability. Apart from individual industry initiatives, collaborative platforms such as standards development organizations (SDOs)—that foster the development of technical standards and norms assuring interoperability—are considered significant fora for encouraging and realizing environmental objectives. ■

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143. *ibid* 15.

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The Exhaustion Theory Is Not Yet Exhausted—Part 5

By Erik Verbraeken

Since the last overview on recent developments regarding the application of the exhaustion theory by the European courts that was published in *les Nouvelles* (September 2017), new issues have been brought to the attention of the courts that demonstrate once again that the exhaustion theory is not yet exhausted.

After a series of decisions regarding the importation of merchandise within the European market where either the original trademark was reaffixed following the repackaging of the goods, or the trademark of the country of importation was affixed on the goods through an operation of rebranding, the European Court of Justice (hereinafter ECJ) was asked to consider a case of debranding in the context of the importation of cars (judgment of 25 July 2018, *Mitsubishi Shoji Kaisha Ltd and Mitsubishi Caterpillar Forklift Europe BV vs. Duma Forklifts NV and G.S. International BVBA*).

In the Netherlands, the court was asked to rule on the question of whether the rights of the trademark owner were exhausted in relation to the residual stock of a promotional sales campaign, which was returned as surplus to the original promoter (judgment of the Court of Appeal of The Hague, 20 November 2018, *4Everyware Stocklots vs. Guy Laroche SAS*).

Likewise, in the Netherlands, the court was asked to rule on whether the use of multi-marking on packaging boxes by a distributor of cosmetic products infringed the trademark rights of the owner of one of those marks that appeared on the box (judgment of the Court of Appeal The Hague, 17 August 2021, *Coty Beauty Germany vs. EasyCosmetics Benelux*).

In Germany, the court had to address a case where luxury cosmetic products were offered by a discounter and the trademark owner relied on the luxury image of the goods in order to oppose exhaustion (judgment of Oberlandesgericht Düsseldorf, 6 March 2018, *Kanebo vs. Real*).

Likewise, in relation to the exhaustion of patent rights, the German Supreme Court was asked to rule on whether a product refurbishment where simple components were replaced qualified as repair for which the exhaustion of the original product continues to apply or must be considered as a re-manufacturing of the patented product (BGH, 24 October 2017).

1. European Court of Justice, 25 July 2018, *Mitsubishi vs. Duma Forklifts and GSI*

■ Erik Verbraeken,
Deputy General Counsel,
Valeo,
Paris, France
E-mail: erik.verbraeken@orange.fr

This is the first time that the ECJ has had to pronounce itself on the practice of debranding a trademark. Duma acquired forklift trucks from a company within the Mitsubishi group, outside the EEA, that it then brought into the EEA territory for resale. Its affiliated company GSI then removed the Mitsubishi marks from those goods, made the necessary modifications to render those goods compliant with EU standards, and sold those forklifts in the EEA with Duma signs affixed to those goods.

The case is not of direct importance to the current topic of exhaustion of rights in the European Union since the products were imported from outside the EEA, meaning that the products were not yet introduced on the EU market (and therefore subject to the laws of the free movement of goods) when they were acquired and commercialized to the public by Duma. However, the case deserves to be mentioned because it addresses an issue that is neither covered by the applicable Trademark Directive 2008/95/EC nor the Trademark Regulation 207/2009 of the European Union, *i.e.*, the practice of debranding a trademarked product.

In its arguments, Mitsubishi advanced the idea that debranding negatively affects the various functions of the trademark that have been generally recognized by the ECJ; not only did the removal of the trademark harm the mark's functions of indicating origin and quality, but also the functions of investment and advertising: despite that removal, the Mitsubishi forklift trucks remained recognisable to the consumer as such.

In its decision, the ECJ underscored the fact that the trademark proprietor's goods were placed on the market *before* that proprietor had placed them on the market bearing that trademark, with the result that consumers knew those goods before being able to associate them with that trademark. Debranding the products in question therefore impedes the use of that mark by the proprietor in order to acquire a reputation likely to attract

and retain consumers, and to serve as a factor in sales promotion or as an instrument of commercial strategy. In addition, such actions deprive the proprietor of the possibility of obtaining, by putting the goods on the EEA market first, the economic value of the product bearing that mark and, therefore, of its investment. Finally, such practice circumvents the proprietor's right to prohibit the importation of those goods bearing its mark, which is contrary to the objective of ensuring undistorted competition.

The decision is probably of limited interest to the teachings of the exhaustion theory because in many of its considerations as well as in the dictum of the decision, the ECJ stresses the factor that the products have not yet been marketed within the EU while bearing the trademark at issue. Whether the outcome of the case would have been the same (against the background of the various functions of the trademark that the ECJ highlights in its decision) if the debranding occurred after the proprietor had placed them on the EU market bearing its trademark is therefore uncertain—and in my personal opinion unlikely. Although from an economic perspective the findings of the ECJ apply likewise in the setting of a product that is commercialized for the first time in, say, Greece and then exported to Finland, from a legal perspective the products have been legitimately introduced on the EU market from that moment and at that point the common market and related free movement of goods principles will take over.

However, it must be noted that legislation in certain countries expressly forbids debranding. For example, under the French Code de la Propriété Intellectuelle, debranding of trademarked products is not authorized. Since Article 36 of the EU Treaty specifically provides that the provisions of the free movement of goods do not preclude prohibitions or restrictions on imports justified on grounds related to the protection of industrial and commercial property, debranding is probably an issue that remains to be tackled on a local law level in many jurisdictions.

2. Court of Appeal Netherlands, 20 November 2018, *4Everyware vs. Guy Laroche*

Who thought that Zombieland was fiction reserved for broadcast stations like Netflix? In the Netherlands case *4Everyware (4EW) vs. Guy Laroche*, the question arose in the real world whether the dead could be resuscitated again to life. In other words, once a sold item has become subject to exhaustion, can it once again become subject to protection under the owner's intellectual property rights as a result of a particular event that erodes the basis for exhaustion?

As part of a promotional action with the Carrefour retail chain of supermarkets, Guy Laroche, a French fashion house, offered certain products like bedlinen, bath towels, bathrobes, etc., at a discounted price if the shopping customer at the Carrefour supermarket collected a certain number of savings stamps. The action was organized through a certain number of participants: (1) Guy Laroche entered into a license agreement with Textiles Oliviers Mercier (TOM) authorizing the latter to manufacture and propose for sale, as part of the promotional action with Carrefour, certain products bearing the Guy Laroche trademark; (2) TOM entered into a subcontract with Promeco whereby the latter would organize the promotional operation at Carrefour in consideration of the payment of a royalty to TOM, part of which would be transferred to Guy Laroche; (3) Promeco then made the products available to Carrefour upon its order.

After the promotional campaign had come to an end, Promeco sold the products that remained in stock to Boxter (an affiliated company of Promeco), who, in turn, sold the products to 4EW; the latter subsequently offered the products to the public via its website. Guy Laroche brought 4EW before the courts claiming trademark infringement. 4EW opposed the claim by holding that the trademark rights of Guy Laroche were exhausted. Part of the dispute between the parties resided in the question of whether Promeco originally sold those products to Carrefour or whether Promeco only held those products available under consignment until they were distributed by Carrefour to the ultimate end-customer.

The license agreement between Guy Laroche and TOM authorized the latter to sell the products only within the frame of the Carrefour promotional campaign. However, the contract between TOM and Promeco contained an additional "end of campaign stock" clause that authorized Promeco to sell the remaining products to third parties within one month after the Carrefour action had ended. One salient additional fact: Guy Laroche received a copy of the agreement between TOM and Promeco without (at least according to the Court of Appeal; this part of the decision was criticized in the latter decision of the Supreme Court) objecting or otherwise presenting any comments on this clause.

When Guy Laroche learned of the availability of its promotional products on the website of 4EW, it asked the court to issue a cease-and-desist order for trademark infringement because the conditions of sale under which 4EW presented those products were such that it harmed the reputation and image of the Guy Laroche trademark.

After receiving a favorable judgment from the Rotterdam District Court, 4EW appealed the decision arguing that the trademark rights of Guy Laroche were exhaust-

ed following the authorized first sale of the products to Carrefour. Guy Laroche countered with two arguments: (1) the goods were never sold to Carrefour but were held in consignment until a consumer traded his savings stamps for the product in question, (2) even if the goods were sold and thus introduced on the market with the authorization of Guy Laroche, the latter could still oppose the resale to 4EW because of article 22 of the European Trademark Directive: "The proprietor of a Community trademark may invoke the rights conferred by that trademark against a licensee who contravenes any provision in his licensing contract with regard to (…) the quality of the goods manufactured or of the services provided by the licensee."

The Court of Appeal held in favor of 4EW. In its opinion, the rights of Guy Laroche were exhausted through the first sale of the goods by Promeco to Carrefour for the purpose of the promotional campaign. Since the transaction between Promeco and Carrefour qualified as a sale, the subsequent return of (surplus) goods by Carrefour to Promeco did not, as a result thereof, revive the intellectual property rights of Guy Laroche on those goods: "once exhausted, forever exhausted." In considering that the goods were effectively sold (and not simply held in consignment), the Court attached particular importance to (a) the words of the agreement between TOM and Promeco where the latter was authorized to resell the surplus stock at the end of the promotional campaign, (b) the reference in this agreement to "ventes" (= sales) by Promeco to Carrefour, and (c) the fact that Guy Laroche was aware of this agreement between TOM and Promeco, an agreement to which it had not expressed any objections. Also, Guy Laroche had received the royalties over these sales to which it was entitled and had therefore reaped an economic reward from these sales; even if the economic reward turned out to be less than the usual profit margins that Guy Laroche could expect from those sales (because the conditions were tailor-made for a promotional campaign), this did not overturn the fact that Guy Laroche had realized an economic value over these transactions.

The Court went one step further, holding that, even if it should be considered that the trademark rights were not exhausted when Promeco made these goods available to Carrefour, they were subsequently exhausted through the sale by Promeco to Boxter, which sale was authorized under the terms of the agreement between TOM and Promeco. This sale took place before the expiry date set forth in the agreement between TOM and Promeco and was therefore an authorized sale. Unfortunately, the Court did not address the argument of Guy Laroche that, because Boxter was an affiliated company of Promeco, the goods were not put on the market since the sale was only made as part of an intra-group transaction; for procedural reasons (the argument was only raised in the second instance, contrary to Dutch procedural rules) the Court discarded the argument. Under Peak Holding, if that finding was considered correct, Guy Laroche could legitimately argue that "a transfer between companies within the same group should be regarded as an internal measure within the group, which does not bring about exhaustion of the rights."

Finally, where license agreements are involved, a licensee who puts goods bearing a trademark on the market in disregard of a provision in a license agreement can prevent exhaustion of the trademark rights where it is established that the provision in question is included in those listed in Article 8(2) of the EU Trademark Directive 89/104/EEC of 21 December 1988 (likewise, article 25 of the EU Trademark Regulation 2017/1001 of 14 June 2017). Amongst those provisions that authorize a proprietor to invoke its trademark rights against a licensee figures the breach of "any provision in the licensing contract with regard to the scope of the goods or services for which the licence is granted."Guy Laroche's reliance on the aforementioned "escape route" is also dismissed by the court; although Guy Laroche may be considered a luxury brand, which normally authorizes the trademark holder to oppose sales of the product under conditions which could damage the reputation of the trademark, the court finds that since Guy Laroche had already consented to the sale of its luxury products in the retail stores of Carrefour, whose means of advertising were not radically different from those used by 4EW, it could not rely on the provisions of article 15 of the EU Trademark Regulation to oppose further commercialization.

The Supreme Court has reversed the decision of the Court of Appeal on legal grounds that bear no direct relationship to the above general arguments, so it is worthwhile to have a closer look at this decision of the Court of Appeal that provides some interesting clarifications to the demarcation line between exhaustion and non-exhaustion of the owner's intellectual property rights—and raises at the same time some further interrogations in this respect.

At first hand, the judgment of the Court raises some questions. The Court qualifies the nature of a transaction between Promeco and Carrefour, which is at the heart of the question of whether the trademark rights of Guy Laroche were exhausted, on the basis of the wording of a clause that figures in an agreement between TOM and Promeco. Although Guy Laroche requested that 4EW hand down copies of the sales invoices from Promeco to Carrefour (which it could not produce), the Court considered that this would be

irrelevant since 4EW was not a party to the transactions between Promeco and Carrefour. This is certainly true, but on the other hand, the invoices could shed light as to whether the products were effectively sold to Carrefour, as 4EW argued. The decision of the Court, therefore, implies that the contractual qualification of what happens "downstream" in the supply chain (Promeco—Carrefour) may be determined by the choice of words used in an agreement "upstream" of such chain (TOM—Promeco).

If, as Guy Laroche argued, Carrefour held the goods in consignment, those particular goods were not, as such, put on the market, but only available to be put on the market. Availability alone is not sufficient for exhaustion to occur: *Peak Holding* (Case C-16/03 of 30 November 2004). The fact that Carrefour could dispose of the goods for only a limited time in the context of the special offer did not alter the Court's conclusion on the exhaustion. Since under the agreement, Carrefour had the right to dispose of all the goods (including the right to return the goods after the end of the campaign), the rights of Guy Laroche must still be considered exhausted.

Whatever the foregoing queries, looking at the economic context of the transactions, where (i) Guy Laroche was aware of the contents of the Memorandum of Understanding between TOM and Promeco and did not raise any objections (although the Supreme Court annulled the Court of Appeal's decision on this aspect, holding that 4EW did not bring sufficient proof of that awareness) and (ii) Guy Laroche received (via TOM) royalties over all products (including the unsold surplus products) that Promeco made available to Carrefour, the Court concluded that the transaction between Promeco and Carrefour exhausted the trademark rights on those products. Through point (i), the court derived that Guy Laroche consented to the further sales by Promeco (which fulfills the specific subject-matter of the IP right). Through point (ii), the Court concluded that Guy Laroche had received financial consideration for its trademark rights through the royalties that Promeco paid to TOM (which fulfills one of the essential functions of an IP right). It is irrelevant that Carrefour did not subsequently succeed in selling all those products to end-customers during the loyalty program, and consequently returned the surplus of goods to Promeco at the end of this program. "Once exhausted, always exhausted"—the court held that a trademark right cannot revive simply because the goods, after having been sold with the consent of the trademark holder, are "returned to sender" as unsold surplus goods.

This decision shows that the trademark rights of the owner are as strong as the weakest link in the contract chain. Although Guy Laroche had introduced a clause in the agreement with TOM that after the end of the promotional action, TOM could not dispose of the goods without the consent of Guy Laroche, this restriction was not reproduced in the agreement between TOM and Promeco. Because Promeco sold (according to the Court) the goods to Carrefour, this sale exhausted the trademark rights, and the return of those goods at the end of the campaign did not revive those trademark rights. The "post-sale" non-exhaustion arguments based on the conditions of resale by 4EW were also insufficient for the court.

3. Court of Appeal Netherlands, *Coty Beauty Germany vs. easyCOSMETIC Benelux.*

In this decision, the trademark right holder, Coty Beauty, opposed the use of two trademarks for which it was the selective distributor (Jil Sander and Davidoff) as part of a packaging strategy implemented by easyCOSMETIC, a wholesale trader that resells cosmetic products through an internet website, where those products are shipped to the customer in packages using a "multi-mark" presentation, as follows: (See Figure 1).

Figure 1: *Coty Beauty Germany vs. easyCOSMETIC Benelux*

It was not disputed that the resale of the cosmetic products itself could not be further prohibited—the exhaustion of the trademark rights in relation to the resale itself was not at stake. However, Coty argued that under article 15 of the EU Trademark Regulation 2017/1001 of 14 June 2017, exhaustion shall nevertheless not apply "where there exist legitimate reasons for the proprietor to oppose further commercialisation of the goods."

First, Coty relied on the ECJ's decision of July 8, 2010, Case C-558/09, where the Court held that "in the case where a third party's ad suggests that there is an economic link between that third party and the proprietor of the trademark, the conclusion must be

that there is an adverse effect on the function of indicating origin" for which the trademark owner's rights are preserved.

This argument is dismissed by the Court of Appeal. The multitude of trademarks that are reproduced on the boxes and that represent a "wordcloud" of more than 80 product references, cannot mislead the average consumer to believe, especially in a context where these same products are offered through a variety of sales channels including department stores and commercial websites, that the reseller has an economic connection (in the sense of an authorized distributor) with the respective trademark owners. This impression will be reinforced through the mode of presentation where the trade name "easyCOSMETIC" is prominently displayed, whereas the trademarks only figure in the context of a "wallpaper presentation." Finally, the overall context in which the consumer purchases these products, where the receipt of a box including the products is only the final link in the supply chain, and where the e-shop where the consumer makes its purchase decision promotes the products through a general slogan "Beauty For Less," also avoids the creation of a mistaken belief that the seller acts as the authorized (selective) distributor of the original manufacturer of those products. Rather, such slogan confirms that easyCOSMETIC acts as a discounter and not as an authorized distributor. The mere fact that the reseller derives an advantage from using another person's trademark in advertisements for the sale of goods covered by the mark, which are in other respects honest and fair, this lending of an aura of quality to his own business does not constitute a legitimate reason to oppose these practices: Case C 63/97 *BMW* [1999].

Another issue that was only addressed sideways concerned the necessity of the "wordclouded" configuration of this shopping box. According to the main case of the ECJ on reaffixing trademarks, *Bristol-Myers Squibb vs. Paranova* A/S (C-427/93), "The power of the owner of trademark rights protected in a Member State to oppose the marketing of repackaged products under the trademark should be limited only in so far as the repackaging undertaken by the importer is necessary in order to market the product in the Member State of importation." Although this case concerned not so much a case of repackaging but rather the mere use of the trademark for marketing purposes, the principle of necessity remains applicable because the use of the trademark is the prerogative of the trademark holder, as the ECJ underscored in its landmark decision *Hoffmann Laroche vs. Centrafarm* (Case 102/77), and the only exception thereto is an exercise of the trademark as a disguised restriction on trade between member states, *e.g.*, in order to compartmentalize markets.

Thus, in the case *Christian Dior vs. Evora* (Case C-337/95), it was held that the proprietor of a trademark may not oppose the use of the trademark by a reseller who habitually markets articles of the same kind, but not necessarily of the same quality, as the trademarked goods. This is done in ways that are customary in the reseller's sector of trade for the purpose of bringing the further commercialization of those goods to the public's attention.

However, the reaffixing of numerous trademarks on those shipping boxes appears as a use of the trademark after the purchase of the related goods has already been made. Hence, the trademark is not used as a prospective instrument. This is even more so since the box is only addressed to the purchaser (and not to the public at large) so the question can legitimately be asked: is the use of the trademark in this particular context necessary for the purpose of further commercialization of the product, once it has been legitimately put on the market for the first time by the original manufacturer?

Without surprise, the decision of the Court of Appeal has been confirmed by the Netherlands Supreme Court.

4. Oberlandesgericht Düsseldorf, 6 March 2018, *Kanebo vs. Real*

Apart from the right of the trademark owner (or its authorized distributors) to oppose an abusive "free ride" that a reseller appropriates by misleading the public to believe that he entertains an immediate business relationship with the trademark holder, the latter may also oppose further commercialization when the means used by the reseller in order to promote and market those goods damages the allure and prestigious image of the goods for which the trademark owner has created an aura of luxury: Case C 59/08, *Copad vs. Christian Dior* [2009].

An illustration thereof was provided by the German courts in a case where skin and hair care products, makeup and perfumes from a Japanese luxury cosmetics manufacturer (Kanebo) were offered for sale by the retail chain Real, which mainly sells groceries, but also household products, electrical appliances, textiles and cosmetics. Real placed Kanebo's products on the market in both physical stores and through its webstores.

The Court had particular regard to the sales environment, both online and offline, which it considered not comparable to the luxurious environment in which the products were usually sold by the manufacturer through its selective distribution system. Particular items that the court highlighted in its decision were that Real sold the goods together with mass-produced and discounted products of all kinds, that no product consultation took place, and that its marketing and advertising focused on price rather than quality. In the overall commercial con-

text, these means of offering for sale the trademarked products of Kanebo detracted from the exclusive and luxurious appeal of its branded products.

5. *BGH*, judgment of October 24th 2017, case no. X ZR 55/16 ("Drum Unit")

It is a well-known expression in patent law that "to repair ≈ to infringe," which functions as a warning to third parties that where repair turns into remanufacturing the patented products, the third party will be infringing those patents.

As so often happens, the case tuned in on the issue of the replacement of toner cartridges for printer machines, where the original unit is "stripped down" and where the relevant (used) components (not the ink itself) are replaced. In this particular case, the dispute concerned the replacement of a so-called photosensitive drum unit and its connection to the original coupling device. A pertinent detail: the patent claim addressed the combination of a photosensitive drum unit and a coupling device, whereas the replacement only concerned the photosensitive drum unit.

The Regional Court of Dusseldorf found that the defendants infringed the patent because the replacement of the drum constituted an impermissible reconstruction. However, the Federal Court of Justice overruled this decision: the FCJ regarded the replacement of the drum as a permissible repair, since the technical effects of the invention are not so much reflected in the drum itself, but more particularly in the coupling member (which was not replaced). The replaced drum is a mere object participating in the inventive effect of the overall component. Hence, the patented claim is not reproduced by this action and the underlying patent remains exhausted. ■

The Critical Importance Of The Bayh-Dole Act In The U.S. Energy Transition

By Eric Payne

Abstract

To respond to the looming threat of climate change, the global community must transition to a low carbon energy economy. A robust pipeline of innovative technologies is needed to drive this transition. An often-overlooked law in the United States that promotes the commercialization of inventions developed by academic research organizations represents an expansive pipeline of innovative clean energy technologies needed to accelerate our transition to renewable energy. The Bayh-Dole Act provides academic research organizations the ability to own and license innovations they develop during government grants, therein generating massive economic benefits to the U.S. economy. In addition to generating novel technologies for commercialization, the government patent policies codified in the Bayh-Dole Act provide strong patent rights needed for startup company formation and investment while promoting public-private partnerships critical to advancing the diffusion of clean energy technologies to address rising greenhouse gas emissions. Several recent challenges to the Bayh-Dole Act have the potential to significantly compromise the effectiveness of the law in promoting the development and transfer of clean energy technologies from research organizations to the private sector for effective commercial development. Recent government investments in cleantech deployment will rely on clear government patent policies as enumerated in the Bayh-Dole Act to drive the U.S. transition to a low carbon economy.

1. Introduction

The United States has a rich history of supporting scientific research and development (R&D), which grew significantly during World War II and generated numerous technological innovations that were developed into products for civilian applications, including radar, jet engines, nuclear power, digital computers, mobile telecommunications, mass-produced penicillin, and anti-malarial drugs while driving massive economic growth (Mowery 2004, 22 and Gross 2020, 2). During the height of the war, federally funded innovation accounted for one out of every eight U.S. patent applications filed (Gross 2020, 28). From 1945 through the late 1970s it was the policy of the U.S. government to take ownership of patents developed during federal research grants. This policy impeded the ability of patent owners to effectively commercialize inventions they developed and led to a stockpile of innovations that were never commercialized. Prior to 1980, the U.S. government had accumulated over 28,000 patents with less than 4 percent of these inventions licensed to industry for commercial use (House hearings 94th Congress, 1976). Beginning in 1968, the U.S. government started to experiment with nongovernmental ownership of patents, where a small number of universities were allowed to own the inventions they developed in conjunction with federal grants as long as the U.S. government retained the right to "march-in" if the owner of the patent refused to grant a license such that the invention didn't achieve practical application (Latker 1977 and Whalen 2015, 1098). As a result, between 1968 and 1978 university patent application filings increased by 300 percent, and the percentage of patents licensed to industry grew to 37 percent (Allen 2016 and Government Accountability Office 1998, 3). Policymakers observed that private sector players were significantly more motivated to commercialize inventions if the patents were assigned to the university so that exclusive licenses could be granted. Several high-profile innovations developed by universities and small businesses were held up by government ownership of patents, and these academic organizations started to lobby their lawmakers for change. In 1978, Purdue University approached Senator Birch Bayh (D-IN) about several important inventions developed by faculty with federal research grants where the university had tried, unsuccessfully, to secure ownership rights from the government needed to file patent applications and commercialize their inventions (Stevens 2001, 94). Thereafter Senator Birch Bayh partnered with Senator Bob Dole (R-KS) to develop and propose the Bayh-Dole

■ Eric Payne,
Graduate student,
Colorado School of Mines,
Golden, Colorado, USA

E-mail: Eric.Payne@nrel.gov

Act to the Senate on November 21, 1980, where it was passed by unanimous consent and was then sent to outgoing President Carter for signature.

The Bayh-Dole Act emerged in the 1970s as the U.S. economy suffered through several massive energy shocks stemming from the 1973 OPEC embargo of oil exports to the United States. The DOE was only three years old when the Bayh-Dole Act passed in 1980 and the department was tasked with advancing energy R&D across several technical areas from nuclear, fossil, renewable energy, and energy efficiency under the paradigm of the Bayh-Dole Act where federally funded inventions would be transitioned to the private sector for commercialization. Renewable energy research at the DOE accelerated significantly in the mid-1990s after the passage of the Kyoto Protocol (Popp 2011, 649). The Energy Policy Act of 1992 established the DOE's Office of Energy Efficiency and Renewable Energy to advance cleantech R&D priorities. As a result of sustained federal energy R&D investments over the past 50 years, the United States has significantly reduced per capita energy usage while aggressively driving down the cost of wind power, solar power, light-emitting diodes, and lithium-ion batteries, corresponding with a significant deployment of these technologies in the United States (IEA 2022). The DOE invested in several critically important energy saving programs that included vehicle fuel efficiency, advanced refrigeration, low e-glass and compact fluorescent lights while funding research to advance promising early-stage technologies that included high-capacity batteries, solar photovoltaics, proton exchange membranes for hydrogen fuel cells, and advanced wind turbine systems. Between 1975 and 2015, the DOE invested $12 billion in energy efficiency and renewable energy, which produced approximately $388 billion in net economic benefits (Dowd 2017, 2). These economic benefits were realized in large part because the Bayh-Dole Act enabled innovations funded by the DOE to be transitioned to the private sector for commercialization.

2. Patent Policy under the Bayh-Dole Act

The statutory regulations that implement the Bayh-Dole Act provide uniform patent policy across all agencies of the U.S. government. The Act provides certain non-federal entities (universities, small businesses, and non-profit organizations, including operators of federal laboratories) whose employees created the invention the right to elect title to subject inventions. The following conditions apply and are outlined in 35 USC §§200-212 and 37 CFR §§401.1-401.17. Exclusively licensed technologies used or sold in the United States must be 'substantially manufactured in the United States' unless a waiver is granted (35 USC § 204). The U.S. government retains a nonexclusive license to practice, and have practiced on its behalf, inventions made with federal funding (35 USC § 202). During the legislative development of the Bayh-Dole Act, several federal agencies expressed concerns that the proposed policy reforms may impact government interests in federally funded research (Stevens 2001, 98). To address these concerns, Senators Bayh and Dole introduced amendments, which were approved as part of the final law, that provided for a set of limited exceptions to the ownership paradigm in 37 CFR § 401.14 (Allen 2010). These exceptions (found in 37 CFR § 401.3.a.1-6) allow a federal agency to provide an alternative to the standard patent rights clause if the agency determines that exceptional circumstances exist that warrant a deviation so that the government can place additional requirements and obligations on ownership of inventions. The government also retains the ability to 'march-in' and utilize inventions in the case of a demonstrated need or when inventions have not been effectively commercialized (35 USC § 203). The Bayh-Dole Act specifies four circumstances under which the U.S. government can exercise march-in rights:

1. When the patent owner has not taken effective steps to achieve practical application of the subject invention,
2. When action is necessary to alleviate health or safety needs that are not satisfied by the patent owner,
3. When action is necessary to meet a public use specified by federal regulations, and
4. When the patent owner has failed to manufacture substantially in the United States.

3. The Bayh-Dole Act Promotes Economic Development and Cleantech Innovation

A globally meaningful response to climate change will require deep investments in R&D necessary to create a pipeline of clean energy innovations and careful consideration of the policy factors that effectively promote the commercialization of these inventions. In addition to establishing policies to promote clean energy adoption like standards, tax incentives, and rebates, governments play an important role in establishing policies that promote the commercial uptake of innovations developed by academic research organizations. Government patent policy under the Bayh-Dole Act has created immense economic value, has promoted the adoption of technologies, supported public-private partnerships, and helped companies secure the funding they need to further develop early-stage technologies into products and services in the market.

Economic Development

Combined with increasing federal research funding, the passage of the Bayh-Dole Act in 1980 radically transformed the innovation ecosystem for government-funded innovations. The new patent policy significantly increased the industrial uptake of innovations, contributing significant economic, technical and social benefits to the United States. Between 1996 and 2020, it's estimated that universities and small businesses operating under the Bayh-Dole Act have contributed between $333 billion and $1 trillion to U.S. gross domestic product and between $631 billion to $1.9 trillion to U.S. gross output, while creating between 2.356 million and 6.499 million jobs in the United States (Pressman 2022, 3). Similarly, the National Institute of Standards and Technology found that federal laboratories have contributed between $10.6 billion and $34.6 billion to U.S. gross domestic product and between $23.1 billion to $76.5 billion to U.S. gross output, and supported between 86,000 and 265,000 person hours of employment in the United States between 1996 and 2015 (Pressman 2018, 6). The Bayh-Dole Act also kickstarted an entrepreneurial revolution at American research organizations resulting in over 17,000 startup companies (Athanasia 2022 and Bayh-Dole Coalition).

Patent Protection

The Bayh-Dole Act supports strong patent protection for early-stage clean energy technologies so that the private sector can further invest in the development of these innovations needed for gigaton-scale carbon emission reduction. Economists and policy experts have studied the various factors that support the adoption of clean energy technologies and have found that strong patent rights promote clean energy technology diffusion (Lee 2009, 8 and Du Plooy 2013, 14). A study of patent data from 1990 to 2005 in over 120 countries found that robust patent protection enhances the willingness of IP owners to license and sell their innovations overseas (Park 2008, 28). Specifically, strong intellectual property rights have been found to promote investment in and deployment of renewable energy technologies (Tee 2021, 11).

Public Private Partnerships

Through policies established in the Bayh-Dole Act, the U.S. government and the private sector are complementary players in the commercialization of clean energy innovations through the formation of public-private partnerships (Ezell 2019). Government funding helps create and de-risk inventions at the earliest stages of research so that the private sector is more inclined to further invest in dedicated prototyping, scale-up, demonstration and distribution of clean energy technologies (Engel-Cox 2022, 9). As a result of the passage of the Bayh-Dole Act, nearly all major research universities and federal laboratories have specific missions focused on partnering with the private sector to commercialize innovative technologies. Partnerships between industry and academic research organizations often happen in the form of collaborative research grants, industry sponsored cooperative research and patent license agreements that accelerate early-stage research ideas toward market deployment. Private firms get access to government-funded intellectual capital in exchange for their financial capital and these public private partnerships add significant value to cleantech companies who increase their patenting activity by 73.7 percent for each additional government alliance they form (Doblinger 2019, 1468). Patent filings and commercial licenses enabled by the Bayh-Dole Act provide credibility to cleantech companies, improving their ability to secure financing from the private equity community (Conti 2013, 593 and Islam 2018, 49). Additionally, partnerships with government research organizations send an important legitimacy signal to investors, thereby increasing private financing of cleantech companies by 155 percent for every additional commercial license with a government organization (Doblinger 2019, 1468). The benefits of these public-private partnerships rely on clear and consistent government patent policy provided for in the Bayh-Dole Act.

Support for Cleantech Startup Companies

The Bayh-Dole Act provides strong support for cleantech startup companies who face unique development and fundraising challenges. Early-stage energy innovations developed by academic researchers often require significant amounts of additional funding to further develop technologies to a point where they are ready for commercial deployment. It's estimated that for every $1 in federally funded research that results in technology, at least another $10 of private capital is needed to develop that technology into deployable products and services (Quinn 2013). Cleantech startup companies face significant challenges securing early-stage financing because they often have development timelines that are far too long for most traditional venture capital funds who look to exit within the first five years (Gaddy 2016, 2). As a result of these capital needs and long development timelines, cleantech venture capital has historically shifted its focus to investing in later stage startups who are closer to revenue (Saha 2017).

Given these long development timelines, cleantech startup companies rely heavily on U.S.-government-funded support for R&D where 34.6 percent

of patent applications filed by new ventures from 1976 to 2016 cite federal grants (Fleming 2019, 1140). The Bayh-Dole Act allows startup companies using government research funds to own the inventions they develop and, as a result, cleantech startups increase venture capital funding by 67 percent within the first three years after their patent applications are filed, while increasing their initial public offer valuation by 128 percent (Farre-Mensa 2016, 28 and Farre-Mensa 2020, 667). Very little private capital would be invested in new energy ventures if these companies had to navigate the significant bureaucracy involved in securing patent rights directly from a federal agency. The Bayh-Dole Act has created a synergistic continuum of research, development and deployment of clean energy innovations that has become essential to the advancement of the cleantech movement.

4. Recent Activity in Bayh-Dole Act Implementation

Despite its resounding success at stimulating economic growth through the effective commercialization of government funded innovations, the Bayh-Dole Act is currently being challenged by several groups who want greater U.S. government control of inventions developed with federal support.

March-In Rights

Public health activists are lobbying the U.S. government to exercise its 'march-in' rights enumerated in the Bayh-Dole Act to control healthcare costs, arguing prices alone have impeded public access to therapeutic drugs that were discovered with government support (Feldman 2015, 4 and Arno 2001). These groups invoke 35 USC § 201.f, which requires Bayh-Dole entities to achieve practical application of inventions developed with federal funds or risk a potential 'march-in' by the U.S. government. Since 1980, there have been six petitions for the U.S. government to utilize its march-in rights, and all of these petitions have been denied with the U.S. government maintaining that the use of 35 USC § 203 to control prices is not statutorily supported (Thomas 2016, 8 and Whalen 2012, 1106). The most recent petition was submitted in 2022 by Senator Elizabeth Warren asking Health and Human Services to exercise its rights to authorize generic production of prostate cancer drug enzalutamide, sold under the name Xtandi (Warren 2022). Enzalutamide was discovered in 2000 at the University of California, Los Angeles through NIH and Department of Defense research grants totaling $500,000 (Cullinan, 2022 and Thomas 2016, 9). The university then exclusively licensed the drug to pharmaceutical company Medivation, which was eventually acquired by Astellas who went on to invest over $1.4 billion in further development of the drug through clinical trials (Astellas 2022). The NIH recently denied this petition, pointing out that public access to Xtandi had significantly increased as a result of the drug being licensed to Astellas (NIH 2023). However, the NIH announced an inter-agency review of the government's march-in rights authority to include price as a consideration.

5. Conclusions and Policy Consideration

The Bayh-Dole Act emerged because of inefficiencies associated with government ownership of patents and federal agency involvement in the commercialization process. By providing appropriate incentives, academic research organizations developed the technology transfer expertise and infrastructure needed to identify and protect inventions and then license these inventions to the private sector for commercialization. U.S. government patent policy under the Bayh-Dole Act has produced a plethora of revolutionary innovations that have radically transformed the U.S. economy. Recent significant government investments in clean energy research, development and demonstration projects in the Inflation Reduction Act and Bipartisan Infrastructure Law have positioned the U.S. to aggressively transition to a low carbon energy economy. One study estimates the combination of BIL and IRA could reduce U.S. carbon emissions from the electricity grid 90 percent by 2030 (Budryk 2023).

The Bayh-Dole Act will be critical to ensuring that clean energy innovations developed at academic research labs are effectively transferred to industry for practical application to reduce our carbon footprint in the energy sector while promoting economic development. However, the Bayh-Dole Act currently faces significant challenges from organizations wanting to leverage a provision of the law to advance short-term political agendas that have the potential to significantly damage the U.S. innovation ecosystem.

A growing number of groups representing both academic research organizations and industry staunchly oppose the use of march-in rights, citing their concerns that such a move would destroy private sector investments in revolutionary innovations needed to better the human condition (AAMC 2022, NIST 2019 and GAO 2009, 14). An extensive review of the legislative history of the Bayh-Dole Act, including the U.S. government use license under 35 USC § 202 and the U.S. government march-in rights under 35 USC § 203, indicates Congress had no intention for either of these provisions to be used to control prices (Kersten 2022, Ezell 2016 and NIST 2019, 30). Further, several policy experts and even the NIH have evaluated the potential use of the

U.S. government march-in rights and conclude that it would have little to no actual impact on lowering drug prices (Treasure 2015, 783). Proponents of using the march-in rights to control costs invoke 35 USC § 201.f which requires Bayh-Dole entities to achieve practical application of inventions developed with federal funds on reasonable terms. Practical application is defined in 37 CFR § 401.14(a) to mean the "manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms."

As it relates to research organizations operating under the Bayh-Dole Act, the 'reasonable terms' language refers to the financial terms of a license agreement between the patent owner and the company who licenses the patent for commercialization. Where the owner of IP rights resulting from government research refuses to grant a license on reasonable terms, the government can compel the patent owner to grant licenses or assume title of subject inventions and march-in to grant licenses itself to ensure the technology reaches practical application. There is no reference to 'reasonable terms' in the relevant regulations that would infer that the price of a product is an appropriate factor for the government to consider in its assessment of march-in petitions (NASEM 2020, 37). The use of march-in rights can be appealed by an affected "contractor, inventor, assignee, or exclusive licensee", further supporting the position that the reasonable price provision of 37 CFR § 401.14(a) refers to commercial license agreements to functionally achieve the practical application threshold.

In responding to a 2012 petition asking the U.S. government to exercise its march-in rights to control the price of HIV drug Norvir, the Director of the NIH expressed the following concern regarding use of march-in rights under 35 USC § 203: *"In addition, because the market dynamics for all products developed pursuant to licensing rights under the Bayh-Dole Act could be altered if prices on such products were directed in any way by NIH, the NIH agrees with the public testimony that suggested that the extraordinary remedy of march-in is not an appropriate means of controlling prices. The issue of drug pricing has global implications and, thus, is appropriately left for Congress to address legislatively."* (Zerhouni 2004, 5).

If the U.S. government now decides to expand the governments march-in rights authority to include the consideration of price, this poses substantial risks to the U.S. innovation ecosystem. Inappropriately threatening march-in rights to control prices would decouple the public-private partnerships that the Bayh-Dole Act has effectively promoted over the past 43 years. Investments in clean energy technology would face significant collateral damage, cutting off an important pipeline of inventions from government funded research organizations to the energy sector. Weakening patent rights under the Bayh-Dole Act would hobble the cleantech industry at a time when the global community desperately needs low carbon energy innovations. Further, if agencies of the U.S. government arbitrarily expand march-in rights as an instrument to control pricing, foreign governments will likely follow suit, either nationalizing patent assets or developing their own policies to fix prices. This will make companies licensing government funded innovation less willing to invest in and deploy cleantech innovations in developing nations where low carbon energy technologies are needed to substantially curb emissions. It's imperative that the global clean energy community rally behind the Bayh-Dole Act so that lawmakers and federal agencies preserve the parts of the law that have made it so successful.

For example, investments in clean energy technology would face significant collateral damage, cutting off an important pipeline of inventions from government funded research organizations to the energy sector. Weakening patent rights would hobble the cleantech industry at a time when the global community desperately needs low carbon energy innovations. Further, if agencies of the U.S. government arbitrarily expand march-in rights as an instrument to control pricing en masse, foreign governments will likely follow suit, either nationalizing patent assets or developing their own versions of arbitrary laws to fix prices for innovations funded by governments. This will make companies licensing government funded innovation less willing to invest in and deploy cleantech innovations in developing nations where low carbon energy technologies are desperately needed to curb emissions. It's imperative that the global clean energy community rally behind the Bayh-Dole Act so that lawmakers and federal agencies preserve the parts of the law that have made it so successful.

Recommendation—March-In Rights

The working group established by the U.S. Department of Health and Human Services (HHS) and the Department of Commerce to review the U.S. government's authority under march-in rights should seek broad stakeholder input from public and private audiences to assess the potential impacts of the use of march-in rights on public-private partnerships and commerciali-

zation of federally funded innovations. In particular, the working group should engage industry, entrepreneurs, venture capitalists and startup companies who rely on stable government patent policies to raise funds necessary to invest in the development and commercialization of early-stage technology. Next, the working group and NIST should work to develop clear guidance on the appropriate use of the government march-in rights as specified in 35 USC § 203. The original legislative intent of the march-in provision of the Bayh-Dole Act should be considered. 35 USC § 203 was originally designed to provide the U.S. government the ability to compel patent owners to license their inventions or practice those inventions if they had not been licensed and effectively utilized. This guidance should include more extensive criteria used when assessing the potential use of the march-in provision of the Bayh-Dole Act. Remaining regulatory ambiguity will be leveraged by future activist groups to submit petitions for use of the march-in rights as a price control, thereby damaging trust in the patent system while straining public-private partnerships focused on developing innovative early-stage technologies.

Congress should consider adding clarity and specificity to both the 'practical application' and 'reasonable terms' definitions of 35 USC § 201(f). Practical application should be defined as 'utilization increasing over time' using an evidence-based method to measure public access to the invention as a result of the technology being licensed. This would allow a federal agency to rely on quantifiable measures of increasing availability to determine if the public benefits of the innovation are being fully realized. The 'available to the public on reasonable terms' provision of 35 § 201(f) should differentiate circumstances where the patent owner is a small business capable of directly selling products as opposed to a university or federal lab who rely on their licensees to sell products. In cases where patents are licensed to companies for commercialization, the reasonable term provision should apply to license financial terms and this distinction would significantly resolve concerns about the arbitrary use of government march-in rights. In addition to clarifying the 'practical application' and 'reasonable terms' provisions of march-in rights, the working group should consider other clarifications to 35 § 203, including limiting the use of government march-in rights once an invention is made available to the public as long as deployment consistently increases over time, accounting for the initial phase of development. Limiting the ability of the government to march-in after a private sector partner has invested significant resources in an invention protects industrial investment in early-stage ideas while preserving the governments interest if the technology has not yet been commercialized. Providing clear guidance on the appropriate use of march-in rights will dissuade spurious march-in petitions from being submitted. ■

Disclamer

This article represents the opinions of the author and the views expressed herein do not necessarily represent the views or policies of the National Renewable Energy Laboratory, the U.S. Department of Energy or the U.S. Government.

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Should Copyright Law Prevent AI From Learning Or Be Set Aside?

*By Jesús Alonso Pérez**

■ Jesús Alonso Pérez, LL.M.,
Attorney,
Bird&Bird,
Madrid, Spain
E-mail: jesus.alonso@twobirds.com

1. Introduction

In modern societies where Artificial Intelligence (AI) is growing exponentially, legal implications arise. This is the case with copyright law. AI needs billions of data such as videos, photos, books, *inter alia*, to understand how humans speak, think, and express themselves in order to be useful to society. Copyright holders have criticised with fury the way their works are reproduced to feed AI without their consent. So, should AI be able to learn?

2. AI and Machine Learning

AI is "a discipline of computer science that is aimed at developing machines and systems that can carry out tasks considered to require human intelligence."[1] Nevertheless, for the purpose of this article, the potential implications of copyright law will be related to a subset of AI, that is, Machine Learning (ML). ML is "the collection of using various algorithms to teach computers to find patterns in data to be used for future prediction and forecasting or as a quality check for performance optimization."[2] The problem is that the term data for machines has a different concept for humans, as data may involve or contain works that are copyright protected. The right holders have the *ius prohibendi* to grant access to their works under a copyright licence. In principle, if ML has access to these works without a proper licence, there is a copyright infringement because ML often does a temporary copy of the work for reading.

2.1 Legal Implications

In the United States, some law and policy makers argue that the use of works to train AI is covered under the fair use doctrine. The fair use doctrine must be evaluated by taking the following factors into consideration:

(1) "The purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes,

(2) The nature of the copyrighted work,

(3) The amount and substantiality of the portion used in relation to the copyrighted work as a whole, and

(4) The effect of the use upon the potential market for or value of the copyrighted work."[3]

ML is a very expensive high-tech product that only leading companies can afford; thus, these companies will look for a commercial benefit. Therefore, the purpose, amount and substantiality of the portion used by these companies might not fit well with the fair use doctrine. Regarding the market effect or the value of the work, the ability that a ML can replicate a work as the original or copy the artist's style or expression to create future new works is a huge risk for the copyrighted work owners.[4] However, usually the purpose of ML is learning from humans to assist them in a task, not to become authors. For cases where the aim of copying works has been to have access to facts, ideas or functionality, the use is fair and legal according to the Ninth Circuit Court of the United States in *Sega Enterprises Ltd. v. Accolade, Inc.*[5] Hence, the line between what should be fair use or illegal is very thin and still not out of debate.

Under European Union law, on one side, if the input (access) is not covered by a legal limitation or exception provided by law, such as private copying, research purposes or the Text and Data Mining (TDM) exception, *inter alia*, ML cannot reproduce nor transform such works.[6] Thus, since there is nothing similar to the fair use doctrine in EU law, these limitations or exceptions are not enough to cover the use of these works by ML. For instance, to apply the TDM exception for commercial purposes, the owners of the ML algorithms still need a licence, though not every ML requires a TDM tool.

The problem with denying immediate access to works is that not every ML intends to copy the work

* Jesús Alonso, LL.M., attorney at law at Bird&Bird. The views expressed herein are those of the author alone and do not necessarily represent Bird&Bird's views.

1. WIPO, "WIPO Technology Trends 2019" (2019) 58, 79.

2. Hoss Belyadi, Alireza Haghighat, in *Machine Learning* "Guide for Oil and Gas Using Python," 2021.

3. Section 107 of the Copyright Act.

4. This was the case of the Next Rembrant, an AI-generated painting from thousands of works made by the original author Rembrandt Harmenszoon van Rijn. See Andres Guadamuz, "Artificial intelligence and copyright" (*WIPO Magazine*, 2017) <*https://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html*> accessed 20 January 2023.

5. *Sega Enterprises Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1519 (9th Cir. 1992).

6. Such an act of reproduction is forbidden, per Article 2 of the Infosoc Directive.

so as to transform it or to create a new work with the artist's expression. Sometimes they only aim to feed their pattern recognition algorithms with works to understand human language (natural language processing algorithms) and be able to support workers, *e.g.*, to help patent examiners who need to review thousands of prior art references. What's more, some ML algorithms may need photographs for facial recognition or movies for voice recognition, or both, to identify online copyright infringements. There will be a copyright infringement depending on how much the output of the AI may vary from the input or the copyrighted work, or in other words if the erstwhile work is recognisable in the AI's output. Hence, a general denial will turn out to be detrimental to innovation and creativity. In consequence, a level playing field where innovation and creativity match is the right approach to follow.

3. Possible Solutions When Integrating Works in Machine Learning

Pattern algorithms learn on training datasets.[7] One solution could be to base these training datasets on databases free of copyright protected works or works available under an open-source licence or a creative commons licence. To grant access to copyrighted works under traditional licensing is not feasible. This is not because of the collection of rights, because we have seen that due to the collecting societies this is possible; such is the case with Spotify, which hosts over 80 million songs.[8] It is not feasible because:

(1) ML's training data sets could reach billions of data points.[9]

(2) ML is not a platform that a collecting society can manage or can follow to collect royalties and have eyes in the back of artists' heads.

(3) There are many types of machine learning software that would involve a wide variety of works, which would imply many different collecting societies.

Nonetheless, the concept of open-source licensing, that is, access, reproduction, transformation and distribution of the code (the work) for free—meaning "royalty free"[10]—could be a good approach for works to be used to teach robots. There are many types of open-source licences, so it is advisable for IP licensors willing to grant ML software access to their works to choose a licence that guarantees a certain level of protection. Consequently, the well-known General Public Licence[11] could be a good option since it is a restricted open-source licence that is less likely to affect the original work's market and can be used to teach the robot.

On the other side, creative commons licences could also shed some light on this licensing sphere. For instance, the Attribution-NonCommercial-NoDerivatives 4.0 International Creative Commons licence[12] could be compatible with the interests of the authors or IP licensors and ML's interests. Depending on the type of licence and the purpose of the ML, some licences are preferable to others. For example, if ML only needs to understand human language, both restrictive and non-restrictive copyright licences are appropriate, but if the aim of the ML is to help a painter or a screenwriter, a restrictive licence that does not include the right of transformation and distribution of the code for commercial purposes should apply.

The creation of *ad hoc* databases or new material for that purpose could also be a solution. Such is the case of The Stack, a database made of non-restrictive open-source licences that allow developers to ask for a removal of their data and can prevent its inclusion in the database.[13]

Last but not least, a new copyright exception or limitation in the EU law for ML learning with an opt-out provision for copyright holders could be introduced by the legislators, provided that this does not affect the value of the work and its market.

4. Conclusion

AI and Copyright share the same goal: to boost innovation.[14] Authors and IP implementers should find a balance to achieve this goal. It is at their will to collaborate via licensing or to wait for a new copyright exception. Instead of looking for copyright infringements, authors should see the advantages of training AI, since good training could contribute to stopping online piracy or serve the welfare of society. In the same way humans need to read to learn, a robot needs to do it as well. ■

7. They usually "include data that is publicly accessible and freely available on websites." See Claudia Tapia and Marta Duque, "Artificial intelligence: IP challenges and proposed way forward" (*The Patent Lawyer*, 2022) < *https://www.4ipcouncil.com/application/files/9016/4310/5066/PL_-_Artificial_intelligence_IP_challenges_and_proposed_way_forward.pdf* > accessed 20 January 2023.

8. Spotify < *https://newsroom.spotify.com/company-info/#:~:text=Discover%2C%20manage%20and%20share%20over,ad%2Dfree%20music%20listening%20experience.*>

9. See Lemley, Mark A. and Bryan Casey, "Fair Learning" (2020) <*https://ssrn.com/abstract=3528447*> accessed 20 January 2023.

10. See the Open Source Definition, Open Source Initiative (OSI) <*https://opensource.org/osd*>.

11. See the licence text at: *https://opensource.org/licenses/gpl-license*.

12. See the licence text at: *https://creativecommons.org/licenses/by-nc-nd/4.0/*.

13. James Vicent, "The scary truth about AI copyright is nobody knows what will happen next" (The Verge, 15 November 2022) <*https://www.theverge.com/23444685/generative-ai-copyright-infringement-legal-fair-use-training-data*> accessed 29 December 2022. See also the Stack project at *https://www.bigcode-project.org/docs/about/the-stack/*.

14. Council Directive 2019/790/EC of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC, Recital 2.

Dr. Zhivago, Literary Copyright, And The Fundamental Distance Between Works Of Historical Fact And Fiction

Lara Prescott Succeeds In Her Defence Against Copyright Infringement Claim

By Simon Keevey Kothari, Aled Richards-Jones and Ian Kirby

"This is Doctor Zhivago. May it make its way around the world," *Boris Pasternak is to have said to the envoy of an Italian literary agent. It is indeed still doing so, making its way, particularly around the English High Court and into the Law Reports.*

Anna Pasternak, the great-niece of ***Doctor Zhivago*** *author Boris Pasternak, brought a claim for copyright infringement in the High Court of England and Wales. Pasternak's claim alleged that Lara Prescott's historical novel,* ***The Secrets We Kept****, infringed the copyright in the "selection and arrangement" of the events presented in Pasternak's biographical work Lara:* ***The Untold Love Story That Inspired Doctor Zhivago.***

Dismissing the "selection and arrangement" claim in full, the High Court gave a detailed judgment on 25 October 2022 which affirms the role of copyright protection as extending to original expression and not ideas themselves.

Every so often an intellectual property case comes along that really does have it all. On this occasion, first and foremost, it resulted in a highly insightful judgment, which helpfully summarises an interesting aspect of copyright law, where a work of fiction is alleged to have infringed the literary copyright in a prior work of non-fiction. It also comprised a rare factual matrix made up in large part of passion, intrigue, espionage, romance, suffering and CIA-sponsored anti-Soviet propaganda, but which was ultimately a story about the triumph of the human spirit. All these elements have come together to result in a penetrating analysis of the current state of play of literary copyright infringement involving authors drawing on historical sources, interwoven into the rich fabric of mid-twentieth century Cold War geopolitics.

Introduction

Copyright infringement cases involving allegations that the author of a work of *fiction* has infringed the literary copyright in a prior work of *non-fiction* are rare in the UK. One has to go back to the well-known case of *Baigent v. Random House* [2007] EWCA Civ 247 (the "*Da Vinci Code* case") in which it was asserted (unsuccessfully) that Dan Brown's fiction novel, *The Da Vinci Code,* infringed copyright in a book called *The Holy Blood and the Holy Grail,* which was described by the Court as "a work of historical conjecture."

From first principles, it is easy to see why such claims are rare: copyright famously *"protects the expression of ideas, not the ideas themselves."*[1] That means that works of non-fiction will attract copyright protection in the expression of the facts which those works present, but not the facts themselves. Therefore, where a work of historical fiction seeks to develop those same facts in the context of fiction, a non-fiction author will struggle to make out infringement unless they can establish that the particular expression of those facts—and not merely the facts themselves—has been reproduced in the allegedly infringing work.

The recent case of *Pasternak v. Prescott* [2022] EWHC 2695 (Ch) was another case in which a non-fiction author sought to establish infringement against an author of historical fiction. The case provides a fresh survey of the difficulties of such an endeavour, and also contains some particular curiosities.

Facts

Doctor Zhivago was the only novel of Russian poet Boris Pasternak, and he was well aware that its criticism of the Soviet revolution, though not severe, would still

■ Simon Keevey Kothari,
Senior Associate,
Carpmaels & Ransford,
London, England
E-mail: Simon.keeveykothari@carpmaels.com

■ Aled Richards-Jones,
Senior Associate,
Carpmaels & Ransford,
London, England
E-mail: Aled.Richards-Jones@carpmaels.com

■ Ian Kirby,
Partner,
Carpmaels & Ransford,
London, England
E-mail: Ian.Kirby@carpmaels.com

1. *Baigent v. Random House*[2007] EWCA Civ247, [5].

make it impossible for the book to get past the Soviet censors. He was, however, persuaded to pass it to an Italian publisher for it to be translated and published abroad, knowing full well that this would cause some severe vexation to the authorities in the USSR. Unsurprisingly, given that by the late 1950s the Cold War was in full swing, the CIA decided it could be an invaluable propaganda coup if they could have the book printed in Russian and smuggled back into the USSR—a *samizdat* operation in a sense, although on a more sophisticated, CIA-backed level. The immense power of great literature in changing minds and hearts was not to be underestimated, and it is this CIA campaign which forms a backdrop to the defendant's novel. Other, more infamous anti-communist CIA operations of the era, such as the one involving the Cuban leader Fidel Castro and exploding cigars (yes, it seems there actually was such a project), came somewhat later and were nowhere near as subtle or arguably potentially as powerful, as that which surrounded *Doctor Zhivago*.

The claimant's work, *Lara: The Untold Love Story That Inspired Doctor Zhivago ("LARA")*, is a biography of Olga Ivinskaya, a lover of Boris Pasternak and speculated inspiration behind the character of Lara Antipova in *Doctor Zhivago*. In David Lean's 1965 multiple-Oscar-winning film adaptation of the book, the character of Lara was played by English actor Julie Christie, with the late Omar Sharif in the role of the eponymous doctor. The defendant's work, *The Secrets We Kept ("TSWK")*, is a novel with two narrative strands: an Eastern strand focusing on Olga's life, her relationship with Boris and involvement in the writing and dissemination of Doctor Zhivago; and a Western strand narrating a fictional account of two female CIA spies tasked with publishing copies of *Doctor Zhivago* outside the Soviet Union and of smuggling copies of *Doctor Zhivago* into the Soviet Union where it had been banned, as a means of anti-Soviet propaganda.

By the time of trial in July 2022, the claimant's principal claim was that the defendant had copied, from the relevant chapters in *LARA*, a substantial part of the "selection, structure and arrangement" of facts and incidents which the claimant is said to have created when she wrote *LARA* (referred to as "the Selection Claim"). This formulation arose, in part, because the defendant had conducted an extensive analysis of the claimant's work to reveal that large portions of it had been copied verbatim and *seriatum* from prior works (which the judgment acknowledges at §139). Accordingly, the claimant could hold no copyright in those portions of text as they were not original to her; the claimant's position therefore was that the *selection, structure and arrangement* of those events were original and attracted copyright.

The claimant also ran a further, minor claim in relation to a passage translated from a book called *Légendes de la Rue Potapov,* the autobiography of Olga's daughter, Irina. The claimant had commissioned a translation of some 22,000 words of *Légendes* from French into English, of which 55 words (which comprised sentencing remarks from a Russian court that committed Olga to the Gulag) were admitted by the defendant to have been copied. After issuing her claim, the claimant acquired the copyright in this translation and added this as a separate, discrete claim; this was called "the Translation Claim."

Claimant's Motivation in Bringing the Claim

A striking feature of the case is that the claimant asserted, in her written and oral evidence, that she had never read the defendant's work, either before or since issuing proceedings. This did not escape judicial comment:

"It struck me as extraordinary that an author could bring a copyright claim, claiming infringement of the copyright in their own book, without actually having read the book which is alleged to infringe their copyright.… The Claimant explained in her evidence however that she had commissioned a review of the two books, and I assume that her case in this action derives from that review. It would have been interesting to see that review, but it was not available. It may be that it is said to be subject to legal professional privilege. I was told by [the defendant's lead counsel] that his instructing solicitors had sought a copy of the review, but that the review had not been provided. Odd as all this is, I accept the Claimant's evidence that she has read very little of TSWK. It was clear from the Claimant's evidence that her essential motivation for bringing this action was her perception, based upon what she was told by others and based upon the publicity for TSWK, that the Defendant had committed a form of identity theft."

This approach to bringing a copyright infringement claim brings to mind another work of fiction, Franz Kafka's *The Trial*, although perversely turned on its head. *The Trial* is the story of a man, Josef K., arrested and prosecuted but the nature of his crime is revealed neither to him nor to the reader. In *Pasternak v. Prescott*, it was the nature of the claimant's claim itself that was not initially particularly clear to the defendant or the Court.

The claimant's motivation for bringing her action seemed to be the protection of her and her family's good name (and to her mind only the claimant had the right to tell her family's story) rather than her copyright —an affray which in a strange way perhaps mirrored the "struggle for ideas" between the two Cold War superpowers themselves. The forum chosen for the claimant's struggle was never the most appropriate given the nature of the claimant's grievance. Whilst Mr. Justice

Johnson had found that in *LARA* there was a sufficient degree of the claimant's own intellectual creation in order for copyright to subsist in the work, subsistence is obviously only one of the issues on which the claimant needed to succeed to achieve a positive result.

It is interesting to wonder what odds the late Omar Sharif (himself a well-known gambler, horse-racing aficionado and a top-ranked world-famous Bridge player) might have given on the successful outcome of the action brought by the claimant.

The Translation Claim

This section was described by the judge as a "minor" aspect of the claim, hence we will deal with it first, before moving onto the more substantive Selection Claim. In respect of the Translation Claim, the nub of the dispute at trial was whether the defendant's use of the 55-word extract of the *Légendes* translation could find immunity in the defence under section 30(1ZA) Copyright Designs and Patents Act 1988, which required (amongst other elements) that the defendant establish: (i) that the use of the quotation had been fair dealing and (ii) that the quotation had been accompanied by a "sufficient acknowledgement."

As to (i), the judge accepted that the defendant's use was fair dealing; the defendant had acted in "good faith," and she had used no more of the translation than was required to convey the terms of the prison sentence imposed on Olga.

As to (ii), the defendant relied on (amongst other matters) the fact that she had included the claimant's work in her acknowledgements, and the fact that the claimant's work had acknowledged Irina herself (and not the French translator) in respect of the extract. This limb of the defence failed, as the judge held that the defence required a sufficient acknowledgement of the *author of the excerpt*—namely, the translator of the French edition into English—and not the author of the work in which the extract had been reproduced (namely, the claimant). Further, although the identity of the translator could not have been ascertained from inspecting the claimant's work (which credited Irina and not the translator), it ought to have been apparent that Irina could not have authored the extract in English and therefore the defendant ought to have made enquiries as to the identity of the inevitable translator.

The Selection Claim

The claimant's case on the Selection Claim was that seven of the 11 chapters in the East section of *TSWK* reproduced the selection, structure and arrangement found in seven of the 12 chapters of *LARA*. As an illustration of how this case was put, the claimant relied on seven events abstracted from Chapter five of *LARA,* which were said to be copied in Chapter one of *TSWK*:

1) Olga discovers her pregnancy and the conditions of her confinement in the Lubyanka being eased.
2) Olga being told during interrogation that she is being taken to see Boris; then being taken in a van to another government building, to a morgue.
3) Olga being taken back to her interrogator, where Irina's English teacher is brought in to confess.
4) The teacher later writes to Olga to apologise.
5) Olga suffers a miscarriage, brought on by her experience in the morgue.
6) Irina's reflections on the miscarriage.
7) Olga sentenced and reference to Potma.

Applying the copyright subsistence standard under *Infopaq*,[2] the judge held that the selection, structure and arrangement asserted by the claimant were "original" works of the claimant. In doing so, the judge accepted the claimant's submission that the *Infopaq* test for originality –namely the author's *"own intellectual creation"* —was a *"relatively undemanding threshold."* He then proceeded to examine each allegation of copying in respect of each part of the selection, structure and arrangement in question. In a detailed analysis, the judge declined to find copying in respect of any. The reasons for his findings were fact-specific, but many could be summarised as follows:

- Many of the scenes or choices which the claimant alleged were copied had been alighted on by the defendant prior to the defendant having been sent a proof copy of *LARA* by her literary agent.
- Many of the scenes were chronological in order.
- Some of the scenes or choices had been derived from the same historical sources, including Olga's own autobiography, which both the claimant and the defendant had used.
- Some of the scenes or choices simply bore little resemblance to those said to have been copied from *LARA*—they were too differently expressed or appeared in too-different a context in *TSWK* as compared to *LARA.*
- Many of the similarities had in fact been produced by an artificial legal exercise which had produced the appearance of *"similarity by excision,"* when the reality of the two works revealed *"differences between the relevant parts of the two works, in terms of the selection of events, [which] are too great for a finding of selection copying."*

Having devoted some 350 paragraphs to a detailed analysis of each and every allegation of copying and found each to be wanting, the judge reinforced his

2. *Infopaq International A/S v. Danske Dagblades Forening* (C-5/08) [2010] FSR 20.

conclusion of non-infringement by finding that *LARA* and *TSWK "are fundamentally different works"* (§408), a *"fundamental difference"* which was *"apparent on a first reading of the two works"* (§408), *"written in very different styles, with different content and different arrangement"* (§409). The judge found that the defendant had done no more than the *"use of odd words or phrase[s] or other detail"* from the claimant's book (§411), which fell far short of the threshold for copyright infringement.

The Costs Hearing

In a separate costs hearing, on 2 December 2022, Mr. Justice Edwin Johnson ordered the claimant to pay 99 percent of the defendant's legal costs, on the basis that the defendant had won substantially the whole claim, with a 1 percent reduction to reflect the claimant's success on the Translation Claim. As for damages, the claimant accepted a payment of £1.38, which reflected *pro rata* the amount paid by the claimant for the original *Légendes* translation.

Take-Home Remarks

There are two particular points in the judgment which should be noted. First, it seems clear that works of historical fact may always struggle against works of historical fiction, unless there is clear evidence that there has been copying of the selection, structure and arrangement of facts and incidents, or some other protectable expression. Second, one should also beware the inference of copying where two authors have used the same historical sources.

Returning to our hypothetical question posed earlier—what might have been the experienced risk-taker Omar Sharif's view of the odds of the claimant's action succeeding? With knowledge of the pertinent background facts to this case (or, as he may have viewed it, the hand the claimant had been dealt) and in this hypothetical scenario his being extremely well-versed in English copyright law, Mr. Sharif would almost certainly have concluded that the outcome of the case was as predicted and expected: the claimant had never possessed a winning hand nor, unwisely, had she even cared to look at her hand before making her decisive move. ■

Second New Use Of Known Molecule vs Combining Two Molecules Into A Single Chemical Entity

By Dr. Charanjit K. Sehgal

India has been a member of GATT (General Agreement on Tariffs and Trade) since July 8, 1948. The World Trade Organisation (WTO) was established in 1995 as an international organisation to cater to global trade by providing basic agreements between member countries for an efficient global market. On January 1, 1995, India became a member of the WTO in order to continue with the reforms of its economy post 1991.

On April 15, 1994, in Marrakesh, Morocco, the Marrakesh Agreement was signed by GATT member states, establishing the WTO. The Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement is Annexure-C of the Marrakesh Agreement. The TRIPS Agreement provides guidelines to member states to enact IPR-related legislation in their respective jurisdictions. When the WTO came into being on January 1, 1995, it was decided that developing member states have to comply with the TRIPS Agreement requirements within ten years and underdeveloped countries within 15 years. Since India had become a member of the WTO from the day of its inception, it was necessary that India enact IP laws complying with the TRIPS Agreement by January 1, 2005.

Article 27 of the TRIPS Agreement emphasises that each WTO member state must respect and honour the IP of member states in their respective jurisdiction under its IP laws enacted in compliance with the TRIPS Agreement.

During the pre-TRIPS Agreement implementation era in India, drugs as a product were not patentable under Section 5. Only process patents were considered for a patent grant. However, India enacted legislation and amended the IP laws in compliance with the TRIPS Agreement. As a result, Section 5 was deleted, and applications for drugs as a product were considered for a patent grant from that point forward. However, prior to this, some generic pharmaceutical companies were making patented molecules as generic products for the Indian market, as the relevant drug molecules were not protected by patent in India under Section 5. In such cases, amended Indian patent law made it mandatory for patent holders to grant a voluntary license for their patent to those who had been making the patented molecule prior to January 1, 2005.

■ Dr. Charanjit K. Sehgal,
Sehgal IPR Services,
Mumbai, Indial,
E-mail: ck@sehgaliprservices.com

It has been a standard practice by big pharma companies to evergreen a new drug molecule by filing new patents for new chemical derivatives of the same product viz. salts, stereoisomers and new physical forms viz. multiple polymorphic forms. This approach provides protection to the innovator company for a drug molecule that has been around for over 50 years, depending upon the possibility of a chemical and/or physical form of substitutes/derivatives. Filing a new patent for a new chemical or physical form of a known patented drug molecule during the later tenure part of the patent provides additional protection for the same base molecule, essentially allowing for an additional protection term depending upon the time of filing of the new patent application. Likewise, multiple applications for a known product for new chemical and physical forms can be submitted, and a known base drug molecule for the same symptoms can be protected for a longer duration, depriving the public of the availability of a generic version of the drug molecule in question.

However, the Indian government realised that such an "evergreening" was taking place and addressed this issue by introducing Section 3d, which bars patenting of any new physical or chemical form of a known drug molecule unless it has enhanced efficacy, which has to be supported by pertinent data.

Article 8 of the TRIPS Agreement provides freedom to WTO member states to formulate or amend their laws and regulations, to adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital importance to their socio-economic and technological development.

In addition, TRIPS Agreement Article 31(f) allows member states to enact legislation providing for the compulsory licensing of patented drug molecule patents to local pharma manufacturers to meet domestic requirements at an affordable price.

Second Use of a Known Drug Molecule

Section 3(d) of the Indian Patent Act 1970 states that an invention claiming a new form of a known substance or second and subsequent use of a known substance with established medicinal activity is treated as the same substance and is not patentable unless the invention significantly improves therapeutic efficacy concerning that known compound.

Section 3(d) bars a patent for any new property or new use for a known substance. The basic reason for denying the patent for a new use of a known drug molecule is to avoid a double granting of a patent for the same substance.

The U.S. patent law chapter 804 definition of double patenting under 35 USC § 111 describes that whoever invents or discovers any new and useful process, the machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title. It means that a new use of a known product can obtain patent protection.

It all depends on how the claims for the second use of a known substance are presented. For example, with the use of substance X for the manufacture of a medicament for a specific therapeutic indication, such claims are considered not as a product claim but as a method of treatment claim. If the specific therapeutic indication is defined in the claim and supported in the patent document, then such claims may be allowed in many jurisdictions.

Following is a list of a few more drugs with a second use approved by the U.S. FDA in 2016:

The need for such claims was first recognised by the European Patent Office in Art. 54(5), which allows the patentability of a known substance or compound for a new use in a medical or veterinary treatment, provided that such use is not comprised in the state of the art.

These take the form "use of X for the manufacture of medicament for the treatment of Y," *i.e.*, they are purpose-limited process claims. Such claims are also known as Swiss-type claims and have found acceptance with Article 54(4) of the EPC.

However, such claims are not patentable in India under section 3(i), as they are being treated as a method of treatment of the human body and section 3(i) forbids claims on a new use of a known substance.

Regarding the new use of a known substance, the said substance is not novel as a product; however, the new therapeutic indication for the non-novel product is novel and the said novel therapeutic indication, though inherent in the known product, was neither in the public domain, nor was there any teaching, motivation or stimulation to a person skilled in the art from any information in the public domain about the inherent second use.

It is feasible that a person skilled in the art could identify the presence of the second therapeutic indication in the known product after an exhaustive R&D effort comprising creating clinical trial data acceptable to drug regulatory bodies. This act by the innovators may be considered as meeting the requirements of Section 3(d), and therefore is inventive, as the new therapeutic indication is an enhanced efficacy supported by clinical trial data. This is important because a drug regulatory body never approves a drug for a new therapeutic indication without clinical trial data.

However, it all depends upon how the claim is presented as far as complying with the Section 3(d) requirement.

Table 1: List Of Drugs With A Second Use Approved By The U.S. FDA In 2016

Drug	First Use	Subsequent Use
Nimodipine	Blood pressure	Cerebral Disorder
Alfuzosin	CVS	Benign Prostatic Hyperplasia
Zoledronic Acid	Paget's disease	Osteoporosis
Pregablin	Neuropathic pain	Generalised Anxiety Disorder
Amphotericin	Antifungal	Leshmaniasis
Bromocritine	Parkinson's Disease	Diabetes Mellitus
gemcitabine	Antiviral	Anticancer
Methotrexate	Anticancer	Rheumatoid Arthritis
Minoxidil	Antihypertensive	Hair Loss Treatment
Raloxifene	Birth control	Osteoporosis

Data U.S. FDA January 2016

Combination of Two Known Molecules Into a Single Chemical Entity

There have been attempts to make multiple-component solids having at least one active pharmaceutical ingredient. There are many examples of pharmaceutical molecules that can be used as active pharmaceutical ingredients in multiple-component solids, such as aspirin, one or more members of the profen series (*e.g.*, ibuprofen and flurbiprofen), carbamazepine, phenyloin, and acetaminophen. There has also been the practice wherein two different drug molecules are used for a known therapeutic indication that is inherently present in the individual molecule.

Pharmaceutical molecules or ions are inherently predisposed for such combined single chemical entities as they already contain molecular recognition sites

that through ionic/hydrogen bonding bind selectively to give biomolecules, and they are prone to form a combined single chemical entity which may also be termed as a supramolecule. Examples of the groups commonly found in individual active pharmaceutical ingredients, and which are capable of combining, include, but are not limited to, acids, amides, aliphatic nitrogen bases, unsaturated aromatic nitrogen bases (*e.g.*, pyridines and imidazoles), amines, alcohols, halogens, sulfones, nitro groups, S-heterocyles, N-heterocycles (saturated or unsaturated), and O-heterocycles. Other examples include ethers, thioethers, thiols, esters, thioesters, thioketones, epoxides, acetonates, nitrils, oximes, and organohalides. Some of these groups are capable of forming ionic bonds with identical groups in similar or different molecules, *e.g.*, acids and amides. Other groups can form ionic bonds with different groups and are termed heterosynthons, *e.g.*, acide/amide, pyridine/amide; alcohol/amine. Hetero synthons are particularly suitable for the formation of multiple-component molecules as a single chemical entity.

There has been ongoing research and development identifying existing drug molecules that have chemical functionalities that can form a non-covalent bond to form a combined single chemical entity. The said combined single entity contains two different drug molecules with different pharmaceutical activities that may be for a similar therapeutic indication. Such combinations of two individual molecules as a single chemical entity can be administered in a single dosage form instead of administering as separate individual dosage forms as they may have a synergistic impact by acting at different pharmaceutical sites in the human body. In such case the combined macro single chemical entity acts as a prodrug, since after it is administered the macro single chemical entity, being linked/combined through a weak ionic bond, breaks into the original single drug molecules, and each then acts when administered as an individual dosage form.

These individual molecules that act in a human body after administered in a combined single chemical entity are already known for the same pharmaceutical activity, therefore, protection of such known individual molecules in an unknown new chemical entity form may be considered as double patenting. The mode of action of a novel unknown combined single chemical entity, which may also be referred to as a supramolecule, is the same as the individual known constituents of the said combined supramolecule, and the said individual constituents are already protected or have enjoyed a protection term, if lapsed. In reality, protection of an unknown combined new chemical entity that contains known drug entities may mean double patenting of an already known substance when the action, purpose, use and applicability of the combined (vis-à-vis the individual constituents of the combined) new chemical entity is taken into consideration.

Generally, the macro single chemical entity is a novel molecule obtained by combining two known chemical entities having chemical functionality/ies capable of getting joined together through ionic bonding using a simple standard established chemical process. However, there may be cases wherein two known molecules have been combined by covalent bonding by using a complex chemical process.

Herein is a case study related to a patent application where two individual chemical entities are combined into a single chemical entity through covalent bonding.

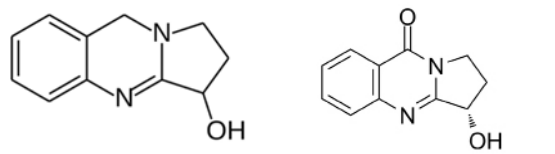
Vasicine is an alkaloid natural product isolated from the Adhatoda vasica plant. Vasicine has been established for its use as a bronchodilator but there has not been any report about its use as anti-asthmatic, anti-inflammatory or anti-tussive. See Figure 1.

949/DEL/2014 discloses a novel compound referred to as KLD therein. In the patent document said KLD molecule has been obtained by the incorporation of a menthol-based azepino skeleton within the vasicine framework, combining the therapeutic activities of vasicine and azepino into a new and novel chemical compound referred to as KLD. See Figure 2.

The unknown novel KLD molecule is obtained by the concept of combining two known molecules into a single chemical entity, and the said new novel single-chemical entity (KLD) possesses bronchodilatory, anti-tussive and anti-histaminic properties, which may have the potential to graduate to an ideal anti-asthmatic molecule.

KLD is a novel molecule based on the concept of combining azepino, which is an aromatic, seven-car-

Figure 1: Vasicine



Vasicine Vasicinone

Figure 2: KLD

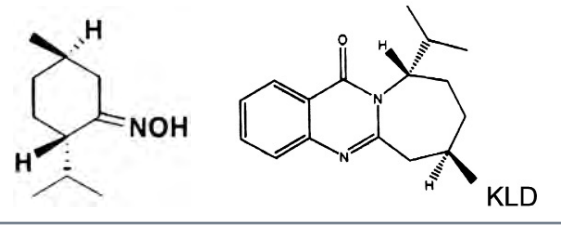


Figure 3: Azepino

bon nitrogen heterocyclic chemical compound, Azepino, Figure 3, and vasicine, wherein the azepino skeleton has been infused in the vasicine molecule by using lactam of terpenoid molecule menthol. The novel KLD molecule had been obtained not by combining two known molecules through an obvious ionic bonding, but by combining two known molecules through a non-obvious chemical process via covalent bonding. An embodiment in the 949/DEL/2014 patent document does support the claimed multiple therapeutic activities with pharmaceutical data.

However, based on the fact that the two known molecules have been combined not directly through ionic bonding, but conceptually through a chemical process through covalent bonding, the said invention does not meet the Section 3(d) requirements as it uses two known molecules to obtain the new molecule claimed in the patent application.

The patent application for the KLD combined molecule, even though it has enhanced efficacy supported by *in vivo* pharmaceutical trial data, was rejected. This is likely because, if the claim of a new novel molecule is allowed, then it amounts to double patenting of the two molecules that were conceptually chemically combined to obtain the new novel molecule known as KLD. This has transpired even though the pharmaceutical activity claimed in the new molecule is anti-asthmatic, which has not been disclosed by either of the two molecules that were combined together to obtain the new novel molecule KLD.

This vividly demonstrates that the Indian Patent Act 1970 under Section 3(d) does not permit patentability of known products as an individual molecule in any new chemical or physical form, nor the combination of two known molecules, even though the combined form forms a novel new macro molecule, which may also be referred to as a supramolecule.

In view of the above, and as per the Indian Patent Act 1970, the following two types of inventions do not meet Section 3(d) requirements:

1. The second therapeutic use of a known drug molecule, which as described above would seem to be patentable in the U.S. and EP jurisdictions. Since such claims are based on enhanced efficacy as supported by clinical trial data and the new therapeutic indication, though inherently present, is neither disclosed nor known in the prior art, the new therapeutic indication is distinct and should likely be perceived as inventive in nature. However, the Indian Patent Act 1970 as interpreted currently shows that, since the new indication is of a known molecule, such claims amount to double patenting of a known molecule. In the EP under Article 54(5), it is allowed as a Swiss-type claim, which allows for the patenting of a new efficacy for a known medication. Unfortunately, in India such claims are method of treatment-like claims and as per the Indian Patent Act 1970 Section 3(i), method of treatment claims are not allowed.
2. The combination of two known molecules either by ionic or covalent bonding into a new and novel single chemical entity which incorporates inherently present therapeutic activities of the individual molecules that have been combined into a single new chemical molecule entity.
3. Particularly, the combination of two known molecules through ionic or hydrogen bonding into a new chemical entity is a weak case compared to a second therapeutic indication of a known molecule as the two molecules combined are not novel as individuals, and also the combined activities into a new combined molecule is also not novel as the inherent known activities are carried into the combined single chemical entity. Furthermore, the new combined molecule, particularly when joined together through ionic bonding, when administered into a human body separates into the respective individual original molecules and acts on the body as individual components. Thus, it does not meet Section 3(d) requirements, and if allowed, may amount to double patenting as the same set of molecules and mode of action of the known molecules is already known and is not novel. As evident from the above discussion, even a new chemical entity made by combining two known molecules and supported by biological trial data in respect of its enhanced efficacy is not patentable per the Indian Patent Act 1970 as it does not meet Section 3(d) requirements, and if allowed amounts to double patenting of known molecules in the form of a new chemical form as a single combined molecule.
4. When two chemical entities are combined into a single chemical entity through covalent bonding, then after administration into the human body

the macro combined single chemical entity does not split into respective single chemical entities. In such a case, the novel combined macro molecule acts as a single biological molecule with the combined biological activities of the individual respective molecules since the covalently bonded macromolecule does not break into the respective individual chemical entities. The India Patent Act 1970 does not even recognise covalently bonded combined molecules as complying with Section 3(d) requirements. This is supported by the rejection of patent application 949/DEL/2014 as discussed in detail herein.

5. This further supports the fact that when covalently bonded individual drug molecules do not meet Section 3(d) requirements, then an ionic bonded combined molecule is a still weaker case. This is because of the fact that ionic bonded macro molecules, also referred to as supramolecules, break into their respective individual single chemical entities after administration compared to a covalently bonded combined molecule, which acts as a combined molecule single entity without breaking into its respective single-chemical entity components. ■

Genetic Resources From Biodiversity: Reflections On Contractualization In The Light Of The Latest News

By Pagnavoine Khieu and Jean-François Bloch

Summary:

Currently, a major issue arises regarding the use and the exploitation of genetic resources issued from countries owning such resources by exploiting parties, due to the lack of balance regarding the access and benefit sharing (ABS) from such acts.

In order to ensure a fair benefit sharing due to these resources and prevent biopiracy matters, the Convention on Biological Diversity (CBD) (1992) and the Nagoya Protocol (1996) are major legal instruments relating to access and sharing of genetic resources and their associated traditional knowledge, which would be used and exploited by exploiting parties. However, these texts lack key notions concerning any general rules for the use and the exploitation of genetic resources in scientific publications and/or R&D programs, but also regarding the creation of innovative products, notably by startups but also major companies, thus leading to uncertainty in the fair application of the ABS principles.

In this respect, the users of genetic resources need some clarifications regarding the proceedings in order to obtain the authorizations from the providers in this matter and to ensure the proper contractualization to access an important raw material. Also, this point is important especially for securing startups in charge of investing in R&D programs and for exploiting results, either directly or through a technology transfer.

The purpose of this article is to present a global update on the latest trends in intergovernmental instruments to frame the use of resources not originally foreseen by the Convention on Biological Diversity or the Nagoya Protocol, while indicating some key questions on this matter.

Introduction:

Genetic resources from biodiversity and its valorization constitute a major challenge for the states providing the resources, but also for their users, such as universities, technology transfer offices and startups for realizing scientific studies, as well as the industry parties in charge of exploiting, particularly in health, cosmetics, chemistry and energy.

In the current society, there is a major issue between the South countries and the North countries about this topic, as the majority of the biodiversity is located in the South countries and that the developed countries in the North have the overall economic resources for developing and exploiting innovations (directly or through technology transfer) using this biodiversity, especially the genetic resources.

■ Pagnavoine Khieu,
IP and Contracts Counsel,
Starting Bloch SAS,
Nîmes, France
E-mail: PKHIEU@startingbloch.com

■ Jean-François Bloch,
Chief Executive Officer,
Starting Bloch SAS,
Nîmes, France
E-mail: JFBLOCH@startingbloch.com

Thus, its conservation and exploitation have become a common concern for both biodiversity-holding countries and users. Indeed, the economic and environmental stakes linked to biodiversity are communicated at length by the different media and political powers in place, so that many studies have been carried out in this field.

However, it is important to note that there is a misunderstanding between preserving the global biodiversity, through a climate perspective, and using some samples from this biodiversity for new innovations profitable for mankind.

It is then important to find a balance between the interest of each side, namely:

- Allowing the open science and the exploitation of genetic resources, and;
- The need for fair benefit sharing of such exploitation and use and access control of genetic resources for the providers.

However, their access and use are now subject to procedures that are increasingly complex to implement. Generally, such genetic resources are not directly exploited, but it requires huge investments in R&D development, production and regulatory matters before obtaining and exploiting new products. There is also a risk for exploiting parties to be involved in biopiracy matters, and then to lose reputation.

Then, to define rules for using biodiversity, the Con-

vention on Biological Diversity was adopted in Rio de Janeiro in 1992 and then entered into force on 29 December 1993.[1] It was supplemented by the Nagoya Protocol, adopted on 29 October 2010.[2] These international legal instruments aim to regulate access to genetic resources and to establish a fair and equitable sharing of the benefits arising from the use of these resources (ABS).[3]

These instruments provided key definitions regarding the ABS principles as applied to technology transfer and/or R&D studies based on genetic resources issued from biodiversity:

Some Key Definitions from Article 2 of the Convention on Biological Diversity:

- "Biotechnology" means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.
- "Country of origin of genetic resources" means the country which possesses those genetic resources in *in-situ* conditions.
- "Country providing genetic resources" means the country supplying genetic resources collected from *in-situ* sources, including populations of both wild and domesticated species, or taken from *ex-situ* sources, which may or may not have originated in that country.
- "Domesticated or cultivated species" means species in which the evolutionary process has been influenced by humans to meet their needs.
- "Genetic material" means any material of plant, animal, microbial or other origin containing functional units of heredity.
- "Genetic resources" means genetic material of actual or potential value.
- "Technology" includes biotechnology.

Complementary Key Definition from Article 2 of Nagoya Protocol:

- "Utilization of genetic resources" means to conduct research and development on the genetic and/or biochemical composition of genetic resources, including through the application of biotechnology as defined in Article 2 of the Convention.
- "Derivative" means a naturally occurring biochemical compound resulting from the genetic expression or metabolism of biological or genetic resources, even if it does not contain functional units of heredity.

However, some major actors concerned by the legal framework of the ABS principles were not currently precisely defined, such as mainly "Provider" and "User" of genetic resources. This lack of definitions would lead to challenges in interpreting the Convention on Biological Diversity. Concerning "derivative," its definition provides ambiguity in its interpretation.

For the purpose of this article, the following definitions will be indicated:

- The Provider is an entity wishing to transfer genetic resources. It can be the providing country directly, suppliers of resources such as private or academic institutes, universities or landowners, but also *ex-situ* collections;
- The User is considered as the entity wishing to access genetic resources. It can represent, respectively, various actors, *e.g.*, the bioprospectors, research institutes, universities, *ex-situ* collections, R&D or industrial companies.[4]

Even by defining these actors, many questions arise regarding the procedures to be followed in order to be able to access and use a specific genetic resource (whether it is of terrestrial or marine origin, or even from a digitized collection) and the associated traditional knowledge. Questions deserve to be raised with regard to the sharing of benefits that will be negotiated, taking into account, from the perspective of this article, the considerations regarding technology transfer, which involves questions of intellectual property.

Some Issues Relating to Contractualization Involving Genetic Resources for Developing, Protecting and Exploiting Technologies From Such Resources

In the context of the implementation of access and benefit-sharing agreements, as advocated by the Nagoya Protocol, intellectual property issues around the use of genetic resources and/or traditional knowledge by innovative companies must be raised upstream in order to ensure strategic management that benefits each party in the system downstream.

In any R&D program associated with the use of genetic resources, authorization is required before initiating such a program. However, due to the characteristics of such program, the planned results may not be the concrete ones. Sometimes, the results would differ from the expected ones, but could then be exploitable.

While the results of an R&D program may be uncertain and unknown for the parties, it is necessary to define upstream the main lines related to the means of protection of the results, as well as those associat-

1. Convention on Biological Diversity. 1992. *https://www.cbd.int/convention/text.*

2. Nagoya Protocol. 1996: *https://www.cbd.int/abs/text/.*

3. The ABS Mechanism—What is ABS? s.d. *https://www.abs-biotrade.info/topics/the-abs-mechanism/what-is-abs/.*

4. Tichet, Camille; Nguyen, Hong Khanh; El Yaakoubi, Sefia; Bloch, Jean-François (2010). "Commercial product exploitation from marine microbial biodiversity: some legal and IP issues." *Microbial Biotechnology, Special Issue: Volume 3*, Issue 5, sept 2010 (507-513).

ed with the exploitation of these results. It could be possible, in some cases, that a complementary transfer agreement has to be defined between the final commercial exploiting party of the genetic resources and the User that has led the R&D studies, notably if the commercial party is not the one that conducted the studies. Any amendments of the agreement between the R&D partner and the final User could then have an impact regarding the Provider.

From the point of view of protection and exploitation of R&D results, the following figure summarizes the general ABS principles based on the CBD and Nagoya Protocol and some key questions to be considered by the User. See Figure 1.

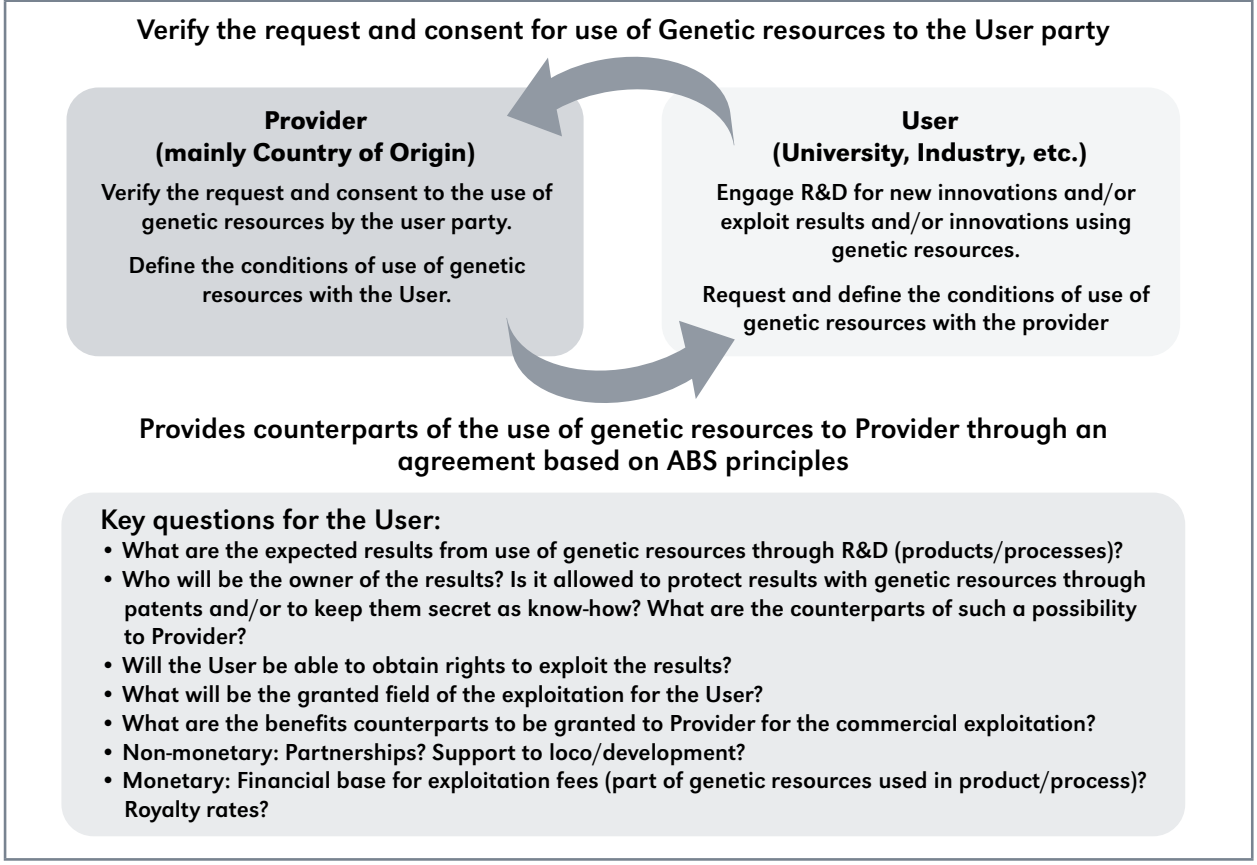
Due to the fact that each Member State of the CBD and Nagoya Protocol has different rules regarding the ABS principles, it is currently challenging for the User to find a "template" for defining the mutual agreement for the use and exploitation of genetic resources:

–Some countries, such as Brazil, have defined a strict and rigorous ABS policy in order to prevent massive bioprospecting for developing new innovations and to check the relevant use of its genetic resources (obligation to disclose the origin of genetic resources in patent application).[5]

–In France, there are some exceptions regarding the implementation of ABS policies for some resources:

- For some specific genetic resources managed by the Ministry of Agriculture (notably genetic resources from domesticated animal species, genetic resources of cultivated and wild relatives of plants, and genetic resources of domesticated and cultivated micro-organism species), it was decided not to implement the Nagoya Protocol principles for such resources.[6]
- Some other microorganisms used as models for R&D purposes, under French sovereignty, would also be excluded from the ABS principles, accord-

Figure 1. ABS Principles Summarized With Key Questions



5. Brazilian Law No. 13,123, of May 20, 2015, relating to access to genetic heritage and associated traditional knowledge and regulates benefit sharing: *https://www.wipo.int/wipolex/en/text/490992.*

6. "Ressources génétiques : l'application du protocole de Nagoya en France," French Ministry of Agriculture, last modified May 12, 2023: *https://agriculture.gouv.fr/ressources-genetiques-lapplication-du-protocole-de-nagoya-en-france.*

ing to Article L412-5 of the French Environment Code.[7] Once the concerned microorganisms are listed, the User would then be free to use and exploit such genetic resources.

Regarding the different elements above and based on our practice, it appears that startups are often involved in R&D programs based on genetic resources and mainly have the responsibility of fulfilling ABS principles. The universities are mainly involved in the R&D aspects, whereas exploiting parties request warranties in exploitation agreements.

However, ABS principles must be proposed at the time the application is drawn up, which means that the valuation rules must be known in advance before any innovative projects associated with such genetic resources can be launched. This imposes a high level of knowledge of the potential value generated by the R&D project. However, there is always some uncertainty as to the expected economic potential. It is therefore difficult to be sure of the existence or amount of revenue that can be generated from a genetic resource.

Actually, startups do not usually have the capacity to anticipate and ensure the exploitation of results and the fulfillment of conditions from ABS agreements (conditions of use, benefit sharing, etc.), mainly because of uncertainty of the R&D results, and the to-be defined conditions of the exploitation of results. Because of such uncertainties, this would not then be supportive of the emergence of startups that would become major actors in innovations using genetic resources.

In order to prevent this matter, ABS principles could be more flexible for Users, in order to allow them to implement these principles in their development projects, given that unsuccessful negotiations of ABS conditions could block the R&D aspects of the projects, and then hinder innovation and partnership projects for the exploitation of results stemming from the used genetic resources.

Whereas major companies can provide non-financial advantages for Providers, such as partnership or involvement in local development, it would be difficult for startups to provide such advantages as they would mainly financially invest in R&D programs.

Moreover, startups are mainly the Users that need information and advice to help them understand the different genetic resource regimes, and then take the necessary steps to comply with the regulations in force for any innovative projects (R&D studies, exploitation of results). Negotiating the ABS conditions should then be defined in accordance with companies' current R&D and commercial capacity, but also financial investments intended for any project involving genetic resources and the associated traditional knowledge.

Some Practical Tips in Light of the Constraints of ABS Mechanisms and Future Intergovernmental Instruments Governing the Use of Non-territorial Resources

In light of the above, it appears that the definition of a contract upstream, although important, risks complicating the procedures to be followed for commercial exploitation due to different origins of genetic resources (marine, digital, etc.).

Indeed, for example, from the point of view of patent protection, some states require that the IP office verify the existence of prior authorization for the use of the genetic resource that is the subject of the patent, in particular by checking the content of the associated agreement, which appears to contradict the principles linked to the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement, which does not require such verification.[8]

For example, in India, Section 6 of the *National Biological Diversity Act of 2002* indicates that *"no person shall apply for any intellectual property right, (…) for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the National Biodiversity Authority before making such application." Regarding any patent applications, "permission of the National Biodiversity Authority may be obtained after the acceptance of the patent but before the sealing of the patent by the patent authority concerned."*[9]

This illustrates a divergence on the importance of preserving biodiversity with regard to climate and human issues and the role of intellectual property as a commercial instrument allowing a company to have a competitive advantage in its operating market.

At the time of the article, the World Intellectual Property Organization (WIPO) Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC) is currently discussing the matter, *"with the objective of finalizing an agreement on an international legal instrument(s), […] relating to intellectual property which will ensure the balanced and effective protection of genetic resources, traditional knowledge and traditional cultural expressions."*

7. Article L.412-5 d) of the French Environment Code: *https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000044233732*. This article indicates that among the resources not concerned by the French ABS principles, are "Genetic resources of species used as models in research and development. A joint order of the ministers responsible for the environment, agriculture, research, health and defense indicates the list of these model species." Such list is currently under development at the time of the article.

8. Roca, Santiago. (2021). "Compatibility of the Intellectual Property Regime, the Convention on Biological Diversity and the Nagoya Protocol." *GRUR International*. 70. 10.1093/grurint/ikaa182.

9. English version of the Indian Biological Diversity Act 2022: *https://nbaindia.org/uploaded/act/BDACT_ENG.pdf* .

Through this finality, in July 2022, the WIPO General Assembly decided to convene a Diplomatic Conference to conclude an International Legal Instrument Relating to Intellectual Property, Genetic Resources and Traditional Knowledge Associated with Genetic Resources. A Preparatory Committee on the Diplomatic Conference will take place from 11 to 13 September 2023, in order to prepare such an instrument. It could be based on the IGC Chair's text of a Draft International Legal Instrument Relating to Intellectual Property, Genetic Resources and Traditional Knowledge Associated With Genetic Resources, produced on 30 April 2019, whose goals would consist of enhancing the efficacy, transparency and quality of the patent system with regard to genetic resources and the associated traditional knowledge and preventing patents from being granted erroneously for inventions that are not novel or inventive with regard to such resources and knowledge.[10]

This reflection should also take into account the "Treaty of the High Seas" concluded on 5 March 2023 by the delegates of the Intergovernmental Conference on Marine Biodiversity beyond National Jurisdiction (BBNJ), and signed on 19 June 2023 by the United Nations.[11] Among other things, this treaty aims to incorporate a mechanism for the fair and equitable sharing of benefits arising from marine genetic resources and to contribute to the generation of knowledge, scientific understanding and technical innovation.[12]

The issue of the exploitation of digitally sequenced resources should also not be overlooked. At the end of the Conference of the Parties to the Convention on Biological Diversity, which took place from 7 to 19 December 2022 in Montréal, a draft decision was proposed by the President, which concerns digital sequencing information on genetic resources in order to try to establish a multilateral system for benefit-sharing from such assets. This draft decision indicates, among other things, the commitments by contracting parties to transpose the ABS mechanisms related to digital sequencing information on genetic resources through taking *"effective legal, policy, administrative and capacity-building measures at all levels, as appropriate, to ensure the fair and equitable sharing of benefits that arise from the utilization of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, and facilitating appropriate access to genetic resources, and by 2030 facilitating a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing instruments."* [13] Beyond the principles indicated in this project, for a fair ABS between North countries and South ones, difficulties in implementation will arise due to the lack of precise rules that the contracting parties will have to follow.

Although the latest developments in legal instruments in this area may provide some answers, there are still some unanswered questions relating to the legally secured exploitation of genetic resources and their associated traditional knowledge in relation to the ABS principles. There are still some administrative issues concerning the management of ABS principles by Users, as this is time-consuming, especially for startups. Besides, such uncertainties remain challenging for investing in R&D in this domain, as this could discourage potential investors for Users in financing such programs.

Thus, while waiting for the implementation of these future legal instruments, the Users that envisage the development of new technologies or innovations involving genetic resources, without being accused of biopiracy, will have to take the following steps before any use of these resources and their associated traditional knowledge:

- Obtain information from the Provider state on its own conditions of use and exploitation of the resource and/or associated knowledge.
- Carry out a study of the prior art associated with this resource, in case of a possible patent project involving this resource.
- Negotiate upstream an agreement for the use and exploitation of the resource, taking into account the final innovation that will be commercialized, while trying to obtain the maximum possible guarantees on the possibility of using the resource (either from the Provider, or from the university/major industrial company if the User/exploiting party is a startup). ■

Acknowledgements

We thank Pascale Joseph for a critical reading of the manuscript.

10. WIPO/GRTKF/IC/43/5: Chair's Text of a Draft International Legal Instrument Relating to Intellectual Property, Genetic Resources and Traditional Knowledge Associated With Genetic Resources: *https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=572391*.

11. United Nations—UN News. Beyond borders: Why new 'high seas' treaty is critical for the world. June 19, 2023. *https://news.un.org/en/story/2023/06/1137857* (accessed June 29, 2023).

12. Draft agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. June 12, 2023. *https://documents-dds-ny.un.org/doc/UNDOC/LTD/N23/073/63/PDF/N2307363.pdf?OpenElement=&_gl=1*e2ehnb*_ga*MjAwMTM5NDI3OS4xNjg4MDQ4MDk4*_ga_TK9BQL5X7Z*MTY4ODA0ODA5Ny4xLjEuMTY4ODA0ODI0OS4wLjAuMA* (accessed June 29, 2023).

13. Kunming-Montreal Global biodiversity framework—Draft decision submitted by the President. Fifteenth meeting—Part II—CBD/COP/15/L.25—18 December 2022: *https://www.cbd.int/doc/c/e6d3/cd1d/daf663719a03902a9b116c34/cop-15-l-25-en.pdf.*

File Wrapper Estoppel

By Dr. Madelein Kleyn

Patent law differs in each country, but there are some important equitable doctrines that apply across borders. One such doctrine is prosecution history estoppel.

The term *estoppel*[1] is derived from the Middle French word *estoupail* and refers to the principle which precludes a person from asserting something contrary to what is implied by a previous action or statement of that person or by a previous pertinent judicial determination:

"the case had been one of estoppel"

"that fact is not sufficient to raise an estoppel"

File wrapper estoppel (also known as prosecution history estoppel) is an estoppel in patent law barring an applicant who has acquiesced in the rejection of a broad claim in the application for a patent from later asserting that a claim, deliberately more restricted, is equivalent to the original claim. Prosecution history estoppel thus acts as a limitation on the scope of a patent claim, preventing inventors from claiming monopoly over a space.

This doctrine limits the extent to which a patent can be broadened by the doctrine of equivalents.

Why Prosecution History Estoppel is Relevant

The patent prosecution process is a form of conversation between the patent applicant or inventor and the patent examiner. The patent examiner will examine the patent claims and issue an office action(s) (or examination report), considering the relevant jurisdiction's patent law and oftentimes objecting to the patent claims in application on various grounds available. The inventor then has the opportunity to respond to those objections, arguing in favor of the patent claims as drafted, or to amend the patent claims to overcome the examiner's objections.

When drafting patent applications, it is important to think ahead and consider potential patent litigation. Patent lawsuits for infringement and validity inevitably consider the claims of the granted patent. The perfect patent application is extremely rare without further amendment, and patent amendments are par for the course. Virtually all complex inventions only receive grants after amendment, or at least significant arguments aiming at convincing a patent office examiner of the validity of the claims. As a consequence of this reality, it is important to consider the reasons and ways patent claims and specifications are drafted, and patent applicants should take care to limit potentially negative effects of narrowing statements and amendments in order to ensure their patents are as broad as possible.

■ Dr. Madelein Kleyn,
Mad IP Consulting (Pty) Ltd.,
Somerset West,
South Africa
E-mail: info@mad-ip.com

Patent amendments during the prosecution of the patent may include adding a mistakenly omitted name of a co-inventor; amending patent specification to bring it into conformity with the patent act in each country where the application is filed; amending the claims to combine a dependent claim with an independent claim, to describe them more clearly, or to remove claims over unpatentable material; and amending the drawings to further illustrate the invention.

When amending patent applications, no new matter may be added, and claims may not be broadened. Patent applicants and inventors may also face restriction requirements from the patent examiner as a prerequisite to receiving their patent grant, which may further narrow the scope of the patent's claims.

In drafting the initial patent specification and claims it is essential to minimize the extent to which amendments may be necessary. These can be avoided by conducting a detailed prior art search before drafting and submitting the patent application and by paying careful attention to the language used in the patent specification and claims, including whether nouns are plural and how structure, function, and relationships are described. Carefully consider the limitations you include in claims. Simple language like "a" or "an" may inadvertently mean "one," when you do not intend to write this limitation into the claims. The patent application will not only be read by the examining attorney—it will become part of the public record, searchable as prior art, and potentially subject to interpretation by a judge that does not necessarily have a technical background.

Pay equal, if not greater, attention to how eventual amendments may be read. Do not amend a patent to meet the examiner's requirements simply to have a patent granted but consider each amendment and argument strategically. Be careful not to create contradictory arguments in prosecuting the same patent in different jurisdictions. Amendments should be treated with the same care as the original patent application in terms of editing and review before submission. Be-

1. Definitions are from the Merriam-Webster's Dictionary of Law ©1996.

fore submitting an amendment consider whether there are foreseeable ways to draft amendment language that would broaden the scope of the proposed patent claims.

Remember that all parts of the prosecution history are, after 18 months from date of filing, public record and will play into opposing counsel's arguments when raising prosecution history estoppel as an affirmative defense to an infringement claim. Be deliberate in communications with the patent examiner when discussing the intention behind a patent application as well as the language used. Disclaimers made to the patent examiner regarding the intended scope of protection can be used later by defendants in infringement actions to prevent the patent owner from obtaining relief.

Since prosecution history estoppel can act as a bar to the enforcement of patent rights, it is important that patents and their amendments be drafted carefully. Always consider the ramifications of narrowing original patent claims before committing to a more limited invention than originally filed.

Application of the Doctrine of Patent Estoppel

Not all countries apply this doctrine. Some countries allow foreign patent prosecution history estoppel and others do not. Some countries do not apply this doctrine at all. Below follows a brief overview of some jurisdictions' application of file wrapper estoppel.

United States

The doctrine of file wrapper estoppel was developed in the case *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.,* 128 S. Ct. 2903 (USA 2008) in the United States. File wrapper estoppel essentially means that when an inventor during prosecution narrows down his/her invention to escape prior art by some amendment, s/he cannot claim that someone else infringed his/her patent under the doctrine of equivalence.

The following are the two types of file wrapper estoppels:

1. Amendment Estoppel, which functions to limit the doctrine of equivalents by preventing a patentee from capturing through equivalents subject matter surrendered during prosecution.
2. Argument Estoppel, which means that unmistakable declarations to the USPTO in favour of patentability, whether or not they were necessary to win acceptance of the claims, will prevent the patentee from receiving protection for the subject matter relinquished under the theory of equivalents. In *Caterpillar Tractor Co. v. Berco*, S.p.A., 714 F.2d 1110, 1116 (Fed. Cir. 1983), the Federal Circuit noted that assertions made to foreign patent offices may also be considered for establishing the application of prosecution history estoppel. "Representations to foreign patent offices should be considered where they contain relevant evidence." When a court considers comments made in a foreign prosecution:
   - The statement was made in an official procedure in which the patentee had every incentive to be careful in describing the scope of its invention;
   - The patents are related and/or contain an identical claim; and the remark had nothing to do with distinctive elements of foreign patent law.

The principle is thus well entrenched in U.S. patent law.

Canada

Since December 13, 2018, the Canadian Patents Act expressly provides that patent prosecution histories are admissible as evidence in any action or proceedings respecting a patent. Section 53.1(1) reads as follows:

In any action or proceeding respecting a patent, a written communication, or any part of such a communication, may be admitted into evidence to rebut any representation made by the patentee in the action or proceeding as to the construction of a claim in the patent if

(a) it is prepared in respect of:

(i) the prosecution of the application for the patent,

(ii) a disclaimer made in respect of the patent, or

(iii) a request for re-examination, or a re-examination proceeding, in respect of the patent; and

(b) it is between:

(i) the applicant for the patent or the patentee; and

(ii) the Commissioner, an officer or employee of the Patent Office or a member of a re-examination board.

Europe

The scope of protection is defined in Article 69 EPC and the Protocol on the Interpretation of Article 69 EPC. It requires that reasonable protection must be afforded to the patentee and at the same time a reasonable degree of legal certainty must be provided to third parties. In Article 2 of the Protocol it is stated that due account shall be taken of any element which is equivalent to an element specified in the claims.

The doctrine of file wrapper estoppel is however applied differently in the EPO member states.

In the *Eli Lilly v. Fresenius Kabi AB v/Fresenius Kabi and Fresenius Kabi Oncology Plc.* case, different European courts considered this doctrine. This case concerned the infringement of Eli Lilly's patent EP 1 313 508B1.

Denmark

In relation to the question of infringement by equivalence, the Danish Maritime and Commercial High Court found that the decisive questions in this regard are:

(1) Whether the essential or significant part of the invention can be found in the alleged infringing product;

(2) Whether deviations only are less significant; and

(3) Whether the scope of the claims has been limited during the prosecution history against the prior art.

The Danish Maritime and Commercial High Court then went on to assess whether the prosecution file history eliminated a possible infringement by equivalence. The Danish Maritime and Commercial High Court stated that the change from "pemetrexed" to "pemetrexed disodium" was due to the EPO's formality objection to added matter in accordance with Article 123(2) EPC, and that the objection did not relate to lack of novelty or inventive step.

UK

In 2016 in a UK Supreme Court decision in *Activis v Eli Lilly*, Lord Neuberger effectively introduced the doctrine of equivalents and also referred to certain circumstances where it would be appropriate to consider prosecution history to assist in claim interpretation.

However, in 2018 in the *L'Oréal v RN Ventures* case,[2] in response to a contention that the prosecution history of an application should be used to interpret the scope of protection, the UK Patents Court has recently observed that reference to the prosecution history is the exception and not the rule.

The Patents Court case in question was *L'Oréal v RN Ventures* before Mr Justice Carr. At the European Patent Office, L'Oréal obtained a patent directed to an apparatus for treating acne.

Lord Neuberger had stated that reference to the prosecution file would only be appropriate in two circumstances where:

- The point at issue is truly unclear if one confines oneself to the specification and claims of the patent, and the contents of the file unambiguously resolve the point; or
- It would be contrary to the public interest for the contents of the file to be ignored.

Ireland

File wrapper estoppel does not apply. In the *Ranbaxy* case,[3] the court ruled that reliance on the inventor or patentee evidence or arguments as to the construction of the claims is inadmissible.

Netherlands

Dutch law does not expressly recognise file wrapper estoppel. However, the Dutch Supreme Court[4] has ruled that a defendant in infringement proceedings can derive arguments from the file wrapper.

Germany

File wrapper estoppel was introduced in German patent law in 2016. Formerly, it was confirmed by the Federal court in the *BGH, judgment of 12.3.2002—X ZR 43/01—plastic pipe part; OLG Düsseldorf (lexetius.com/2002,247)*, which found that the determination of the conferral of protection of a patent does not depend on events in the grant procedure which preceded the grant of the patent and specifically that issues derived from prosecution history cannot be taken into account in the assessment of the scope of protection of a patent, even with regard to the requirement of legal certainty. The Federal Court of Justice ruled on 14 June 2016[5] that arguments made during prosecution may indicate how the skilled person construes a patent claim but that such indications must not readily be relied on as the sole basis of claim construction.

Italy

In hearing the Eli Lilly case in Italy, the Court considered Article 52(3)bis of the Industrial Property Code, which requires that "to determine the scope of the protection granted by the patent, every element that is equivalent to an element indicated in the claims must be considered."

The court, based on file wrapper estoppel, found that it was unnecessary to enter into the merits of the issue, as the patent file history excluded infringement entirely. The court concluded that the applicant was bound by the description statements and the Claim 1 amendments during prosecution, which unambiguously referred only to the disodium salt, regardless of the reasons behind those statements and amendments.

Australia

File wrapper estoppel does not apply in Australia. In the *Bradken Resources Pty Ltd v Lynx Engineering Consultants Pty Ltd* [2015] FCA 1100[6] case Judge Nicholas' judgment reiterated the following:

1. Construction of patent claims under Australian law is ultimately a matter for the court.
2. Construction of patent claims may be assisted by evidence from a person skilled in the art and recourse may be had to earlier versions of the patent specification, to assist interpretation.
3. Whilst it needs to be borne in mind that foreign and domestic prosecution history may be used when interpreting the scope of U.S. patent claims,

2. *L'Oréal Societe Anonyme & Anor v L'Oréal (UK) Ltd* | [2018] EWHC 391 (Ch) | England and Wales High Court (Chancery Division) | Judgment | Law | CaseMine.

3. *Ranbaxy Laboratories Ltd & ors -v- Warner Lambert Company* [2005] IESC 81 (02 December 2005) (*bailii.org*).

4. *Dijkstra v Saier Verpackungstechnik Gmbh & Co.* Kg. Supreme Court of the Netherlands. 22 December 2006. *Dijkstra vs. Saier: File wrapper estoppel* (*ie-forum.nl*).

5. Urteil des X. Zivilsenats vom 14.6.2016 - X ZR 29/15 - (*bundesgerichtshof.de*).

6. *Bradken Resources Pty Ltd v Lynx Engineering Consultants Pty Ltd* [2015] FCA 1100 (20 October 2015) (*austlii.edu.au*).

there are considerable obstacles to applying the doctrine of file wrapper estoppel in Australia.

4. In view of these considerable obstacles, it is highly unlikely that the doctrine of file wrapper estoppel will be applied in Australia in the foreseeable future.

South Africa

In the recent *Bayer v Villa Crop* case,[7] the Court considered the doctrine of unclean hands in a patent infringement matter and a related application for further evidence. At issue in the application briefly was the allegation that Bayer had made certain representations during proceedings in various countries in the European Union when it applied for a Supplementary Protection Certificate ("SPC") with reference to the active substance spirotetramat, in respect of which Bayer now seeks to impose a monopoly in the pending action. Villa relied on the doctrine of unclean hands, which concerns the honesty of a party's conduct. It holds that where a party seeks to advance a claim that was obtained dishonestly or *mala fide,* that party should be precluded from persisting and enforcing such a claim. The matter landed in the Constitutional Court, where it was found by the majority that the invocation of the unclean hands doctrine was not reducible to the statutory claim for revocation but a distinct cause of action. It is the author's interpretation that the doctrine of file wrapper estoppel now applies in South Africa. ■

7. *Villa Crop Protection (Pty) Ltd v Bayer Intellectual Property GmbH* (2005/00230) [2020] ZACCP 2; 2021 BIP 1 (COP) (14 October 2020) (*saflii.org*).

SEPs In The Mobile, Wireless And DVB Markets

By Mattia Fogliacco, Garrard Beeney, Alan Fan and Carter Eltzroth

As part of the Thought Leadership Program—a professional learning series organized by LES International—one track was devoted to Standard Essential Patents (SEPs). The objectives of this track were to engage LES members to be able to navigate SEP licensing negotiations, and to provide an understanding of the transactional efficiencies that are available, notably through patent pooling. These efficiencies offer benefits to those adopting a standardized technology and generate revenue streams for continuing innovation by the patent holders.

les Nouvelles has already published a report on the initial session of this track, "An Overview of Standard Essential Patents" held on October 25, 2022.[1] This article sets out the main take-away points on three additional panels on specific standards like mobile communications, Wi-Fi and DVB.

SEPs and Mobile Communications– Main Take-Away Points

On November 29, 2022, a panel of experts addressed the topic of standard essential patents in the mobile communications industry. It discussed the development of mobile standards, why SEP licensing in the mobile space is different from other standardized technologies, and potential solutions to friction in mobile communications SEP licensing.

The panel consisted of Thomas Chia, Via Licensing Alliance; Mattia Fogliacco, Sisvel; Gabriele Moshler, Ericsson; Michael Schlicht, Fraunhofer; and Koen Wuyts, KPN. The discussion was moderated by Garrard Beeney, Sullivan & Cromwell LLP.

Mobile Standards Development

In a relatively short time, cellular communications technology has advanced from 2G (simple voice telephony) to 5G, and further developments are in the works. Today these standardized technologies enable a wide variety of operations not just on mobile handsets, but also on a vast array of other functionalities on devices from medical equipment to automobiles to white goods and smart meters. On mobile handsets alone, cellular communications development has empowered devices that are hand-held computers with audio-visual entertainment capabilities that surpass even the most optimistic prognostications of just a few years ago.

■ Mattia Fogliacco,
President,
Sisvel International,
Luxembourg
E-mail: Mattia.fogliacco@sisvel.com

■ Garrard Beeney,
Partner,
Sullivan & Cromwell LLP,
U.S.A.
E-mail: Beeneyg@sullcrom.com

■ Alan Fan,
Head of Intellectual Property Rights Department, Huawei,
Shenzen, Guangdong,
China
E-mail: fanzhiyong@huawei.com

■ Carter Eltzroth,
Legal Director,
DVB Project, & Managing Director, Helikon.net,
U.S.A.
E-mail: eltzroth@helikon.net

These technological advancements have led to 6.7 billion people owning and using smartphones to the benefit of those users as well as benefiting, among others, sellers of enabled devices and bandwidth providers. For example, average smartphone use among U.S. owners is more than five hours a day and mobile communications constitute 63 percent of all website traffic. Standards development has thus led to the sale of billions of products that incorporate cellular communications technologies and those products rely on the standard essential patented technologies that comprise critical parts of these standards. Cellular communications standard development has yet a further benefit: the development of the best technologies through widespread collaboration has standardized the technology worldwide so that any device can operate almost anywhere in the world.

This rapid and remarkable development has been fueled by billions of dollars devoted to research and development by a wide group of private organizations, governmental entities, universities and companies. Indeed, one of the many things that set cellular communications apart from other standards is the large group of standards development participants contributing the best technologies, not merely the best-patented technologies, while royalties received from licensing SEPs frequently are reinvested in further standards development, thereby fueling innovation.

Differences in Licensing Mobile Communications SEPs from Other Standards

Licensing mobile SEPs differs from licensing SEPs in other technologies such as those related to audio and

1. Brismark, Gustav; Fogliacco, Mattia; Eltzroth, Carter; Sabattini, Matteo and Vary, Richard, "Overview of SEPs, FRAND Licensing and Patent Pools" (January 30, 2023). *les Nouvelles*, Journal of the Licensing Executives Society, Volume LVIII No. 1, March 2023, available at SSRN: *https://ssrn.com/abstract=4342975*

video codecs. As for the latter technologies, in the last 30 years patent pools have largely avoided disputes in the licensing markets and there has been minimal friction as tens of thousands of consensual licenses have been executed. Why is this not the case for mobile communications?

First, mobile communications, and in particular 5G, have brought into the ecosystem multiple new implementers (and some patentees) who had little or no significant patent licensing experience. This has sparked an education process that continues today, and the first-time use of patented technologies by multiple industry participants creates ongoing friction in licensing efforts. In short, it is easier to conclude a license with a party experienced in paying royalties for use of others' technology than when negotiating with a licensee who has no such experience.

A second difference is the proliferation of products, now using 5G, which never before had deployed a communications standard (or even a patented technology). From "smart" white goods to "smart" meters, to automobiles, to medical equipment and other devices, the technological advances of 5G have empowered communications capabilities in a broad array of new devices and enabled capabilities impossible with prior communications standards. This too has led to challenges with existing licensing practices. While most – or even all - of the market for a technology such as video codecs can be covered by licensing smartphones, TVs, tablets and a few other products, the market for 5G use is multi-layered and far more complex.

Third, the complex valuation issues, unique to cellular communications in some respects, result from multiple use cases based on 5G, coupled with the first introduction of many users to patent licensing. Disparate views on values created additional licensing friction. With respect to valuation, few if any other technologies have been so widely deployed as 5G, raising valuation questions for multiple and highly diverse specific uses. What is the value of a mobile communications SEP to adjust a refrigerator temperature? What is the value of a mobile communications SEP to avoid an automobile crash? Again, contrasting mobile communications SEP use cases with those related to video codecs, whether employed in a phone, a TV, or set-top box, the value of a video codec SEP may be the same or similar. It is far harder to make that argument for mobile communications SEPs used by such a wide variety of devices. The valuation question is made even more complex by the many products using 5G that have never before employed a mobile communications standard. In some respects, those value negotiations do not benefit from a history of licensing discussions, they must start at the beginning.

The valuation question and the resulting friction have been exacerbated by the nature of multiple highly competitive markets using mobile communications. The competitive nature of the market and lack of familiarity with the need to add IP cost to product costs has proved challenging. These and other questions have led to new challenges in educating licensees about the need to take a license and new challenges in sorting out the value of those licenses to various use cases.

The valuation question also becomes complex when looking at various licensors' cellular communications SEP portfolios. Some asset collections may include foundational SEPs, others not as much. Some portfolio owners may be able to devote substantial resources that are necessary for enforcement; others may not be able to bear such costs. These factors lead to a perception among some that certain portfolios may need to be licensed while others can be ignored.

Licensing friction also has been caused by the pace of rapid technological development in cellular communications. Many products use multiple generations of mobile communications standards and even the typical efficient "one standard" joint licensing program or pool often does not meet licensees' needs.

How to Deconflict the Mobile Communications Licensing Landscape

Inviting agencies, government or even standards development organizations (SDOs) to set rules for licensing or SEP essentiality determinations is not a productive solution. In general, such intervention could add significant and unnecessary costs to the system that would have to be borne by system participants. In addition, this kind of intervention may lead to a "one-size-fits-all" solution that simply does not work in the cellular communications SEP licensing markets.

On the other hand, government or standards development organizations could facilitate the aggregation of SEPs and joint licensing programs by establishing measures such as tax incentives on royalty income derived from efficient joint licensing or SDO incentives to form such programs.

In general, integration and deployment of new licensing models to meet new needs are fundamental. As for integration, mobile communications SEPs should be integrated into as few efficient licensing programs as possible. Indeed, this is recently evidenced by the consolidation in licensing administration in wireless markets.[2] In addition, new models of integration should be explored. For example, given that many products use multiple

2. See "Via Licensing ending wireless patent pool to double down on audio codec programmes" available at *https://www.iam-media.com/article/licensing-ending-wireless-patent-pool-double-down-audio-codec-programmes* and "Sisvel comments on Via wireless pool activity" *at https://www.sisvel.com/news-events/news-events/news/sisvel-comments-on-via-wireless-pool-activity.*

generations of mobile communications standards, single licenses integrating multiple standards could be useful.

Other new paradigms emerged during the discussion, including:

- First, there may be no single SEP integration that is sensible or possible. While use cases of similar value may be integrated, disparate value use cases may not be susceptible to integration of relevant SEPs. For example, a patent pool limited to low power 5G and/or data delivery may be practicable. There may need to be different solutions for different market applications.
- New royalty systems and other new ways of licensing need to be developed and deployed.

It must be recognized also that for mobile communications SEPs there may not be joint licensing programs or pools that meet all needs, and that pools and bilateral licensing may have to exist side-by-side. Whereas most SEPs for other technologies may be available in a single patent pool, the perception of differing values and portfolio significance may lead to a market structure where several pools address the market side-by-side with several bilateral licensing programs.

To reduce friction in licensing cellular communication SEPs arbitration or other forms of alternative dispute resolution (ADR) should be employed rather than court litigation. Litigation may involve multiple filings across multiple jurisdictions while ADR may more likely resolve in one proceeding the entire dispute between patentee and implementer. It may be productive in particular for SDOs to explore encouraging ADR.

Licensing mobile communication SEPs requires education and patience. A broad new array of licensors and licensees are not familiar with fundamental licensing principles and education will take time and hopefully lead to less friction in the market.

SEPs and Wi-Fi — Main Take-Away Points

On January 18, 2023 another webinar of the SEP Thought Leadership Program was held, bringing together a panel of experts addressing the topic of standard essential patents in the Wi-Fi industry.

The panel consisted of Mattia Fogliacco, Sisvel; Kaoru Takagahara, Panasonic; Jako Eleveld, Philips; and Jin Sam Kwak, Wilus. The discussion was moderated by Alan Fan, Huawei.

The Rise of the Wi-Fi Standard

Wi-Fi has become an essential part of our daily lives. It allows us to connect to the internet from anywhere, anytime, and it is used in our homes, public places, and even on the go. Wi-Fi has revolutionized the way we communicate, work, and play, and it has become a crucial component of the global economy.

A study done by the Wi-Fi Alliance shows that the global value of Wi-Fi was estimated to be $3.3 trillion in 2021, increasing to $4.9 trillion by 2025, taking into consideration factors such as consumer and business communication needs, technology developments, access to additional spectrum, and the economic impact of a global pandemic. But it is important to understand that behind the seamless wireless communication we enjoy every day, there are complex technological advancements and intellectual property rights that made this possible.

The technology behind Wi-Fi did not emerge overnight. It has been the result of more than 20 years of research and development, and it is based on a set of standards and protocols that govern the way devices connect to the network. These standards and protocols have been developed and maintained by the Institute of Electrical and Electronics Engineers (IEEE). To implement these standards, companies need to use patented technology from many companies. Some of these patents are classified as Standard Essential Patents—patents that are necessary to implement the Wi-Fi standard and cannot be replaced by any other technology. Without these essential patents, it would be impossible to produce products that can be used with the Wi-Fi network.

SEP Licensing Fueling Innovation

Innovation continues to enrich consumer choices and drive the growth of various industries, including Wi-Fi. Intellectual property, and in particular patents that protect innovation, have become increasingly important. Standard Essential Patents are the core patents that cover technologies essential to implementing a particular standard, such as the Wi-Fi standard. These patents are vital to ensuring that users have seamless connectivity, and that the Wi-Fi standard is available to all, irrespective of geographical location or economic status. However, in order to truly promote innovation and progress, reasonable patent licensing plays a crucial role. That is why Wi-Fi SEPs are subject to licensing obligations. The licensing of SEPs promotes innovation, encourages competition, and ensures that essential technology is available to everyone on fair and reasonable terms. And a fair licensing program or framework should try to balance the needs of those who develop and contribute technologies to standards with the needs of those who implement them. How to establish a level playing field is an important topic in the SEP licensing process. A reasonable licensing program promotes innovation and competition by allowing companies to access new technology and inventions, even if they do not have the resources or expertise to create it themselves. And it benefits consumers by ensuring the availability of the latest technologies. It creates a fair playing field for companies of all sizes and types, by guaranteeing the provision of the technology they require for success. We should, therefore, strive to balance the interests of patent holders and the industry as a whole, to ensure

that both can prosper and innovate to keep up with the needs of the ever-changing world. Otherwise, unbalanced licensing practices can prevent companies from using SEPs and block market entry, which leads to less competition, higher costs for consumers, and diminished innovation. Alternatively, unbalanced licensing practices can also hinder the companies from investing in the development of new technologies, as there would be no guarantee of a return on investment.

Fostering a positive atmosphere for SEP licensing in the Wi-Fi industry is crucial for promoting innovation and driving industry growth. SEP licensing provides a framework for companies to share their patented technologies and collaborate on new developments, which can lead to more efficient and effective solutions for consumers. To create a favorable environment for SEP licensing, industry leaders should work together to establish the best practices for SEP licensing, including guidelines for determining fair and reasonable licensing fees and procedures for resolving disputes. By promoting collaboration and cooperation among companies, we can create a culture of innovation that benefits everyone in the Wi-Fi industry. By working together to create a positive and transparent licensing environment, we can unlock new opportunities for growth and innovation in this exciting field.

The Pro-Competitive Effect of Pooling in the Wi-Fi Industry

Wi-Fi is a market covering more than three billion devices, with many patent holders and implementers from different vertical industries. This makes patent licensing a very complicated process.

Patent pools offer a licensing mechanism allowing multiple patent owners to collectively license their patents to third parties. This approach is particularly effective in reducing both the number of transactions and transaction costs while simplifying license negotiations — all of which make it easier for third parties to access the necessary patents. This can lead to more efficient and effective business practices, as well as the creation of new products and services that benefit consumers. This also can lead to increased innovation and competition, as well as reduced litigation, which can be costly and time-consuming for both parties and ultimately erode licensing fees.

Patent pools are often used in industries such as telecommunications, electronics, and media codecs, where a large number of SEPs are required to produce a product or service. However, patent pools must be carefully designed and managed to ensure that they do not violate antitrust laws or harm competition. Therefore, professional third-party institutions or organizations are required to participate in the operation and jointly create a patent-licensing ecosystem. Third-party institutions or organizations can provide neutral supervision and management to ensure that the operation of the patent pool complies with laws and regulations. In addition, they can also facilitate cooperation and communication among patent pool members to ensure the effective operation and maximum benefits of the patent pool.

Overall, patent pools can be an effective way to promote innovation and collaboration in industries where patent licensing can be complex and costly.

SEPs and Digital Video Broadcasting (DVB) – Main Take-Away Points

The final panel in the SEP Track of LES Thought Leadership Program was held on March 30, 2023. It was devoted to licensing of patents essential to standards developed by the DVB Project. DVB licensing is regarded as "the gold standard of patent pooling."

The panel of experts consisted of Georg Nolte, Panasonic (and Chair of DVB's IPR Module); Mattia Fogliacco, Sisvel; Brian Kacedon, Finnegan; and Lorenzo Casaccia, Qualcomm. The discussion was moderated by Georg Nolte.

DVB's IPR Policy—Fostering Patent Pools

The IPR policy of the DVB Project has several unique features. One is a provision, included in its Memorandum of Understanding, calling for the formation of voluntary licensing programs covering patents essential to DVB standards. Based on this provision, DVB has developed a series of steps designed to lead to the choice, by SEP holders, of a commercial pool administrator to complete the work of forming patent pools for its key specifications. These steps include:

- Early indication, at the start of a work item on a possible DVB specification, by each contributor of technology that it will participate in pool fostering once the standard has been formally adopted;
- Shortly after adoption, convening by DVB of these contributors (together with those outside DVB responding to a DVB call), each with a well-founded belief that it holds one or more patents essential to the DVB standard;
- Communications between this group and potential candidate pool administrators on the information they require to make a focused proposal to offer pool facilitation services; and
- After proposals and presentations by candidate administrators, selection by this group of an administrator to form, and eventually to manage, the patent pool covering the standard.

Within DVB, pool fostering is pre-commercial; the discussion of the group is limited by antitrust constraints. These groups have selected different pool administrators for different standards over time; Sisvel now administers all these pools.

Thanks to the success of these efforts, DVB is now in a position to promote pool fostering to sister standards bodies, notably those whose standards are normatively referenced by DVB standards. Normative referencing has become more significant for DVB standards, and DVB has developed other mechanisms to provide transparency on licensing terms of these materials (through its InfoSnap process) and to assess the compatibility of the IPR policies of these authoring standards bodies with DVB's IPR policy.

Success of DVB Patent Pools

DVB patent pools have enjoyed considerable success. In one case, the pool includes as its licensors all the patentees that have made declarations to ETSI of DVB-essential patents. The pool-fostering efforts undertaken by DVB has allowed the comparatively early formation of DVB pools, giving timely assurance to implementers of the patent landscape and the aggregate royalty burden. DVB pools offer the "one-stop shop" that has served as the objective for reducing licensing friction for bringing efficiencies to both sides of the licensing market. Another favourable feature is that the licensing terms offered by a pool can represent a balance between the interests of patentees and the implementer community.

But while DVB licensing is regarded as the "gold standard" of patent pooling, it may not be a model for all technology sectors. In mobile communications, as discussed earlier in this article, there are a number of factors that may make pooling of 5G standards more complex. For example, some companies licensing in mobile communications may have long-standing relationships with others, including cross-licensing, that they choose to retain instead of engaging in pooling. Even within video codecs (HEVC and recently VVC), the one-stop shop is not achieved: multiple pools compete for licensors and licensees with the risk of overlapping patents. Nevertheless, two or three pools covering a technology, while inconvenient, are certainly more efficient, and less costly, than numerous bilateral negotiations.

When considering pools outside DVB, some implementers may find that a licensing program lacks transparency. Also, some pools are formed years after the initial market launch of a standard, so the implementer may well claim to be surprised that it is expected to take a licence and pay royalties. And these implementers may complain that there is little scope for negotiation; they push back on the terms in the pool's standard form of licence, which they had no hand in developing. Finally, implementers may hesitate to agree to become licensees if some large SEP holders remain outside the pool.

DVB Pool Fostering: What of the Future?

For DVB, its work on traditional broadcasting standards has been completed; there is no plan for a further next-generation standard handling the physical layer. As DVB's work evolves to address other audiovisual technologies, there could be scope for a pool covering a new DVB standard DVB-I. For pool administrators, there could be innovation as well, as evidenced by Sisvel's introduction of its LIFT royalty abatement scheme to encourage early signature of pool licences, and consideration of inclusion in a single pooling framework of multiple releases of the same underlying standard.

Pooling is now a well-established licensing model that provides transparency, an essentiality check, and ease of licensing; it is surprising that the European Commission has undertaken to displace this market-based structure with a new framework under its proposed Regulation on Standard Essential Patents (at the time of the panel, then in unofficial draft stage). It is all the more disconcerting because Europe and EU institutions have devoted significant efforts over the years to complete the Unified Patent Court with supposedly the same competence as the proposed new SEP regulator.

Conclusion

As intellectual property becomes increasingly important in the modern economy, reasonable licensing must be a top priority for businesses and policymakers alike. It is imperative that legal professionals and corporate legal departments work together to create a healthy SEP licensing environment. This can be achieved through the development of clear and transparent licensing policies, the establishment of fair and reasonable licensing terms, and the promotion of open and constructive dialogue between patent holders and implementers.

Patent pools work very much in this direction: helping to reduce transaction costs, bringing clarity and transparency about the conditions for licenses and growing confidence that the entire market is engaged under the same conditions.

By working together to create a healthy SEP licensing environment, we can promote innovation, encourage investment, and drive progress in industries around the world. This will not only benefit businesses and consumers, but also society as a whole. ■

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Dana Robert Colarulli, LESI Executive Director
Tel: +(202) 841-0276 E-mail: dana@lesi.org

David Drews, Editor
12526 High Bluff Drive, Suite 300, San Diego, CA 92130
Tel: +1-858-603-8825 E-mail: editor@lesi.org

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