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Turkmen inventor finds new ways to recycle rubber and plastic waste

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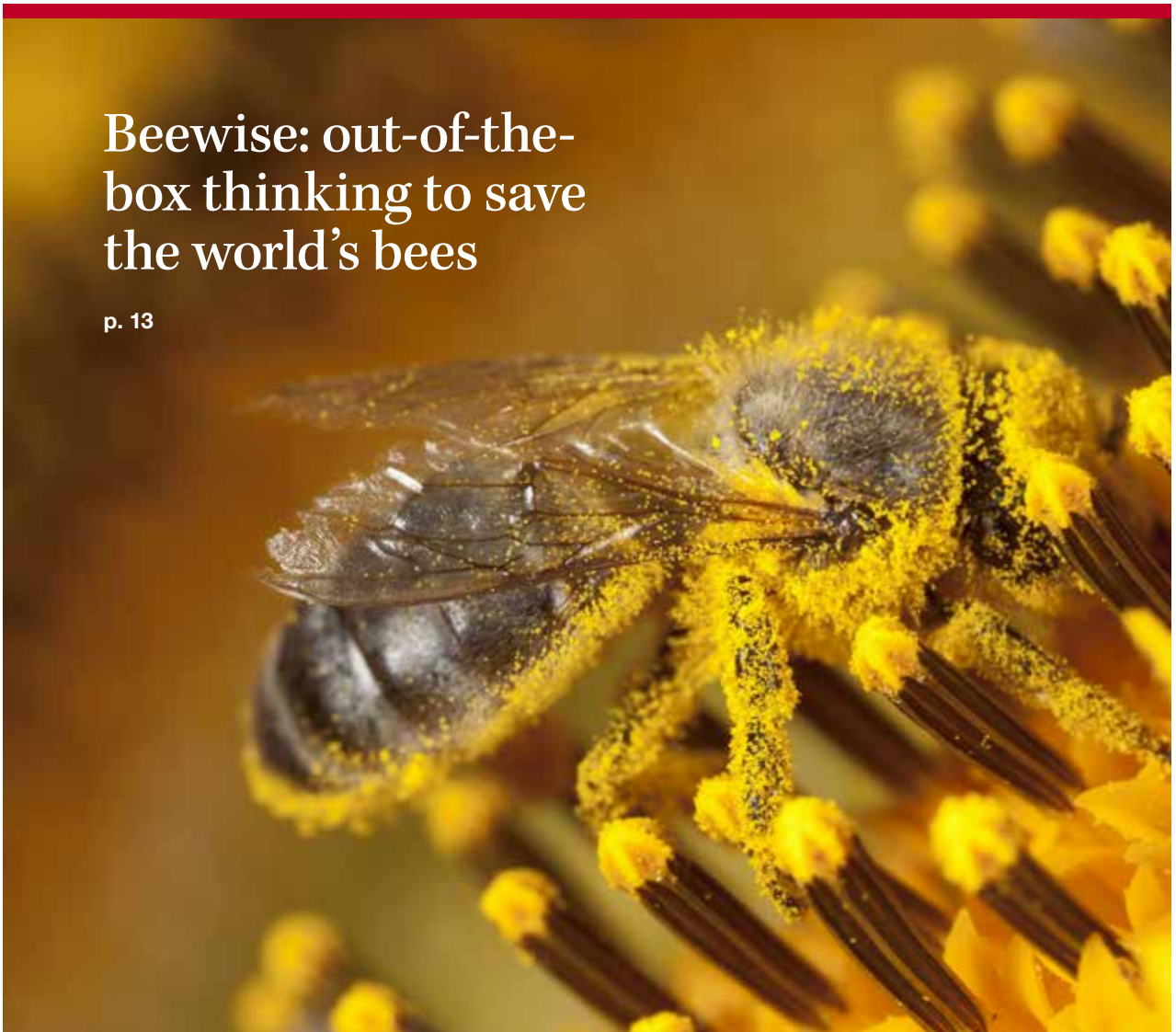
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The youth of today are an incredible and largely untapped source of ingenuity and creativity. Their fresh perspectives, energy, curiosity and “can do” attitude, not to mention their hunger for a better future, are already reshaping approaches and driving action for innovation and change.

World Intellectual Property Day 2022 (on April 26) is an opportunity for young people to find out how intellectual property (IP) rights can support their goals, help transform their ideas into reality, generate income, create jobs and make a positive impact on the world around them. With IP rights, young people have access to some of the key tools they need to advance their ambitions.

For more information, check out the World Intellectual Property Day 2022 web page at www.wipo.int/ip-outreach/en/ipday. Get involved. Why not organize a World Intellectual Property Day 2022 event in your local community?

Join us on Twitter (#worldipday), Facebook (www.facebook.com/worldipday) and Instagram (@wipo_ompi) and share your ideas and views on IP and how you and other young people are innovating for a better future.

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Unlocking IP-backed financing in Singapore*

By **Andre Toh**, ASEAN Valuation,
Modeling & Economics Leader, Ernst
and Young LLP, Singapore

The global economy is increasingly driven by innovation and intangible assets (IA). With rapid proliferation across different technology fields, the global value of intangible assets today has risen above USD 65 trillion, according to Brand Finance's 2020 Global Intangible Finance Tracker.

Intellectual property (IP) rights, such as patents, trademarks and copyright, along with data, know-how and branding, are key components of IA. As enterprise value is increasingly founded in IA and IP, the ability of businesses to raise capital from these assets is critical to unlocking business value and driving enterprise growth.

SINGAPORE TAKES A HOLISTIC APPROACH TO IP FINANCING

The Government of Singapore has stepped up efforts to support enterprises in proactively protecting, managing and commercializing their IP. To this end, in 2013, the Government launched its IP Hub Master Plan, to position Singapore as a global hub for IP activities. In 2017, in line with Singapore's broader economic strategy, the IP Hub Master Plan was revised and updated. The updates include the expansion of IP expertise, the enhancement of IP commercialization and financing as well as greater transparency around IP-related market information.

Building on the IP Hub Master plan and its revision, in 2021, the Singapore Government launched the Singapore IP Strategy 2030 (SIPS 2030). It focuses on three key areas. First, it seeks to strengthen Singapore's position as a global hub for IP activities and transactions; second, it aims to attract and grow innovative enterprises; and third, it strives to develop good jobs and skills in IP.

*In the first of a new report series, WIPO recently partnered with the Intellectual Property Office of Singapore (IPOS) to document the country's journey towards unlocking IP-backed financing. Mr. Andre Toh, the author, shares the country's experience in developing a multifaceted ecosystem to help businesses maximize the potential of their IP assets.



Singapore starts from a strong position. It has an internationally recognized world-class IP ecosystem that provides a robust legal and regulatory infrastructure to enable enterprises to protect, manage and commercialize their IP. This includes a financial reporting and valuation framework that is aligned with international standards. Singapore is also home to more than 36,000 startups and technology companies, and continues to grow its pool of innovative enterprises. Moreover, Singapore’s IP ecosystem consists of a comprehensive network of IP service providers, including financial institutions and private lenders, valuers, consultants, and lawyers. Public-private partnerships between relevant government agencies and industry stakeholders continue to strengthen the IP ecosystem.

SINGAPORE OFFERS A ROBUST SLATE OF FINANCING OPTIONS FOR IP-RICH ENTERPRISES

IP-rich companies in Singapore primarily pursue funding through equity financing, debt financing and government grants.

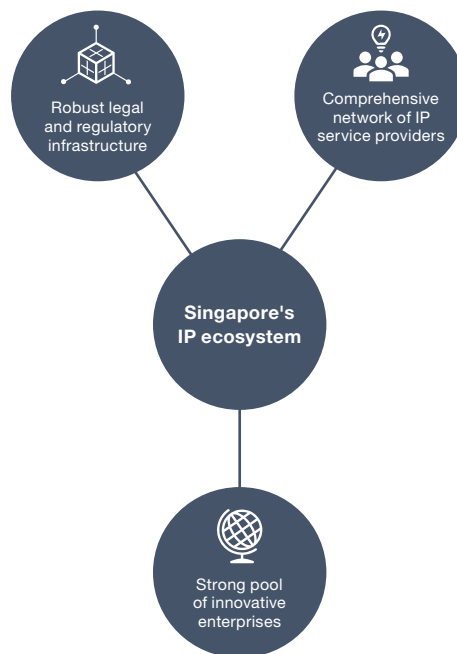
Singapore’s business environment enables innovative enterprises to seek and secure equity investment from angel investors and venture capital firms. In 2019, venture investments rose to more than SGD 13.4 billion (approx. USD 9.8 billion), representing a year-on-year increase of 36 percent.

While IP debt financing in Singapore is still at a relatively early stage, in 2014, the Government piloted its IP Financing Scheme (IPFS) to support the cost of IP valuation and to share the risk of potential default on IP-backed loans with participating financial institutions. The pilot has helped to raise awareness of the use of IP as collateral to raise capital.

Other government-backed guarantees or funds, such as the Enterprise Financing Scheme-Venture Debt Programme (EFS-VDP) launched by Enterprise Singapore, is also fueling the growth of innovative and IA-driven enterprises. Loans of SGD 8 million (around USD 5.8 million) per applicant may be raised under this program.

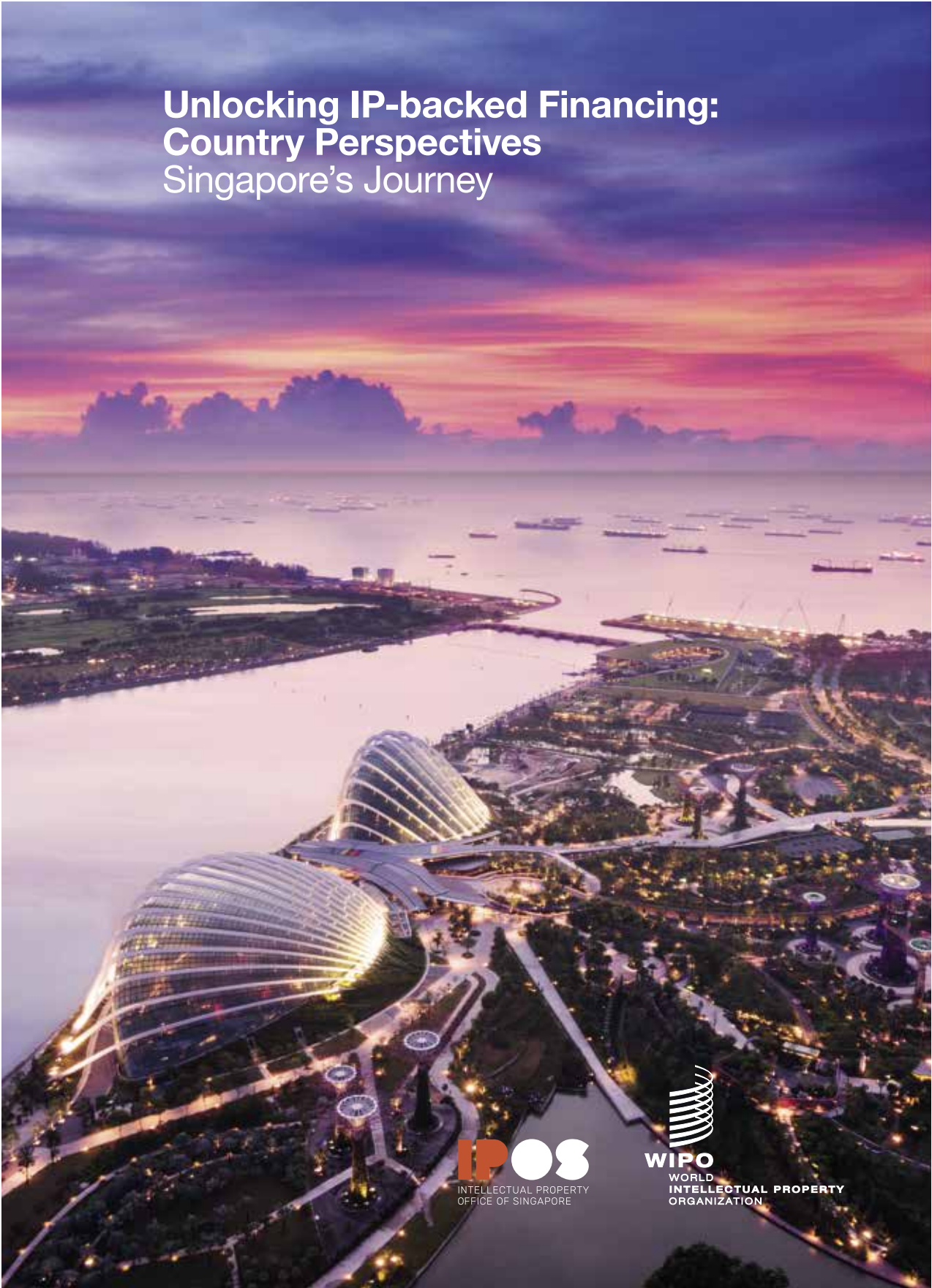
IP FINANCING IS A JOURNEY

Despite the implementation of these measures, several challenges in relation to IP financing remain. IP financing is a journey and Singapore will continue working with stakeholders, including its international partners to overcome these challenges.



Singapore has a robust IP ecosystem in place to attract IP investors/companies

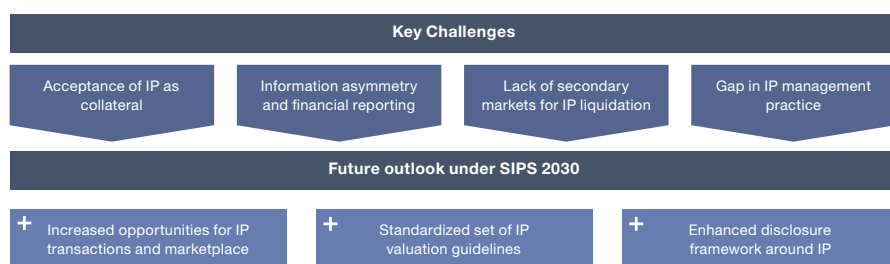
Unlocking IP-backed Financing: Country Perspectives Singapore's Journey



A key challenge lies in the fact that financial institutions still have reservations about using IP as collateral when financing companies. Many financial institutions are relatively unfamiliar with using IP as collateral and lack the in-house capability to value IP. To address this challenge, the Government of Singapore and the Institute of Valuers and Appraisers of Singapore (IVAS), plan to develop a standardized set of IP valuation guidelines that can be recognized internationally. The guidelines will help stakeholders better understand the value of IP and enhance their trust in the way IP is valued. In turn, this would lead to more IP financing activities for innovation-driven businesses.

Financial institutions are also concerned that IP is often viewed as an asset with low liquidity due to the lack of secondary markets. This concern is further amplified by the fact that illiquid IP may face volatility with respect to its value and the ability to dispose of it under distressed situations. To address this concern, the Singapore IP Strategy 2030 will increase IP commercialization opportunities for businesses by facilitating transactions through platforms and connections. In so doing, the aim is to increase the liquidity of IP assets and their attractiveness to capital providers.

Information asymmetry is another challenge for IP financing in Singapore. Typically, crucial IP information is not disclosed during the company's financial reporting. This impedes a proper assessment of the value contribution of IP as well as the financing process. This situation is a result of gaps in IP management practice among enterprises in Singapore, which lack the awareness and capabilities to manage, protect and extract value from their IP assets. For this reason, the Intellectual Property Office of Singapore (IPOS) and the Accounting and Corporate Regulatory Authority of Singapore (ACRA), are co-chairing an interagency committee, which will work closely with an industry working group to co-develop an IP disclosure framework to help companies better communicate their intangible assets, including IP, to stakeholders, including capital providers. The aim is to encourage more IP financing activities.



Singapore's challenges in IP financing and future outlook to overcome these challenges

SUMMING UP

The Government of Singapore has launched a range of programs and initiatives to support its vision of strengthening the country as a global hub for activities relating to IP and intangible assets. Recognizing the challenges identified, the Government has come up with a robust holistic approach to establish the necessary enablers, as laid out in SIPS 2030. Under that strategy, the relevant government agencies will work closely with the industry players and international partners to enable better appreciation, disclosure and valuation of IP to help enterprises unlock value from their IP assets.

Read more about the series and the full report *Unlocking IP-Backed Financing: Country Perspectives: Singapore's Journey* at: www.wipo.int/sme/.

Rwanda and Senegal will host Africa's first COVID-19 vaccine plants: what's known so far

By **David Richard Walwyn**, Professor of Technology Management, University of Pretoria, South Africa*

The lack of vaccine production capacity in African countries has been the subject of much concern and hand-wringing in the wake of the COVID-19 pandemic. It has become a particularly hot topic because of the gravely unequal access to COVID-19 vaccines between developed and developing countries.

Africa has limited capacity for vaccine production. Only Tunisia, Senegal, Egypt, Ethiopia, and South Africa have varying capabilities to produce and fill or finish vaccines. The largest and most integrated facility is the Biovac Institute in Cape Town.

Recently, Pfizer signed a letter of intent with the institute for 100 million doses per annum. The deal covers the importation of the drug substance in bulk, the filling of vials, and the distribution of the product in Africa and elsewhere.

Africa's shortage of manufacturing capability contrasts strongly with developing countries such as India, which has extensive pharmaceutical production capability, and Brazil.

That's why the recent announcement by German biotechnology company BioNTech that it will be building a vaccine manufacturing facility in Rwanda, to be followed by a second in Senegal, is seen as a game changer.

The BioNTech plan involves the construction in Germany of a containerized manufacturing unit that will then be installed in Rwanda, shortening the construction period for a vaccine facility by at least a year and lowering the risk of delays. Initially, the facility will be managed and operated by BioNTech staff. But the ownership and expertise will be transferred over time to local operations. At present, such expertise does not exist in Rwanda and, based on the experience of Biovac in South Africa, could take a decade to develop.

To make a vaccine you need intellectual property as well as know-how. The deal between BioNTech and the two countries includes technology transfer – this will happen in the second phase of the contract – and a license agreement that covers intellectual property rights which will remain with the company.

*This article was first published in *The Conversation*, on October 27, 2021

There are no further details about either facility. It's still not known, for example, when the locally-manufactured vaccine will be released and how the infrastructure will be financed.

Nevertheless, the deal with Rwanda is unique. That's because, for the first time, the drug substance, or active ingredient for a COVID-19 vaccine – in this case mRNA – will be manufactured on the continent. mRNA for the COVID-19 vaccine is currently being manufactured only in the US and Europe.

Recent experiences with vaccine availability in developing countries show clearly that local manufacture increases the likelihood of vaccine coverage. This was true in both India and China, both of which have significant local capacity.

THE SHORTFALL

The level of COVID-19 vaccination in Africa is low. Only 60 million of the total population of 1.22 billion, equivalent to 5%, had been fully vaccinated by the end of September 2021.

There is a shortfall of many tens of millions of doses in the market. There is also no sign that this shortage will be overcome before mid-2022.

mRNA vaccines use tiny amounts of active substance. Less than 50kg of mRNA will be required to vaccinate everyone on the African continent.

However, local production of vaccine is not only about manufacturing technology. The operation will require the establishment of a regulatory system for drug approval and a quality assurance system that will be able to certify each production batch.

The recent announcement by German biotechnology company BioNTech that it will be building a vaccine manufacturing facility in Rwanda, to be followed by a second in Senegal, is a game changer.



Photo: Kamionsky / iStock / Getty Images Plus

Clearly, the pressure on drug companies to extend COVID-19 vaccine coverage to Africa is partly the driver for this announcement. But the market could have more easily been supplied directly from BioNTech's facilities in Germany and elsewhere. Undoubtedly, part of the rationale for this deal is the pricing structure for African countries.

Drug companies are careful to protect their high-value markets, where drug prices are high and margins extremely attractive, from any product which may be distributed under "access pricing". Access pricing is a mechanism whereby developing countries are able to purchase equivalent products at significantly reduced prices.

But problems arise when the product becomes available in lucrative markets as a consequence of parallel importation.

Parallel imports can be avoided by using geographically separate manufacturing sites, operating under different regulatory regimes. Product manufactured in Rwanda, and approved by a Rwandan regulatory authority, would not be accepted in Europe or other developed regions.

In this way, pharmaceutical companies can meet the criticisms of the global community in terms of health product access, while retaining their profit margins in the most lucrative segments.

THE END GAME

The hope is that the deal will be beneficial for the development of vaccine manufacturing capability throughout the continent. One possibility is that the BioNTech deal exerts pressure on countries like South Africa to accelerate their manufacturing plans, leading to greater vaccine availability over a shorter time period.

South Africa has so far dominated vaccine deals. Apart from the Pfizer contract it has also announced an mRNA vaccine hub. This will be used to develop and license mRNA technologies from major pharmaceutical companies.

The prize, however, is local manufacture from end-to-end with full technology transfer and fewer restrictions on market access. This will be crucial in removing global inequities in the provision of essential health products.

Another factor might also come into play: a shift in the pharmaceutical manufacturing landscape. The deal that BioNTech has struck is the first it's done independent of its partnership with Pfizer. This is a signal to the market that BioNTech is intent on developing its own customer base outside of its license agreement with Pfizer. This matters because Pfizer has made it clear that it's not interested in releasing the core expertise about how to make the active ingredient for COVID-19 vaccines.

Photo: janiecbros / E+ / Getty Images



Africa has limited capacity for vaccine production. Only Tunisia, Senegal, Egypt, Ethiopia, and South Africa have varying capabilities to produce and fill or finish vaccines.



“To make a vaccine you need intellectual property as well as know-how.”

Improving access to COVID-19 treatments: how IP makes it possible

By **Jhon Carmona Carmona**, Global Challenges Division and **Edward Harris**, News and Media Division, WIPO

The recently announced licensing agreements between the Medicines Patent Pool and Pfizer and Merck Sharp & Dohme (MSD), for their anti-viral pills will enable mass production and low-cost distribution of these COVID-19 treatments for half of the world population.

Some great news broke recently for the worldwide treatment of COVID-19: the Medicines Patent Pool, a UN-backed non-profit organization, of which WIPO is a board member, agreed to work with Pfizer and Merck Sharp & Dohme (MSD), for the licensing of anti-viral pills – MSD’s molnupiravir and Pfizer’s PF-07321332 – in nearly 100 low- and middle-income countries.

WHY THIS IS IMPORTANT

Treating COVID-19 early is key because the cure rate in early infections is higher than in advanced infections. To date, only two oral treatments for early-stage COVID-19 infection have shown promising results: MSD’s molnupiravir and Pfizer’s PF-07321332.

The recently announced licensing agreements will enable mass production and low-cost distribution of these COVID-19 treatments for half of the world population. Under the agreements, MSD and Pfizer will forego royalties for as long as COVID-19 remains a public health emergency of public concern. Sales will continue under normal market conditions elsewhere. This will mean countless human lives will be saved in countries where the need for extra support in moving beyond the pandemic is greatest.

“These deals are very welcome developments and represent a balanced model for promoting the spread of innovative anti-COVID medical technology across the globe,” says WIPO Director General Daren Tang. “I encourage players across the world – those creating these important health technologies, those seeking them and everyone in between – to quickly explore similar arrangements. WIPO stands ready to continue its work to facilitate the sharing of IP, technology and the know-how needed to make it all work.”

THE ROLE OF INTELLECTUAL PROPERTY IN FACILITATING THESE AGREEMENTS

Ownership of the IP rights associated with a product or therapy encourages enterprises to commit to the research and development and other outlays needed to develop health technologies. In many cases in the health field, development and testing of new products may take years before reaching the market.

The COVID-19 pandemic turbocharged this process, which in some cases included massive public investments alongside those made by the pharmaceutical industry and others. The repurposing of molnupiravir by MSD and Pfizer’s discovery of PF-07321332 were made possible by the incentives provided by the IP system.

Now, with a growing range of COVID-19 vaccines and other products coming online, the international community is targeting universal access. This is where the Medicines Patent Pool and other groups

“Ownership of the IP rights associated with a product or therapy encourages enterprises to commit to the research and development and other outlays needed to develop health technologies.”

play a role in helping IP-owning enterprises to link up with the local partners who can scale-up production and distribution of medical technologies. The Medicines Patent Pool is an initiative that connects interested parties to promote the voluntary licensing practices of pharmaceutical companies.

Licensing is the most frequently used tool for transferring IP. In a license agreement, the owner of IP rights or the entity that controls their use, allows third parties to develop, manufacture and/or distribute the invention. In other words, the licensor grants authorization to a company that has the manufacturing capacity and distribution channels to bring the invention to potential users. Under the standard licensing model, the licensor receives a royalty fee under agreed financial terms set out in the licensing agreement.

The license agreements for molnupiravir and PF-07321332 are milestones in the fight against the COVID-19 pandemic and a key example of how IP is a critical ingredient in solving pressing problems, serving as the bridge that allows diverse parties to work together with clarity.

In situations, such as public health emergencies, where there is an urgent need to produce an invention at large scale, the standard licensing model often requires additional features to take into account any market failures. These market failures most often relate to limited capacity to manufacture the invention in massive quantities and the risk of concentrating distribution of the invention only in those places where users are able to pay a premium.

Technology transfer agreements offer a solution to this problem. Technology transfer is a collaborative process that allows scientific findings, knowledge and IP to flow from creators, such as research institutions and universities, or business labs, to public and private users. The goal is to transform inventions and scientific outcomes into new innovative products that benefit society. IP ownership allows for this transfer.

Technology transfer also fosters the multiplication of manufacturing plants and, therefore, can dramatically increase production of a much-needed invention, including medicines.

WIPO welcomes the agreement of The Medicines Patent Pool and MSD to submit any IP disputes that may arise from their license agreement to mediation under the WIPO Mediation Rules. As one of the elements of WIPO's COVID-19 response package, WIPO has launched a new mediation service to facilitate contract negotiation and dispute resolution in the life sciences.

Beewise: out-of-the-box thinking to save the world's bees

By **Catherine Jewell**, Information and Digital Outreach Division, WIPO

“The collapse of bee colonies is a derivative of climate change; we’re causing this harm and, paradoxically, we’re harming our own global food supply,” says Saar Safra.



Photo: J.L.Gutierrez / E+ / Getty Images

Bees are the most important pollinators in the insect world and play a central role in ensuring the global food supply. Without pollination, many plants cannot reproduce. Saar Safra, CEO of Israeli start-up Beewise, is on a mission to save bees – and at scale – using artificial intelligence (AI), computer vision and robotics. Mr. Safra explains how Beewise’s high-tech solution is helping to save the world’s bees. He also discusses the role that intellectual property (IP) plays in supporting small companies like Beewise, which are working to tackle some of the world’s most pressing challenges.



Just like traditional hives, the BeeHome houses a number of bee colonies; it is just bigger and in its central corridor it has a robot that monitors the colonies 24/7 using computer vision, artificial intelligence (AI), and neural networks. These tools identify any issues the bees may be experiencing and trigger the robot to take appropriate action.

“Bees are the infrastructure of our global food supply, yet we are losing about 35 percent of bee colonies every single year all over the world.”



Photo: Courtesy of Beewise

How did you come to set up Beewise?

I am an entrepreneur with a background in software engineering, but my co-founder, Elijah Radzyner, is a commercial beekeeper who, like other beekeepers around the world, has been facing the collapse of bee colonies, despite his best efforts. So, we got together and began exploring how we could use robotics and AI to save the bees. We started iterating on different products. The first ones were very rudimentary, but very early on we saw a product that could actually save bees at scale. That's when we established Beewise and started developing our BeeHomes.

Why is it so important to save the bees?

First, bee colonies are collapsing all around the globe. This is a huge problem because bees pollinate 75 percent of all the fruit and vegetables, seeds and nuts that we eat on this planet. Without bees, we won't have the vegetables, fruits and flowers we enjoy every day. Bees are the infrastructure of our global food supply, yet we are losing about 35 percent of bee colonies every single year all over the world. This is not about single bees dying; it's about whole colonies of bees dying, which is a huge problem.

Second, the global population is growing and as more people come out of poverty, they want a healthy diet. So, at a time when demand for the bees' products keeps growing, the supply is being cut by 35 percent every year. And the gap is getting wider. There is no clear line of supply keeping up with demand. This is the problem that we are trying to solve.

Why are colonies collapsing?

When you're dealing with a specific virus, like COVID, for example, you can identify it and work towards a solution. It takes time, but it's a relatively achievable task.

With bees, that isn't the case. Bees are suffering from a plethora of issues, all at the same time. Take climate change. Every time temperatures rise by one-half of a percent, bees lose about 5 percent of productivity. Bees are also dealing with pests and diseases that didn't exist a few decades ago. And with modern agriculture, they're subject to pesticides. We use these chemicals to protect our crops, but they kill the bees as well. Together, all these stressors are creating the perfect storm for bees.

Humans have been working with bees for millennia, but with traditional wooden hives beekeepers can't treat bees in real time - that's the big issue. With the BeeHome we can mitigate the stressors and make it possible to treat bees in real time.

Tell us more about the BeeHome.

In very simple terms, just like traditional hives, the BeeHome houses a number of bee colonies. The BeeHome is just bigger and in its central corridor it has a robot that monitors the colonies 24/7 using computer vision, artificial intelligence (AI), and neural networks.

The robot inspects the bees, and our AI tools convert those images into data, which then identify any issues the bees may be experiencing and trigger



Photo: Courtesy of BeeWise

“Our solution enables [beekeepers] to see what’s going on in their hives 24/7. We offer them a better tool to manage their business and give the bees better tools to cope with modern-day stresses. It’s a win-win-win,” says Saar Safra.

the robot to take appropriate action. For example, if the AI sees that the bees are ill, the robot will introduce a few drops of medicine to the hive – five droplets can save an entire colony – or, if the bees don’t have water or food, the robot can replenish the colony’s supplies from within the BeeHome. It’s a very simple mechanism and allows the bees to be managed in real time. We haven’t changed traditional beekeeping in any way, we simply do it with a robot in real time.

How did you go about building the Beehome?

The idea is to take existing technology and to apply it to our purpose. We’re not trying to build state-of-the-art hardware. We integrate the simplest and most affordable off-the-shelf hardware into our software platform, which manages and orchestrates the whole solution. I call it software wrapped in tin (credit #Elon Musk). The real value is driven by the AI-driven computer vision; it identifies which treatment to administer and when.

What sort of data do you collect?

We collect a magnitude of data. A traditional hive has 60,000 cells divided into 10 frames (the honeycombs), each comprising around 6,000 cells. This is where the bees store the queen's eggs, larvae and pupae as well as pollen nectar and honey. This is their home. The BeeHome has 30-frame colonies, with 180,000 cells in each colony, which are monitored one by one. By monitoring the colonies 24/7, we generate terabytes of data, which go off into the cloud to be analyzed by the AI, which identifies what is going on in each cell.

Identifying a disease in real time is hard because you need to monitor each cell constantly to identify any small fluctuations in the cells or the bees' behavior which may raise a red flag and require a decision as to the appropriate course of action. That whole process is done using AI.

These data are allowing us to save the bees on the planet, and that is directly tied to saving our global food supply. With our solution, colony collapse has fallen to less than 10 percent compared to the industry benchmark of 35 percent. And we are achieving that with a robot.

We're also examining the data to see if there are other things we can learn from it to optimize the colony, pollination, or honey production. If we can produce these devices and deploy them quickly, we will be saving bees at scale.

These data have always existed but were hidden within a wooden box that acted more like a black box. With traditional hives, you get a momentary glimpse of what's going on and can't really keep track of it. With the BeeHome we are not only thinking outside of the box, we are re-inventing it. We're tracking the data, storing it and analyzing it in the hope of learning other secrets that will be beneficial to the bees and to us – you know we are tied together.

What were the main challenges associated with developing it?

There are many challenges associated with making a harmonized device that treats bees and successfully lowers colony collapse rate. Our device combines hardware, software, biology and chemistry. After all, we are managing livestock. The bees come and go at will, and we have to provide them with a comfortable and convenient home, otherwise they will leave. The challenge has been to convert beekeeping expertise and a chaotic and complex biological system into AI and to train the models and the algorithms. Tracking and identifying 2 million bees that are flying around is not easy. But with the beekeeping expertise of my co-founder, and the company's very powerful talent pool of technologists, we have been able to pull this together. It took a couple of years, but now we have the BeeHome, a five star hotel for bees. It's made of tin, is thermo-regulated and keeps bees safe from storms and fires. It's beautiful.

“We haven't changed traditional beekeeping in any way, we simply do it with a robot in real time.”



Photo: nedomacki / iStock / Getty Images Plus

“With our solution, colony collapse has fallen to less than 10 percent compared to the industry benchmark of 35 percent,” says Saar Safra.

How are beekeepers benefitting?

Beekeepers have a new platform to manage their business. Our beekeeper customers typically own 10,000 traditional hives, with 10,000 colonies and generate revenue from pollination and honey. They typically get to check their hives and treat the bees once a month at best. Our solution enables them to see what’s going on in their hives 24/7. We offer them a better tool to manage their business and give the bees better tools to cope with modern-day stresses. It’s a win-win-win.

Feedback from our beekeeper clients is allowing us to continue to improve our platform. We iterate constantly, and the BeeHome is getting better all the time. For example, the BeeHome’s in-built honey harvester used to take 19 minutes to harvest the honey from our boxes; now it only takes 15 minutes. That said, while beekeepers are our paying customers, the bees are our primary focus.

What has been the uptake?

People are both baffled and excited by our solution. There is certainly an important education component in the market. When you’re introducing a disruptive technology, you often have to train people to think differently about the problem and the solution. Our customers are really hurting because they are losing 35 percent of their revenue-generating assets – their bees – every year, despite their best efforts. This is a powerful solution for them.

What role does IP play in the company?

We started patenting our solution early on because we realized we are the first on the planet to use robotics in a beehive. We have secured 18 patents and there are more to come. We're happy about that. Our IP rights will certainly slow down people who try to copy what we do. Our AI, neural networks and datasets, which took nearly four years to develop and optimize, and which are now 99.9 percent accurate, are also important moats that will keep us ahead.

Would you like to see the IP system change?

I have been filing for patents since 1997. It's a slow and cumbersome process and standards for the enforcement of IP rights fluctuate around the world. Cost is also a barrier for many small companies. Patenting is an expensive proposition, and there is not always an immediate and tangible return on investment.

I think the IP system needs significant investment to make it more responsive and efficient, and there needs to be better enforcement of rights. I want it to cost more to infringe IP rights than it does to respect them.

Why is it important for companies like Beewise to have an eye on IP?

We are first to market, we are first on the planet and we are dealing with a huge problem. We're still a small company, so we don't feel huge pressure from competition, but when you bring an innovation to the world and want to leverage it from a business standpoint, and have so much to gain or lose, you want to make sure that you are protected. Without IP, you are vulnerable to competitors.

What are your plans for the future?

Saving the bees is no small feat. We have a big mission ahead of us. I want to arrive at a point in time when bee colonies are no longer under threat. The collapse of bee colonies is a derivative of climate change; we're causing this harm and, paradoxically, we're harming our own global food supply. I still have some way to go to make this work, and if I succeed, I will have a good sense of accomplishment and then I'll go tackle a bigger problem.

You have set up a number of companies. What has been the secret of your success?

Many factors, but the common thread is luck. The second thing is failure. You have to accept that you are going to fail. We are building the first device that does what it does on the planet. Nobody has ever done this before. What are the odds that the first device that we build will work as planned? Zero. I guess failure is also part of success, right? I mean, you can't get to success without going through failure – it's on the same path. But it's really hard, and most don't necessarily understand its value.



Trademarks in outer space: supporting the off-world economy

By **Clark W. Lackert**, Shareholder,
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Photo: forplayday / iStock / Getty Images Plus

Since the famous "Space Race" between the United States and the former USSR in the late 1950s and 1960s, space development has evolved from exploration to commercialization.

“At this critical threshold of expansion of commercial activity off the Earth’s surface, the need to fill the void of legal regulation in space, [...] is increasing with every launch.”

At this critical threshold of expansion of commercial activity off the Earth’s surface – in Low Earth Orbit, around 2,000 kilometers from Earth on the moon, and on Mars – the need to fill the void of legal regulation in space, which is now a legal “no man’s land,” is increasing with every launch.

Trademarks in outer space, for example, have been debated for decades, but nothing has been done since space travel began in 1957. With multiple countries traveling in outer space now, and Earth-orbit hotels, together with moon and Mars cities, planned, the legal structure for trademarks in outer space needs to be implemented *now* to avoid chaos off-world.

This brief review sets out the current legal situation and principles and parameters for a working model, including how WIPO can be an important player in this process. The creation of rights in international treaties and national statutes needs to be followed by enforcement of rights via courts, contracts, arbitration, and mediation. Only trademarks will be reviewed here, but these principles can also be applied to patents, copyright and other intellectual property (IP) rights.

THE CURRENT STATE OF PLAY: FROM EXPLORATION TO COMMERCIALIZATION

Outer space is already crowded. The originators of space travel, the Russian Federation and a few of its Commonwealth of Independent States allies (formerly the USSR), and the United States, ventured into space in the late 1950s and 1960s, in the famous “Space Race.” These countries have now been joined by China, the European Space Agency (ESA), India, Israel, Japan, and others.

New space programs are being developed in countries such as Egypt, Indonesia, Iran, Malaysia, Pakistan, the Republic of Korea and Saudi Arabia. Moreover, we are seeing growing private sector flights into space, with companies like Virgin Galactic, SpaceX, and Blue Origin, ramping up activity in collaboration with intergovernmental efforts, such as the International Space Station (ISS) and its possible successors.

Why is 2021 different from 1957? The key shift in space development has been from government to public-private partnerships to private activity. In other words, space development has evolved from exploration to commercialization. Of course, the countries of Earth will continue to explore space, and it is generally understood that space exploration should benefit all humankind. However, we can no longer turn a blind eye to what is actually now happening off-world.

EXISTING INTERNATIONAL APPROACHES TO OUTER SPACE GENERALLY

The legal status of *physical* property (e.g., spaceships or satellites) in outer space has been a recurring topic in United Nations’, bilateral and multilateral agreements, proclamations of nations and inter-governmental organizations, international commission initiatives,

and studies by nongovernmental bodies. However, there has been no international consensus on the status of *intangible* property, specifically, intellectual property.

The internationally recognized demarcation line between Earth and outer space remains the “Kármán Line,” set at 100 kilometers above the Earth’s mean sea level. However, the concept of demarcating Earth from outer space is not universally accepted. The United States, for example, has consistently refused to recognize any such borders and has extended its patent legislation to govern outer space inventions made, used, or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States.

UNITED NATIONS OUTER SPACE TREATY (1967)

The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (1967) was drafted to address exploration and research activities of independent states. Its objective is to ensure that such activities are pursued “for the benefit and in the interests of all countries” and are “the province of all mankind.” This collective spirit is shared by later treaties concerning outer space. As such, parameters for property ownership and territorial governance have been absent from such agreements. Although this treaty specifies that outer space is not subject to national appropriation by a claim of sovereignty (i.e., by use, occupation, or other means), it could be adapted to accommodate trademark protection as a way to regulate commerce. A new agreement echoing this treaty can be seen in the “Artemis Accords,” concluded in October 2020, which set out general principles on space exploration.

With multiple countries traveling in outer space now, and Earth-orbit hotels, together with moon and Mars cities, planned, the legal structure for trademarks in outer space needs to be implemented *now* to avoid chaos off-world.



Photo: dottedhippo / iStock / Getty Images Plus

UNITED NATIONS RESCUE AGREEMENT (1968)

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched Into Outer Space (1968) was ratified by the United Nations to ensure that persons or *property* of one state will be returned to that state if located by another participating member state. While the agreement is mostly designed to ensure the safe return of astronauts, it also includes provisions mandating the return of *property* that may (1) be rescued from outer space; (2) fall from outer space and land in the territory of another state; or (3) fall from outer space and be found on the high seas.

UNITED NATIONS LIABILITY CONVENTION (1972)

The Convention on International Liability for Damage Caused by Space Objects (1972) contains distinct dispute resolution provisions concerning physical property that could provide groundwork for an IP rights enforcement system to govern outer space activities. Specifically, this agreement ties liability to applicable Launching States and specifies that states can claim Launching State rights based upon (i) the identity of the state that launches or procures the launching of a space object, and (ii) the territory or facility from where a space object was launched. The treaty allows for multiple states to be classified as Launching States for a single object based upon shared connections to a particular launch, and it allows for claims of joint and shared liability as well as claims for contributing liability that resemble traditional common law tort damage mechanisms.

UNITED NATIONS REGISTRATION CONVENTION (1975)

The Convention on Registration of Objects Launched Into Outer Space (1975) provides some clarification on jurisdiction by establishing a formal recordation system for *physical* objects launched into space. There may be a possible trademark registration connection here.

UNITED NATIONS MOON AGREEMENT (1979)

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979) focuses on activities on the moon and other planets or space surfaces. This treaty could provide the framework for regulation and control over the flow of goods or services on the moon, should such trade ever arise. As an example, jurisdiction would be confirmed upon export (departure from one state's moon facility) and import (delivery to a different state's moon facility).

INTERNATIONAL SPACE STATION (ISS) TREATY (1998)

The International Space Station Intergovernmental Agreement has been signed by the 15 governments that are currently participating in activities conducted within the International Space Stations (ISS). It permits participating nations to extend their jurisdiction to the ISS, thereby creating different national zones that correspond to the separate pressurized modules of the ISS. The ISS Treaty is the first to specify *IP protection* as an objective, and traditional protections for patents, trade secrets, and even marking procedures are specified. Jurisdiction is determined by location of the activity pertaining to the IP, specifically the pod or specific areas that may be under the control of a nation's particular ISS activities at a given time.





Photo: mlk38 / iStock / Getty Images Plus

“All nations stand to benefit from balanced, well-organized mechanisms for the protection and enforcement of trademark and other IP rights in outer space without hampering humankind’s journey away from its home world.”

Photo: stevecoleimages / E+ / Getty Images



Given the growing potential for commercial activity in outer space, the time is ripe for governments to consider a more robust road map for extending IP protection to outer space.

LAW OF THE SEA

International laws and customs concerning the high seas are often cited as an ideal model for regulating outer space activities, since the oceans are beyond any one nation's sovereignty. The most recognized agreement is the United Nations Convention on the Law of the Sea (UNCLOS) (1982). It specifies sea "territories" based on concepts of internal waters; territorial waters (i.e., state jurisdiction over the initial 12 nautical miles from its coastline); further contiguous zones for enforcing certain tax, immigration, environment, and customs laws; and the hotly contested concept of the 200-nautical-mile "exclusive economic zones" for use of natural resources.

THE TIME IS RIPE FOR INTERNATIONAL DISCUSSIONS ON IP AND OUTER SPACE

As detailed above, there is a wide body of existing outer space physical property law in the form of United Nations agreements and declarations and national government agreements and legislation. These may provide helpful foundations for outer space trademark regulation and could be combined with national laws, international custom, international treaties, and dedicated international organizations to establish norms and processes. Given the growing potential for commercial activity in outer space, the time is ripe for governments to consider a more robust road map for extending IP protection to outer space. A first step might involve updating the excellent 2004 WIPO study, *Intellectual Property and Space Activities*, to include analysis of the state of play in space in 2021, which has changed considerably since its publication. The study might also include specific suggestions on how to implement a plan of action. These might include:

APPROACH #1: MADRID PROTOCOL EXTENSION

The easiest way to expand trademark protection to space is to use the current Madrid Protocol, which is administered by WIPO and currently has 109 members and covers

125 countries. A new protocol could be added to the treaty, to amend the accession process (Article 14) to allow areas in outer space to become jurisdictions. Such a protocol could expand protection to Earth's orbit, the moon, and Mars, which each member could either accept or reject. This may also need to be reflected in the Paris Convention for the Protection of Industrial Property (1883). Alternatively, the new protocol could extend the protection available to a given member state on Earth to off-world areas. For example, India could declare that rights granted under the Madrid Protocol for the International Registration of Trademarks extend to a space-orbiting Indian hotel.

APPROACH #2: NEW TREATY TO PROTECT TRADEMARKS

Another option would be to create a new treaty specifically for trademarks, similar to the IP sections of the ISS Treaty, or amend the existing treaties listed above to include trademarks off-world. Such a treaty could fully develop the exact scope of protection for the use of trademarks and other IP rights off-world and provide for appropriate enforcement mechanisms, such as court or arbitration panel review. Several of the treaties noted above already protect physical property and may simply need to be amended.

A ROLE FOR THE WIPO ARBITRATION AND MEDIATION CENTER?

If new rights were to be created, how could they be enforced? Developing a working court system for space will be a huge task, but a number of more practical solutions can be accomplished more easily. For Earth territories, a contractual choice of law and jurisdiction clause, mediation, and arbitration could be put into effect immediately. The WIPO-initiated Uniform Domain Name Dispute-Resolution Policy (UDRP), which resolves Internet domain-name disputes without the need for court litigation, is an excellent example of a dispute resolution system with no physical presence. The WIPO Arbitration and Mediation Center is a leading provider of services under the UDRP and frequently organizes virtual online panels with no specific country jurisdiction except "cyberspace" to decide the fate of disputed domain names.

TO SUM UP

As we enter the "New Roaring '20s" of the 21st century, we will need to establish at least a rudimentary IP framework for Earth's orbit, the moon, and Mars. The first step may be for a high-level study to be coordinated by an intergovernmental organization – WIPO would be ideally placed to manage such a study – followed by a possible amendment to the Madrid Protocol or creation of a new treaty that is either trademark-specific or IP-general. All nations stand to benefit from balanced, well-organized mechanisms for the protection and enforcement of trademark and other IP rights in outer space without hampering humankind's journey away from its home world.

“As we enter the ‘New Roaring ‘20s’ of the 21st century, we will need to establish at least a rudimentary IP framework for Earth’s orbit, the moon and Mars.”

Turkmen inventor finds new cost-saving ways to recycle rubber and plastic waste

By **Gennady Galifanov**, Patent attorney,
Ashgabat, Turkmenistan

Recognizing the pressing need to tackle environmental pollution from industrial and household waste, Eldar Rizayev, a young Turkmen entrepreneur, has been exploring ways to convert garbage into a secondary raw material for the manufacture of economically useful products. The conversion of plastic and rubber waste materials, including worn-out tires, has been a particular focus of his work.

THE TECHNICAL NATURE OF THE PROBLEM

Repurposing waste into secondary raw materials for the manufacture of new products is an attractive, albeit challenging, solution. The disposal of rubber is particularly onerous. Waste rubber decomposes extremely slowly – it can take more than a 100 years for them to break down. On top of this, the disposal of rubber produces high levels of air pollution; every ton of burned rubber waste produces more than 250 kilograms of soot and more than 400 kilograms of toxic gas. The huge amount of highly flammable rubber waste in landfill sites also poses major environmental and health problems and creates a convenient habitat for rodents and insects, many of which are sources of dangerous infectious diseases.

For more than a century, attempts to regenerate used rubber products have failed, largely because they are made from thermosetting polymers, which typically do not melt when heated. As such, the ability to convert these waste materials into feedstock for the manufacture of new rubber-based products has remained elusive.

CHANGES IN THE POLICY LANDSCAPE CREATE INCENTIVES OF RECYCLING RUBBER WASTE

In the past, spent rubber products were usually incinerated. In line with EU Landfill Directive 1999/31/EC, in 2003 the European Union banned the incineration of waste rubber and the disposal of tires to landfill. Three years later, in 2006, the disposal of waste rubber (including shredded tires) at landfill sites was also banned. Organizations like the European Tyre and Rubber Manufacturers Association (ERTMA) have been working with policymakers to develop a supportive regulatory environment for consumers, drivers and the European tire industry.

These changes to European law prompted many countries to build processing plants to convert rubber waste into rubber crumb (from end-of-life tires), using a process that does not change the material's chemical structure. The rubber crumb is then combined with polymer binders – hardeners, polyurethane adhesive, heterophase chemical polymer – to create various building materials and road surfaces. However, the use of these binders is expensive and significantly increases the cost of converting this waste into products for subsequent use. That is why the rate at which spent rubber products are processed is far lower than that rate at which rubber waste is accumulated. Recent data indicate that globally around 1 billion waste tires (around 17 million tons) are generated every year, with 75 percent of end-of-life tires going to the landfill.

Over the last 25 years, various incentives have been put into place to encourage the recycling of waste rubber, with positive results. For example, in 2018, countries like Norway, Serbia, Switzerland, Turkey and European Union member states have collected and treated over 90 percent of waste tires; an increase of around 4 percent on figures for 2017.

MIXING RUBBER AND PLASTIC WASTE: A NEW IDEA TO REDUCE COSTS

With the expected global rise in tire production – it is forecast to rise from 2.1 billion units in 2020 to 9 billion units in 2029, according to *Garner Insights* – the tire recycling market presents business and growth opportunities.

Recognizing this opportunity, as well as the need to reduce the cost of rubber recycling and the high cost of polymer binders, Eldar Rizayev set about finding new ways to recycle both rubber and plastic waste and convert them into useful products. Unlike rubber waste, plastic waste consists of thermoplastic polymers, which melt when re-heated and can be re-purposed relatively easily to create diverse useful products.

Recent data indicate that globally around 1 billion waste tires (around 17 million tons) are generated every year, with 75 percent of end-of-life tires going to the landfill.



Photo: Nikolay Zirov / iStock / Getty Images Plus



Mr. Rizayev has developed a new process that combines and heats rubber waste, (e.g. used tires) and plastic waste (e.g. plastic bottles) to create a molten mixture which can be pressed into molds to create a variety of hard-wearing and durable flooring materials.



Photos: Courtesy of Eldar Rizayev

Mr. Rizayev began investigating the possibility of combining thermosetting polymers (characteristic of rubber waste, which do not melt when heated) with thermoplastic polymers (characteristic of plastic waste, which does melt when heated) to mold a variety of new products from the resulting molten mixture. He began testing his idea using polyethylene terephthalate (PET), derived from plastic bottles, and other containers we use every day. This was an easy decision, as his research demonstrated that that more than 80 percent of all solid household waste made from rubber and plastic is not recycled and represents a low-cost and potentially valuable raw material to produce a variety of useful products.

The results of his experiment exceeded all expectations. When mixed with rubber crumb and heated in an extruder to 220-240°C, the crushed PET created a chemical reaction that resulted in the formation of a polymer-rubber mixture that could be used to mold a variety of hard-wearing and durable flooring materials with anti-slip properties, including tiles, thin slabs, rugs, carpets and mats for gyms and children's playgrounds..

Unlike the standard process of combining rubber crumb with polymer binders, Mr. Rizayev's process merges molten rubber crumb with the molten PET to create a new mixture with additional valuable properties.

To optimize the copolymerization process, the inventor tunes the technical process to the specific properties of each waste product used to create the molten mixture, which then passes through a three-section extruder to a series of molds for different outputs.

Mr. Rizayev's solution stands out in that it produces a molten mixture with new, non-obvious and previously unknown properties. Thanks to this breakthrough, the process of converting rubber and plastic waste into useful household and construction products is more cost-effective and efficient.

Buoyed by his success, Mr. Rizayev continues to explore new ways to recycle waste rubber using other types of plastic, which are in plentiful supply, including polyethylene, polystyrene and polypropylene, and has completed various technical studies on his work. A 2018 report by the United Nations Environment Programme estimates that global plastic waste amounts to around 300 million tons every year, much of which ends up in landfill sites. Through his work, Mr. Rizayev is helping to resolve a major global recycling challenge. Where many generations of scientists and inventors have failed, he has succeeded in solving the crucial dual task of recycling rubber plastic waste. His innovative solution is an important step towards tackling the global problem of industrial and domestic waste.

PATENTS BEHIND THE INVENTION

Mr. Rizayev's work has resulted in the grant of patents from the State Service for Intellectual Property of the Ministry of Finance and Economy of Turkmenistan (Patent Nos. 608 and 628) and the Eurasian Patent Office (Eurasian Patent Nos. 028388 and 033283). He has now fully integrated these patented processes into his business operations and is producing recycled rubber and plastic products on a large scale.

Despite the coronavirus pandemic, Mr. Rizayev and his staff of 14 people have been able to produce and sell products worth over 10 million manats (approx. USD 28.6 million). The inventor continues to advance his scientific and experimental work in response to the strong demand for the waste-derived materials he produces from construction companies and sports and other organizations.

Keen to license his technology, Mr. Rizayev is already in preliminary negotiations with various companies in the Russian Federation. Due to financial constraints, he has been able to patent these technologies only in a limited number of countries, but as his financial situation improves, he hopes to be able to protect them more extensively.

Mr. Rizayev continues to invest his time and energy in developing exciting new opportunities to repurpose the world's waste materials. A number of new technologies are in the pipeline which combine different types of waste with new materials, such as barchan sands from Turkmenistan's Kara desert, to cut costs and make stronger and more resilient products, including railway sleepers, baffles for sea and river berths, electrical insulators, road products, foam-backed carpets and more durable sports mats.

Non-fungible tokens (NFTs) and copyright

By **Andres Guadamuz**, Senior Lecturer
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Photo: sjcreens / Alamy Stock Photo

There is widespread confusion surrounding the rights that buyers acquire when they purchase an NFT. Some think they acquire the underlying work of art, and all its accompanying rights, but, in reality, they are simply buying the metadata associated with the work; not the work itself.

One of the most high-profile technological stories of 2021 has been the rise in popularity of the non-fungible token (NFT), the newest hype in the world of distributed ledgers and cryptocurrencies. This breakthrough technology has taken the art and tech worlds by storm.

Twitter's CEO Jack Dorsey sold an NFT of his first tweet for the equivalent of USD 2.5 million. The NBA had been selling NBA Top

Shots, “unique” NFTs of NBA moments, the value of which has exploded. An NFT of a collage of works by digital artist Beeple was auctioned at Christie’s and sold to another crypto entrepreneur for the eye-watering sum of almost USD 70 million. Old memes have been selling at auction as well, with the famous meme of Nyan Cat, an animated colourful cat whose body is in the shape of a pop tart, selling for 300 ETH (the cryptocurrency generated by the Ethereum protocol), over USD 1 million at the time of writing. Musician Grimes has also reportedly sold over USD 6 million worth of digital artworks.

What is going on? What are NFTs? And what does copyright have to do with it?

NFT BASICS

First, what is an NFT? One of the most heralded uses of blockchain technology is the tokenization of assets, where a token is a programmable digital unit of value that is recorded on a digital ledger. There are various types of tokens; they can represent anything from commodities and loyalty points, to shares, coins, and more.

While there are many different types of token standards, the most popular is found in the Ethereum infrastructure, which deploys tokens using the ERC20 standard, which sets the rules for fungible tokens. Fungible goods are by definition exchangeable regardless of the specific item you’re selling or buying. Commodities tend to be fungible: silver, gold, oil, grain. Conversely, non-fungible goods are unique one-offs, like a custom-made silver necklace, or golden statuette, or a painting. Non-fungible goods use a different token standard, known as ERC-721.

Any digital work, including physical goods, which can be represented in digital form, such as a photo, video or a scan, can be turned into a non-fungible token.

The first use of the NFT standard in the Ethereum environment was a set of pixelated images of characters called Cryptopunks, and was released in June 2017. In the intervening years, other types of works have been turned into NFTs, including memes, music albums, and digital art.

There are various types of NFTs, but the most common is a metadata file containing information encoded with a digital version of the work that is being tokenized. The other type is where the entire work is uploaded to the blockchain; these are less common as it is expensive to upload information to the blockchain.

“In 2021, NFTs
have taken
the art and
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by storm.”

The most common type of NFT is a piece of code that is written into the blockchain. That code is made up of various bits of information. The ERC-721 standard for NFTs specifies elements that must be present, and some that are optional. The first core element of an NFT is a number known as the *tokenId*, which is generated upon the creation of the token; the second is the contract address, a blockchain address that can be viewed everywhere in the world using a blockchain scanner. The combination of elements contained in the token make it unique; only one token in the world exists with that combination of tokenID and contract address. At its very core, the NFT is simply these two numbers. However, there are other important elements that can be present in the contract. One is the wallet address of the creator, which helps to identify the NFT with its originator. Most NFTs also commonly include a link to where the original work can be found, this is because the non-fungible token is not the work itself, rather a unique digital signature that is linked in some way to an original work (See Table 1).

Table 1

Item Metadata	
Contract Address	Token Metadata
0x8c5aCF6dBD24c66e6FD44d4A4C3d7a2D955AA ad2	“symbol”: “Mintable Gasless store”,
Token ID	“image”: “https://d1czm3wxxz9zd.cloudfront.net/613b908d000000000/86193240282618763854367550160835360531676033165”
86193240282618763854367501	“animation_url”:””.
608353605316760331651808345700	“royalty_amount”:true,
084608326762837402898	“address”:
Token Name	“0x8c5aCF6dBD24c66e6FD44d4A4C37a2D955AAad2”,
The Clearest Light is the Most Blinding	“tokened”
Original Image	“8619324028261876385436750160835360531676033165”
https://d1czm3wxxz9zd.cloudfront.net/613b908d-19ad-41b1-8bfa0e0016820739c/0000000000000000/86193240216760331651808345700084608326762837402898/ITEM_PREVIEW1.jpg	“resellable”: true,
Original Creator	“original_creator”:
0xBe8Fa52a0A28AFE9507186A817813eDC1454E004	“0xBe8Fa52a0A28AFE9507186A817813eDC1”
	“edition_number”:1,
	“description”: “<p>A beautiful bovine in the summer sun
	“auctionLength”: 43200,
	“title”: “The Clearest Light is the Most Blinding”,
	“url”:
	“https://metadata.mintable.app/mintable_gasless/86193240282618763854367550160835360531676033165”
	“file_key”:””,
	“apiURL”: “mintable_gasless/”,
	“name”: “The Clearest Light is the Most Blinding”,
	“auctionType”: “Auction”,
	“category”: “Art”,
	“edition_total”: 1,
	“gasless”: true
	}

COPYRIGHT ISSUES

From the description of NFTs above, you could be forgiven for not thinking about copyright at all. Most non-fungible tokens are a metadata file that has been encoded using a work that may or may not be subject to copyright protection (you could in principle create an NFT of a trademark), or it could even be a work in the public domain. Anything that can be digitized can be turned into an NFT; the original work is only needed in the first step of the process to create the unique combination of the tokenID and the contract address. So, in principle, NFTs have very little to do with copyright.

However, there is growing interest in NFTs from a copyright perspective, in part because a lot of the works that are being traded as NFTs, such as works of art, are protected by copyright, but also because of a lack of clarity about what it is exactly that you get when you buy an NFT.

WIDESPREAD CONFUSION

One of the key issues is the often widespread confusion surrounding the rights that buyers acquire when they purchase an NFT. Some buyers think they acquire the underlying work of art, and all its accompanying rights. However, in reality, they are simply buying the metadata associated with the work; not the work itself.

Some of the confusion may be caused by the amount of money spent on the tokens. When pixel art can be sold for over USD 1 million, it is easy to assume that the purchaser has acquired more than a string of code.

There is also increasing confusion among the mainstream press when reporting on the sale of NFTs; reporters often assume that it is the work itself that has been sold, which is not the case. Understandably, it is difficult to comprehend that buyers of NFTs are spending such large sums of money on what amounts to a metadata file and a short string of numbers and letters of dubious artistic value, but that's exactly what most NFTs are.

Nonetheless, copyright may well come into play, at least for some NFTs. For example, one possible use of these tokens might be in some sort of digital rights management scheme. While most NFTs do not involve a transfer of rights, in some instances the seller offers to turn the token into an actual transfer of copyright ownership of the original work. However, it is difficult to assess if this is compliant with the legal formalities needed to transfer copyright. For example, in the UK, the transfer of copyright under the Copyright Designs and Patents Act 1988 (CDPA) requires a copyright assignment that is "in writing signed by or on behalf of the assignor". It is difficult to see how an NFT would fulfil those requirements.

Could NFTs be used in other types of digital rights management? In some way, all NFTs could be seen as a form of registration, insofar as blockchain could operate as an immutable record of ownership claims, acting as a means of verifying or determining authenticity. But this idea quickly runs into practical problems, not least, the fact that anyone with sufficient technical

knowledge and the appropriate tools can generate their own token, and this token can include any information that is entered by the author. This means that anyone can make erroneous ownership claims, and write them into the blockchain.

What about licenses? In theory, it is possible to code any type of agreement into a smart contract. A smart contract is an agreement – written in code – between different parties that is stored on a blockchain and cannot be changed. If we consider a license to be a legal document that allows a user to perform an action that is otherwise restricted by copyright, then this can also be achieved with an NFT. At the time of writing, however, a survey of the major NFT platforms did not produce any cryptographic smart contract license in the shape of an NFT. A good number of platforms and collectible projects do not offer licenses of any type, and those that do often present contradictory terms and conditions.

Finally, there is the potential issue of copyright infringement. Can someone generate an NFT that doesn't belong to them? This is not just idle speculation. We are already seeing several instances of alleged copyright infringement taking place. A cursory look at NFT marketplaces produces many different infringing listings. Some artists have taken to social media to complain that their works were being minted as NFTs without their permission. Even public domain works from the Rijksmuseum in Amsterdam have been turned into an NFT. Most instances of alleged infringement have been solved outside of the courts, usually by the removal of the token from the auction platform. But at some point, one of these cases is going to be litigated, and the question of whether the NFT is actually infringing a copyright holder's rights will arise.



Photo: UPI / Alamy Stock Photo

There is growing interest in NFTs from a copyright perspective, in part because a lot of the works that are being traded as NFTs, such as works of art, are protected by copyright, but also because of a lack of clarity about what you get when you buy an NFT.

The question is trickier than it may first appear, mostly because of the nature of an NFT. As noted above, most tokens are not the work itself, but metadata of the work, and making such a token may not infringe copyright. Here is where it becomes relevant to have a clear and precise understanding of what a non-fungible token actually is in technical terms, as outlined above.

From a copyright perspective, it is difficult to see how the minting of an NFT, even without authorization, could be considered copyright infringement. As the NFT is not the work, but a string of numbers that have been generated in relation to a work, the resulting file could not be considered a reproduction or even an adaptation of the work.

Generally, for infringement to take place, three requirements must be met. First, the infringer will have taken advantage of one of the exclusive rights of the author without authorization. Second, there will be a causal connection between the NFT and the original artwork, in other words, the potentially infringing work has to have been created directly from the original. And third, the work as a whole, or a substantial part of it, will have been copied. It is difficult to see how an NFT would meet these requirements, but this will clearly be a point of contention in the future. Already, we are seeing litigation based on alleged copyright infringement. Take for example, production company Miramax's lawsuit against film director Quentin Tarantino for trademark infringement, copyright infringement, and breach of contract, over his plan to sell NFTs based on his film Pulp Fiction.

The exclusive rights enjoyed by the author of a work cover its reproduction, publication, lending and rental, public performance, adaptation, communication to the public, and authorization to perform any of the above. Only the right of communication to the public could be infringed through a link in an NFT, as in such a case there is a causal connection between the token and the work. However, as an NFT is simply code, it is not a substantial reproduction of the work, so it would not infringe those rights.

For the most part, while authors may have legal recourse for unauthorized use by making a claim against a platform for minting an NFT associated with their original work, it is not clear that the author actually has the exclusive right to do so.

SUMMING UP

Inevitably, there will be some practical interaction between NFTs and copyright, although most disputes will be handled at the platform level. The market is already acting as a gatekeeper, removing possible infringement by encouraging the existence of a space where creators can offer the tokens they have generated. Nonetheless, the nature of the market, and the incentive for large returns, still mean that the NFT space may generate a good number of copyright disputes. These are the early days of a potentially disruptive technology, so it will be interesting to see how dispute and ownership claims develop.

“Anything that can be digitized can be turned into an NFT.”

Digital influencers herald a new era of branding

By **Natalie Humsi**, WIPO Academy

A new wave of influencers has taken over social media, with a more cutting-edge look appealing to younger generations. Digital influencers, also known as virtual humans, are the newest addition to the world of social media marketing.

In 2018, Koichi Kishimoto and Takayuki Moriya, teamed up to create a new creative-based form of intellectual property (IP). The pink-haired virtual girl called imma, is Asia's first virtual human. Her name was appropriately inspired by the Japanese word for "now." She has grown a cult-like following with more than 350,000 followers on Instagram and over 250,000 followers on TikTok.

"AWW"-INSPIRING

The success of imma prompted Koichi Kishimoto and Takayuki Moriya to launch Aww Inc., Japan's first virtual human company, in 2019. With its eye on the Asian market, the company is seeking to engage "people's imagination" and "make them feel in "Aww". "Our team of strategists, writers and designers define, create and activate systems that change behaviors and power tomorrow's brands," the company website notes.

Koichi Kishimoto is a computer graphics (CG) expert who also owns Modeling Cafe, an animation studio that develops CG and visual effects for films and video games. His years of research into human features and facial recognition have been key to developing the virtual humans produced by Aww Inc.

Takayuki Moriya studied business and marketing at university before becoming a TV commercial and music video producer. Currently, he is focusing his attention on business development and partnerships in the areas of extended reality and virtual fashion for Aww Inc.

CROSSING THE UNCANNY VALLEY

Humanoid robots and their derivatives tend to evoke a sense of unease among humans; this is referred to as the uncanny valley. Virtual humans or digital influencers



Photo: Courtesy of Aww Inc.

imma (above) is Asia's first virtual human. She is currently working on her own virtual fashion brand.

“The market for virtual humans has been growing rapidly, with various companies developing their own virtual humans or converting existing characters into virtual humans.”

Takayuki Moriya, Co-founder of Aww Inc.



cross this barrier for many audiences as their designs and virtual features are refined over time and become ever more realistic. However, younger audiences that grew up watching animations with special effects and high-quality CG are more accepting and feel more comfortable with them.

“I was researching and creating artificial intelligence, virtual realities, and various other platform businesses, but I was also focusing on creating a community culture that is developed by the blockchain, which is going to affect our individual futures. In this community culture, virtual humans and their associated IP will become very important,” notes Mr. Moriya.

“Instead of creating marketplaces and platforms based on existing concepts, we value the creation of the most fantastic virtual humans and intellectual property (IP). With IP, we are able to access all the different marketplaces, platforms, and communities – and that is the true strength of IP in this field,” he adds.

Virtual humans are popular among the world’s leading brands for their accessibility, creative displays and capacity to be tailored to the needs of the brand.

Aww Inc. is working with a number of well-known companies. For example, imma is currently starring in Lenovo’s brand movie for its “Yoga” series of notebook computers, where she symbolizes “diversity for the youth generation,” and wants to see change and affirm it as a possibility.

The impact of the COVID-19 pandemic has supercharged demand for virtual humans as a creative solution to physical restrictions that many marketing agencies continue to face.

“The market for virtual humans has been growing rapidly, with various companies developing their own virtual humans or converting existing characters into virtual humans,” explains Mr. Moriya.

STRATEGIC CHOICES

Aww Inc. is very selective with the brand partnerships it establishes to make sure that the content aligns with

“As we are now offering the developed technology to our partners, it was necessary for us to acquire the trademark right to visualize our strength.”

Takayuki Moriya, Co-founder of Aww Inc.

the personalities of their virtual humans. These include: imma, her younger brother Zinn, a fashion designer named Asu, a fashion and beauty influencer named Ria, and a Disney princess-inspired virtual character named Ella.

In light of their emerging popularity of digital influencers, the company decided to protect its IP assets by registering the trademark “MASTER MODEL®” at the Japan Patent Office for their virtual humans. The decision to register their trademark and protect their virtual humans was a key strategic business response to growing demand for them.

“As we are now offering the developed technology to our partners, it was necessary for us to acquire the trademark right to visualize our strength,” Mr. Moriya explains.



imma is Aww Inc.’s first virtual human and also the first such creation in the Asia and Pacific Region. She has a very realistic look and distinct personality. You may have seen her at the closing ceremony of the 2020 Summer Paralympic Games in Tokyo. According to her social media bios, she is “interested in Japanese culture, film and art”. She was listed in Forbes Women, Poland’s “Women of the Year 2020”, and in 2021, received the “Incentive Award” of the Cool Japan Matching Awards by the Government of Japan. imma is currently working on her own virtual fashion brand.



Photos: Courtesy of Aww Inc.

Zinn is imma’s younger brother. Aww Inc. launched him in 2019. He has a cool and cute aesthetic. He is characterized as very shy and works as a fashion model. His modeling debut kicked off alongside his sister’s modeling career, with the PUMA x SLY collection in 2020.



Asu is a virtual human fashion designer behind the NOWEAR clothing brand. He made his debut in 2019 as well, and lives by the motto “nothing is true”. He is inspired by “Mojibake,” a style of garbled Japanese text that was born out of Japanese Internet culture. Asu’s brand NOWEAR is so popular that products sell out within minutes of each launch.

Photo: Courtesy of Aww Inc.



Ria is another virtual human that launched in 2019 and is recognized for her beauty. She refers to herself as a “Newman”, bridging the human and virtual worlds.

THE FUTURE OF FASHION

Building on their reputation in the fashion world with their virtual human brand partnerships and Asu’s clothing brand, Aww Inc. have also started carving out territory in virtual fashion, which it sees as a sustainable alternative to the physical fashion cycles. Virtual fashion opportunities easily build on the digital environment of virtual humans, incorporating games and “digital try-on formats” through virtual reality. Aww Inc. even plans to launch imma’s own virtual fashion brand soon, which will be available exclusively as in-game skins and non-fungible tokens (NFTs).

Interested in learning more about how IP can help businesses like Aww Inc.?

The WIPO Academy offers year-long opportunities for those wishing to develop their IP knowledge and skills through its Professional Development Program, Distance Learning courses, Joint Master’s Programs and WIPO Summer Schools.

Find out more about the WIPO Academy’s programs at: www.wipo.int/academy/en/.

Copyright in the Digital Single Market: a taster

By **Eleonora Rosati**, Professor of Intellectual Property Law and Director of the Institute for Intellectual Property and Market Law, Stockholm University, Sweden

*Eleonora Rosati is the author of *Copyright and the Court of Justice of the European Union* (Oxford University Press, 2019) and *Copyright in the Digital Single Market. Article-by-Article Commentary to the Provisions of Directive 2019/790* (Oxford University Press, 2021).

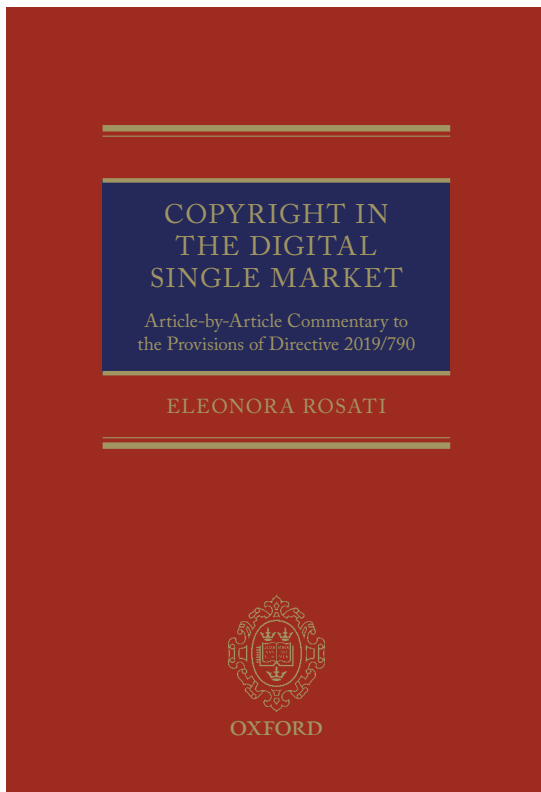
THIRTY YEARS OF COPYRIGHT HARMONIZATION IN EUROPE

Twenty twenty-one marks the thirtieth anniversary since the beginning of the copyright harmonization process in what is today the European Union (EU). The Software Directive 91/250 was the first attempt at harmonizing the laws of EU member states regarding the requirements for and scope of protection of copyright as applied to computer programs. Today, the EU copyright legislative framework consists of 13 directives and two regulations harmonizing a range of issues within the field of copyright and related rights. Throughout this period, the process of approximation of national copyright laws, whereby member states are obliged to align their national laws with EU law, has been supported by a variety of justifications, the primary one being the building of an internal market for copyright content and copyright-based services.

Since the signing of the Treaty of Rome in 1957, the process of European integration has been linked to the creation of an internal market, where a number of basic freedoms – including freedom of movement of goods and services – are guaranteed. Throughout the 1980s, it became apparent that harmonization of intellectual property (IP) laws would also be necessary to achieve this goal. During the following decades, the harmonization discourse has touched upon all the main IP rights: copyright, trademarks, design rights, geographical indications, trade secrets and patents have all been subjected to approximation initiatives. For some of them (though not copyright), this process has led to the introduction of EU-wide rights that subsist in parallel to and independently of national forms of protection.

With specific regard to copyright, in recent years, the internal market-building rationale has been accompanied by the emergence of further objectives and justifications for EU initiatives. Three in particular stand out.

The first has been to ensure a high level of protection of copyright and authors/rightsholders. This has been the case, among others, of the InfoSoc Directive 2001/29 and the Enforcement Directive 2004/48.



This publication is a travel companion for all those who need to navigate the legislative provisions that were adopted in 2019 to make EU copyright fit for the digital single market.

The second has been the idea that copyright reform could serve competitiveness goals and make the EU system more attractive to certain stakeholders for undertaking their own activities. For example, during the early 2010s, this was the main driver for the adoption of EU legislation in the field of orphan works (Orphan Works Directive 2012/28).

The final objective has been to link copyright reform to the goal of ensuring greater fairness and remedying certain market imbalances and failures. This is particularly visible insofar as the DSM Directive 2019/790 (DSM Directive) is concerned.

In parallel to legislative initiatives, the Court of Justice of the European Union (CJEU) has also played a substantial – if not truly foundational – role. Through the system of referrals for a preliminary ruling, the Court has oftentimes not limited itself to interpreting copyright legislation: it has also pushed the boundaries of harmonization further, in some instances even beyond the letter of the law.

The CJEU has identified and shaped the very requirements for copyright protection, including the notions of “originality” and “work”. It has defined the constitutive elements of and scope of exclusive rights like reproduction, communication to the public and distribution, and related exceptions and limitations. It has also defined the room left for national initiatives and ruled on the compatibility of some of them with EU law, including in the field of private copying and exploitation of out-of-commerce works. It is precisely within this rich (and complex) environment that the DSM Directive came to be and finds its place.

THE CONTENT AND OBJECTIVES OF THE DSM DIRECTIVE

In 2015, the European Commission, led by its then President Jean-Claude Juncker, unveiled a strategy to realize a digital single market (DSM) in the EU. Achieving such an objective would allow the EU to maintain its leading position in the digital economy and favor the growth of European companies on a global scale. To realize a DSM in Europe, a number of initiatives would need to be undertaken across a range of sectors, including further harmonization of copyright laws across the EU member states.

In 2016, a proposal for a DSM Directive was unveiled. After three years of intense negotiations, the DSM Directive was adopted in spring 2019. After its entry into force on

June 7, 2019, a two-year period started for EU member states to transpose the DSM Directive into their own legal systems.

In terms of substantive provisions, the DSM Directive is rather heterogeneous and lays down measures to:

- Adapt exceptions and limitations to the digital and cross-border environment. To this end, the Directive introduces mandatory exceptions or limitations for text and data mining (TDM), use of works and other subject matter in digital and cross-border teaching activities, and preservation of cultural heritage.
- Improve licensing practices and ensure wider access to content. To this end, the Directive provides a framework for the use, by cultural heritage institutions, of out-of-commerce works, measures to facilitate collective licensing, access to and availability of audiovisual works on video-on-demand platforms, and a provision on works of visual art in the public domain.
- Achieve a well-functioning marketplace for copyright. To this end, the Directive introduces a related right in favor of press publishers for the online use of press publications and allows member states to provide that publishers are entitled to receive a share of the compensation due for uses of third-party works under available exceptions or limitations. It also establishes a framework governing certain uses of protected content by online services, and mandates fair remuneration in exploitation contracts of authors and performers.

The Directive pursues the same objectives as the pre-existing copyright legislation, including to guarantee a high level of protection for right holders, streamline rights clearance, and create a level playing field for the exploitation of works and other protected subject matter. Such objectives are linked to the establishment and functioning of the EU internal market, as well as to both an incentive-based view of copyright as a stimulus to innovation, creativity, investment and production of new content and the EU's objective to respect and promote culture, including by bringing European common cultural heritage to the fore, and cultural diversity. The preamble to the DSM Directive adds to all this the need to remedy the interpretative uncertainties raised by technological advancement and the emergence of new business models and actors and to guarantee a well-functioning and fair marketplace for goods incorporating, and services based on, copyright works and other protected subject matter.

“In 2015, the European Commission [...] unveiled a strategy to realize a digital single market (DSM) in the EU [...] to maintain its leading position in the digital economy and favor the growth of European companies.”

THE MOST DISCUSSED PROVISIONS

The DSM Directive touches upon several different areas. Some of its provisions have attracted significant attention and have been the subject of intense scrutiny.

Insofar as exceptions and limitations are concerned, those relating to TDM (Articles 3 and 4) are deserving of mention as they are functional to the development of machine learning and Artificial Intelligence in Europe. The European Commission considered that lack of legal certainty regarding the undertaking of TDM processes harmed the EU's competitiveness and scientific leadership. In its proposal, the European Commission only envisaged a TDM exception for the benefit of research organizations. Through the process eventually leading to the adoption of the DSM Directive, that exception was broadened and a further exception or limitation without restrictions in terms of beneficiaries was included.

The DSM Directive also introduces a new related right (Article 15) for EU-based press publishers concerning the online use of their press publications by information society services like online news aggregators. The EU initiative follows some earlier national experiences (Germany and Spain), which had sought to tackle – without much success – the problem of declining revenues in the press sector and the alleged substitution effect caused by the advent of certain online services.

Finally, Article 17 of the DSM Directive seeks to remedy the “value gap” – a notion that refers to a mismatch between the value that some digital user-uploaded content platforms are claimed to obtain from the exploitation of protected content and the revenue returned to relevant right holders – by introducing a complex liability framework. Article 17 is premised on a twofold assumption: first, that certain online services directly perform copyright-restricted acts; secondly, that the Directive needs to remedy the legal uncertainty surrounding the responsibility and liability regime of these services.

STATE OF PLAY AND NEXT STEPS

At the time of writing, only a few EU member states have completed the transposition of the DSM Directive into their own laws and thus met the June 7, 2021 deadline. Delays have been caused by a number of reasons, ranging from the ongoing COVID-19 pandemic to the delayed release of the Commission's Guidance on Article 17, as well as some important CJEU rulings, including *YouTube/Cyando* (C-682/18 and C-683/18, decided in June 2021) and the Polish challenge to Article 17 (C-401/19, still in progress).

Based on what is already available, it is apparent that the provisions that the EU legislature adopted in 2019 to establish a DSM are likely to be implemented in different ways across the EU. It is true that there are provisions in the Directive that leave significant discretion to member states. Such discretion ranges from the very option to do something in the first place (e.g., Article 12 and the possibility to provide for collective licenses with an extended effect) to shaping

Photo: metamorworks / iStock / Getty Images Plus





“Twenty twenty-one marks the thirtieth anniversary since the beginning of the copyright harmonization process in what is today the European Union (EU).”

the actual content of rights and rules (e.g., Articles 18-23 in relation to contracts of authors and performers). This said, there are also provisions in the Directive that do not openly envisage such broad freedom. Yet, where draft or adopted transposition laws have been issued, also in respect of those, member states have already been moving in different directions (e.g., Articles 15 and 17).

WHY A COMMENTARY ON EACH OF THE DSM DIRECTIVE'S PROVISIONS?

The history of the DSM Directive is a complex one, and so are its provisions and the national transposition thereof. In all this, it is evident that the “story” of this piece of legislation did not end when it was adopted: it has just begun. In the years to come, litigation concerning the application of the national provisions transposing the DSM Directive will give rise to several referrals for a preliminary ruling to the CJEU. As has happened in the past with other EU copyright directives, the CJEU will also have to tackle the various transposition inconsistencies and errors.

Within the growing body of literature on the DSM Directive, my own ambition in writing an article-by-article commentary to its provisions, was to produce a text that could serve as a starting point and travel companion to those – judges, legal and public affairs professionals, researchers, policy- and law-makers, and students – who wish or need to navigate the legislative provisions that were adopted in 2019 to make EU copyright fit for the digital single market. I hope to be able to release further editions as the DSM Directive gets interpreted and applied in national and EU case law, so that the commentary also becomes my own professional travel companion for the years to come.



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