

WIPO | MAGAZINE

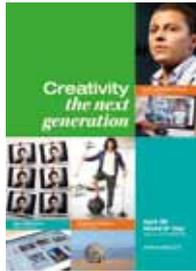
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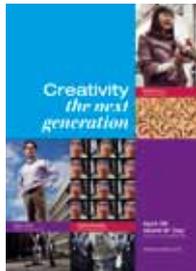
Creativity: the next generation



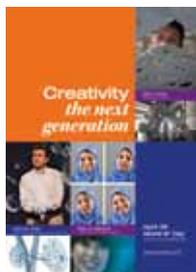
What is the shape of things to come?

From the weather to the markets to the next big thing in technology or the arts, we all want to know how the world will look tomorrow.

Predicting the future is an uncertain endeavor at best, but that doesn't keep us from trying. And with ever greater access to information, instant communication, new forms of collaboration and crowd-sourcing, our predictions are becoming more frequent, more outrageous, and more accurate.



We know, for example, that cars will soon drive themselves. That our sight and speech – eventually our brains – will interact more directly with, and effectively control, our computers. Which will in turn become much smaller and be worn on – or inside – our bodies. This will all have a profound effect on how we live – how we think, how we work, how we learn, heal, enjoy.



What used to be science fiction is now fact. But what's next? What is the future beyond the future? What disruptive technology is now just an idea bouncing around a young engineer's mind? Who will create the next online sensation that again changes how we talk to each other? What new music will emerge from a garage somewhere to rock the world's dance floors or unnerve the academy? Who are tomorrow's great artists and innovators? How are they working; how do they create? And how will they get their creations to market in a world where the game changes, almost daily?



The future? Ask the next generation.

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3-D Systems Corp.
Reef, a 3-D printed wall and ceiling lamp,
resembling a coral reef was designed by
Tanja Soeter for pioneering design company,
Freedom of Creation (FOC).

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Property Organization

3-D PRINTING

and the future of stuff

By *Catherine Jewell*,
Communications Division, WIPO

Have you ever searched for a lamp but just couldn't find the right one, or had to wait months for a spare part for a household device that is no longer produced? These frustrations could soon be a thing of the past. High performance 3-D printing or additive manufacturing technologies, first developed in laboratories some 30 years ago, are now available for consumers. One of the most exciting innovations to emerge in recent times, 3-D printing offers the realistic possibility that anyone, anywhere in the world can produce any object they need on demand. For some, 3-D printing marks the "democratization" of manufacturing, a new age of mass personalization that promises to boost innovation, foster more efficient use of resources and transform the way things are produced. Some have gone so far as to characterize it as the "Third Industrial Revolution". This article considers the technology's expanding range of applications and its huge innovation potential. It also reflects on why it is that intellectual property (IP) policymakers need to watch this space.

WHAT IS 3-D PRINTING?

3-D printing, alias additive manufacturing (AM) or direct digital manufacturing (DDM), makes it possible to create an object by creating a digital file and printing it at home or sending it to one of a growing number of online 3-D print services. In the 3-D printing process, this digital blueprint, created using computer-aided design (CAD) software, is sliced into 2-dimensional representations which are fed through to a printer that starts building up an object layer by layer from its base. Layers of material (in liquid, powder or filament form) are deposited onto a "build area" and fused together. This additive process, which minimizes waste because it only uses the amount of material required to make the component (and its support), is distinct from traditional "subtractive" manufacturing processes where materials are cut away to produce a desired form.

A number of 3-D printing techniques exist. The first commercial 3-D print technology, stereolithography, was invented in 1984 by Charles Hull. Several other techniques have emerged since, including fused deposition modeling (FDM), selective laser sintering (SLS) and PolyJet Matrix. Some of these techniques involve melting or softening layers of material, others involve binding powdered materials and yet others involve jetting or selectively-hardening liquid materials.

The process of "growing" objects layer by layer also means that, with 3-D printing, it is possible to create more intricate and complex structures than can be done using traditional manufacturing techniques.

CURRENT APPLICATIONS

3-D printing was originally developed for rapid prototyping purposes, making one or two physical samples. It allowed designers to identify and correct design flaws quickly and cheaply, thereby speeding up the product development process and minimizing commercial risks. According to business analysts CSC, prototyping remains the largest commercial application of the technology, accounting for some 70 percent of the 3-D print market.



Photo: 3-D Systems Corp

Gaudi Chair designed by Dutch designer Bram Geenen. 3-D printing technology makes it possible to create geometrically complex objects that cannot be made in any other way.

Photo: 3-D Systems Corp



Display by Freedom of Creation (FOC), a pioneering design company specializing in 3D printing technologies, during the Fabrication Laboratory exhibition at the Design Museum in Barcelona in 2010.



Photo: Andrew Weekes Photography

Loughborough University's world-leading expertise in 3D printing was used by the University of Leicester to create a replica of the skeletal remains of King Richard III.

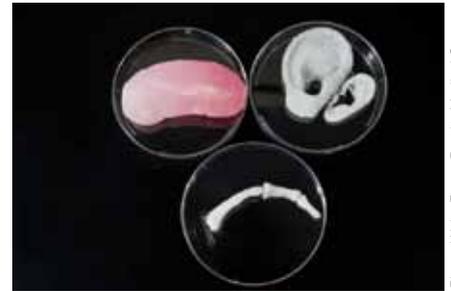
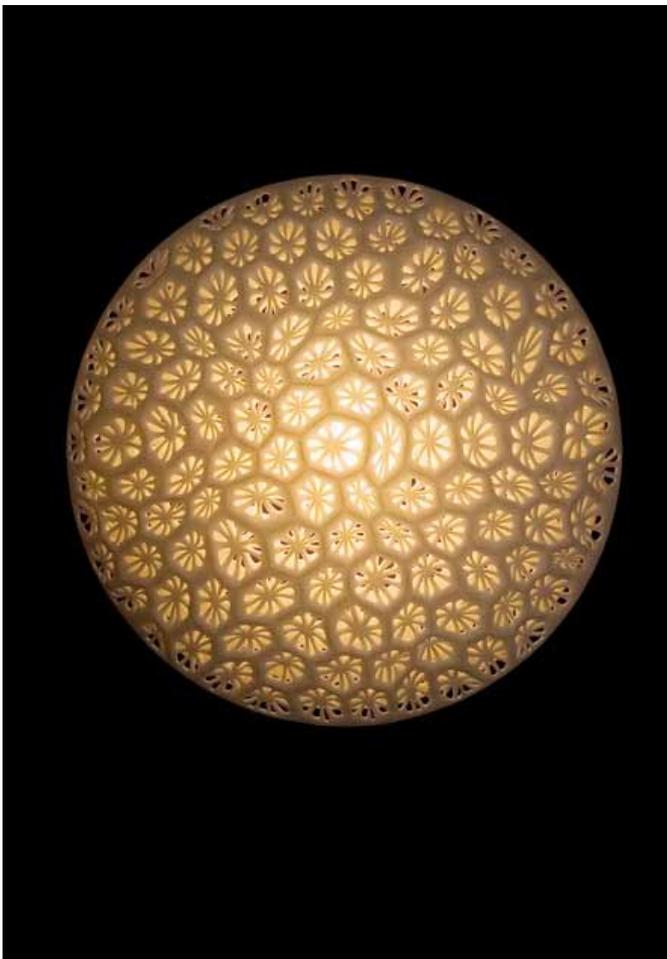


Photo: Wake Forest Baptist Medical Center

Researchers at the Wake Forest Institute for Regenerative Medicine are exploring ways to regenerate organs instead of transplanting them using experimental fabrication technology.

Photo: 3-D Systems Corp



Reef, a wall and ceiling lamp designed by Tanja Soeter for FOC, resembles a coral reef.



Photo: 3-D Systems Corp

3D printing technologies offer a new way to produce customized objects, quickly, cheaply and with less waste.



However, improvements in the technology's accuracy and speed, as well as in the quality of materials used for printing, have prompted some commercial sectors to move beyond the use of 3-D printing in their research and development (R&D) labs and incorporate it into their manufacturing strategy.

The technology is already widely used to make jewelry and other bespoke fashion items, in dental laboratories to produce crowns, bridges and implants, as well as in the production of hearing aids and prostheses, offering patients a perfect fit. 3-D printing is particularly suited to low-volume, short production runs offering companies a more flexible, cost-effective and speedy alternative to traditional mass production methods.

USE IN THE AUTOMOTIVE AND AEROSPACE SECTORS

The technology is also being used to make complex parts for the electronics, automotive and aerospace industries. Major car manufacturers, such as GM, Jaguar Land Rover and Audi, have been 3-D printing auto parts for a number of years. Leading aircraft manufacturers Airbus (part of the European aerospace and defense group, (EADS)) and Boeing are using it to improve the performance of their aircraft and reduce maintenance and fuel costs. Boeing uses 3-D printing to produce environmental control ducting (ECD) for its 787 aircraft. ECD traditionally requires the production and assembly of up to 20 different parts, but can be 3-D printed in one piece. "Additive Layer Manufacturing is truly game-changing technology that has the potential to revolutionize manufacturing for the 21st century. It can be used for a wide variety of materials from metals to plastics – including composites – and is faster and more efficient to produce. It uses less raw material and produces parts which are lighter, more complex and stronger: in short, this is a leaner and greener technology which can be used in many sectors from aviation through to consumer goods," explains Dr. Jean J. Botti, Chief Technical Officer at EADS.

3-D-printed aircraft components are 65 percent lighter but as strong as traditional machined parts, representing huge savings and reduced carbon emissions. For every 1 kilogram reduction in weight, airlines save around US\$35,000 in fuel costs over an aircraft's life.

Aircraft designers already have in their sights the 3-D printing of a whole plane by 2050. To this end, Airbus recently joined ranks with a South African aviation company and the Council for Scientific and Industrial Research (CSIR) (see <http://tinyurl.com/a9mx6l3>) to explore the application of titanium-powder-based additive layer manufacturing for building large-scale, complex aircraft components. Although expensive, titanium is light, strong and durable and ideally suited to aircraft manufacture. In traditional manufacturing, it wears machine tools heavily as it hardens when cut. Such problems are eliminated in a 3-D print environment.

3-D PRINTING IN SPACE

NASA engineers are 3-D printing parts, which are structurally stronger and more reliable than conventionally crafted parts, for its space launch system. The Mars Rover comprises some 70 3-D-printed custom parts. Scientists are also exploring the use of 3-D printers at the International Space Station to make spare parts on the spot. What once was the province of science fiction has now become a reality.

USE IN MEDICINE

Medicine is perhaps one of the most exciting areas of application. Beyond the use of 3-D printing in producing prosthetics and hearing aids, it is being deployed to treat challenging medical conditions, and to advance medical research, including in the area of regenerative medicine. The breakthroughs in this area are rapid and awe-inspiring.

Two-year-old Emma was born with a rare congenital disorder known as arthrogryposis which means she does not have the strength to lift her own arms. Using 3-D printing technologies, researchers at Delaware hospital in the US developed a durable custom exoskeleton with the tiny, lightweight parts she needs to be able to move her arms. Emma calls her prosthesis her "magic arms".



Photo: EADS

The "Airbike, unveiled in 2011 by EADS is the world's first 3-D printed bicycle. Made from nylon powder, the Airbike is strong enough to replace steel or aluminum and does not require conventional maintenance or assembly. It is "grown" from powder, allowing complete sections to be built as one piece; the wheels, bearings and axle being incorporated within the growing process and built at the same time.



Photo: Stratasys Corp.

In 2002, surgeons at the University of California, Los Angeles' Mattel Children's Hospital used 3-D-printed models to plan complex surgery to separate Guatemalan conjoined twins Maria Teresa and Maria de Jesus Quiej-Alvarez. Using these models, the operation took 22 hours instead of the 97 hours normally required for similar procedures.

In 2011, Surgeons at the University Hospital in Ghent, Belgium, successfully performed one of the most complex facial transplants to date with extensive use of 3D printing to plan and perform the procedure. Anatomical models and patient specific guides were 3D printed for use before and during the procedure (see <http://tinyurl.com/cd2hz2n>).

In February 2012, with the help of a 3-D printer, doctors and engineers at Hasselt University successfully performed the world's first patient-specific prosthetic jaw transplant for an 83-year-old woman suffering from a chronic bone disease. "You can build parts that you can't create using any other technique," notes Ruben Wauthle, medical applications engineer at Layerwise, the company that built the implant, in a BBC report. "For example, you can print porous titanium structures which allow bone in-growth and allow a better fixation of the implant, giving it a longer lifetime."

WORLD'S FIRST 3-D BIOPRINTER

3-D printing technology is even being used to grow new human tissue. In 2009, Organovo, in partnership with Invetech, produced the world's first bioprinter. The MMX™ "takes primary or other human cells and shapes them into 3-D tissues for medical research, including drug development and therapeutic applications". In late 2010 Organovo announced it had generated the first bioprinted blood vessels.

3-D PRINTING ENTERS THE PUBLIC ARENA

Beyond these fascinating commercial applications, 3-D printing is starting to filter into the mainstream. "The era of desktop manufacture beckons," notes former *Wired* magazine editor Chris Anderson, in his recent book *Makers*.

Although 3-D printers are not yet a standard part of home-computing equipment, the latest generation of devices, such as Cube® by 3D Systems, the Cubex™ or Makerbot's Replicator™2X – which retail for between one and three thousand US dollars – are bringing the possibility of home manufacturing one step closer to reality.

A study by Wohlers Associates anticipates that the sale of additive manufacturing products and services will reach US\$3.7 billion by 2015, rising to over US\$6.5 billion by 2019.

OPEN SOURCE MOVEMENT FUELS UPTAKE

The uptake and development of 3-D printing is also being fuelled by a dynamic open source movement. For example, the RepRap (short for replicating rapid prototyper) initiative, founded by Dr. Adrian Bowyer at the University of Bath, UK, in 2005, has produced a low-cost 3-D printer capable of printing most of its own components. The project's designs, including the machine itself, are released under a free software license (the GNU General Public License).

One of the initiative's aims is to put low-cost desktop manufacturing systems in the hands of individuals anywhere in the world, so they can build complex products themselves with very little capital investment. A RepRap kit costs around US\$500.



As the RepRap printer design is open, anyone can modify or improve, manufacture and sell it. Business analysts CSC note that the “rate of innovation of the RepRap and its derivatives is accelerating faster than equivalent commercial 3-D printers.”

Similarly, the Fab@Home project aims “at bringing personal fabrication to your home.” The community includes hundreds of engineers, inventors, artists, students and hobbyists – “both those that can develop the technology and those who simply want to use it to make unique items,” the project’s website explains.

EMERGENCE OF ONLINE 3-D PRINT PLATFORMS

A growing number of online 3-D print platforms, such as Makerbot’s Thingiverse (www.thingiverse.com) make it possible for individuals to upload and share their designs or download designs for fabrication.

For those without direct access to 3-D print technology, a growing range of online services are available. Shapeways and Sculpteo, for example, offer platforms for individuals to share their ideas and make them real by providing access to cutting-edge 3-D software and printers. As of August 2012, Shapeways boasted nearly 7,000 shops and over 16,000 members, who had printed over a million products.

A suite of software applications, such as Autodesk 123D, is also available for people to design and customize objects on their home computers.

A NEW ERA OF MASS PERSONALIZATION

3-D printing is heralding a new era of mass personalization. In January 2013, Nokia announced it is making the 3-D printable files of its Lumia 820 phone case available to customers, so they can create their own designs and print them on any 3-D printer. While, as MIT Professor Neil Gershenhoff notes, consumers are unlikely to print what is readily available in the stores, when it comes to making personalized objects, gadgets or irreplaceable parts, the scope for 3-D printing applications is limitless.

UNLEASHING INNOVATIVE POTENTIAL

To reach its full potential as a manufacturing technology, a number of technical barriers still need to be overcome, particularly in relation to the cost of materials, quality of outputs, size limitations and throughput capacity. That said, as noted by the consultancy firm CSC, “3-D printing is providing a platform for collaboration that is accelerating innovation and disruption of the material world, just as the Internet fostered collaboration, innovation and disruption in the digital world.”

Chris Anderson explains, “when a technology becomes desktop, it doesn’t just get cheaper, smaller, better, more ubiquitous, what happens is it gets used in different ways.” It becomes “a vector for ideas which are turned into things,... companies,... movements and that moment is right now.”

The so-called “democratization” of manufacturing that 3-D printing promises has huge potential to unleash the creativity of the masses and foster economic growth.

Traditional manufacturing requires high levels of capital investment and large-volume product runs. By significantly reducing capital outlay, costs and commercial risks, 3-D printing can make it easier for anyone to be part of the manufacturing process and test their ideas.

The full implications of its widespread adoption are as yet unclear, but by making “manufacturing on demand” a realistic possibility, the uptake of 3-D printing could transform the global manufacturing and business landscape. It can reduce the need to carry inventory, and slash warehousing and transport costs, simplify supply chains and significantly reduce the carbon footprint of manufacturing.

IP CHALLENGES

3-D printing raises a number of regulatory challenges including in relation to intellectual property protection.

Just as the digitization of creative content has forced change within the creative industries and fuelled tensions around existing copyright law, similar debates are likely to emerge in relation to 3-D printing. Given the global scale of manufacturing, however, the stakes in this debate may be even greater.

3-D printing is both a manufacturing and a digital technology and as such it makes the unauthorized copying of objects easier. Like other digital files, CAD blueprints are easy to copy and difficult to track. Copying is also made easier by the availability of low-cost 3-D scanners, which enable anyone to scan an off-the-shelf product, create a 3-D blueprint and distribute it online.

As noted in a study by the Big Innovation Centre (www.biginnovationcentre.com) the ability to copy physical products easily and cheaply could reduce incentives for businesses to invest in R&D and design. On the other hand, the continued evolution of the use of the technology will depend on openness and an ability to combine designs. The need to balance these interests – ensuring that incentives and rewards are in place for those who invest in new ideas, without stifling innovation and openness in the use of online designs – will be a key challenge for IP policymakers going forward. Mechanisms that facilitate the licensing and legitimate sharing of design files will play a major role in meeting this challenge.

This brief review of some of the exciting applications for which 3-D printing is being used suggests that the “paradigm shift in manufacturing” that many refer to is well under way. The implications of the continued evolution and uptake of 3-D printing technologies are far-reaching and promise to have a radical impact on the way things are made and business is done. The last 20 years of technological progress have been captivating, but the next may be even more thrilling. ♦

BRIDGING THE IP KNOWLEDGE GAP

in developing countries

By *R. Mark Davis*, President and CEO
and *Emilie van den Berkhof*, Pro Bono
Coordinator, Public Interest Intellectual
Property Advisors (PIIPA)



Photo: Courtesy of PIIPA

PIIPA is working with agricultural producers in developing countries to help them generate higher and more sustainable incomes by using IP to improve the brand value of their products.

What if an inventor, public interest organization, indigenous group, small or medium-sized business, or even a developing country's intellectual property (IP) office needed IP legal counsel but could not afford it or did not have local access to the required knowledge? What would they do? How would they be able to protect their IP assets or access the information they needed? One option is to take advantage of the *pro bono* (free) legal counsel provided by the US-based international nonprofit organization, Public Interest Intellectual Property Advisors (PIIPA).

IP RESOURCES AT THE RIGHT TIME AND IN THE RIGHT PLACE

If people are to enjoy the benefits of the law, including IP law, they need access to an effective system of justice. Only a fraction of the world's population, however, has the knowledge and financial means to take advantage of IP legislation and use it to promote innovation and creativity. Established in 2002, PIIPA's overriding objective is to help bridge this gap. PIIPA primarily

focuses on operating a matchmaking service allowing those seeking IP assistance (seekers) to apply to find individual volunteers or teams of IP specialists (providers) who offer free advice and legal representation on IP matters.

PIIPA uses three criteria to determine which requests for assistance to accept.

First, it determines whether the activity for which PIIPA's assistance is sought is in the public interest and supportive of the interests of developing countries. Second, using a financial, needs-based test, it assesses whether the seeker has the financial means to pay for professional assistance in the absence of PIIPA's *pro bono* assistance. And third, it applies an organizational test to determine eligibility. Certain types of seekers, for example, such as developing country governments and agencies, are automatically eligible for PIIPA's services. Other organizations, such as nonprofit organizations and developing country individuals or businesses, generally have to satisfy at least one of the three eligibility criteria.



PIIPA'S GLOBAL VOLUNTEER WORKFORCE

PIIPA's "IP Corps" consists of 3,500 IP professionals in 50 countries who volunteer their time to meet the IP needs of innovators in developing economies. PIIPA's stable of IP experts now includes many of the world's largest law firms, hundreds of individual attorneys, and representatives from the academic and corporate sectors. This dedicated group of volunteers has provided free IP services, training, symposia and support for over 130 clients in 35 developing countries.

PROMOTING IP FOR DEVELOPMENT

PIIPA is dedicated to supporting the longer-term IP interests of people and organizations in developing economies, through a range of training materials and programs on how IP rights may be applied (or challenged). PIIPA's programs include web-based discussion groups, lectures, forums, panel discussions and conferences. The organization also maintains an online resource center that offers information for professionals, students and assistance seekers. These information resources are free of charge and may be used as long as they are identified as PIIPA materials.

PIIPA offers a unique range of services and operates in a variety of sectors, including: agriculture; biodiversity/genetic resources; traditional knowledge; health care; information technology; and science and technology. At the heart of its mission is the belief that "fair access equals just results!"

In its groundbreaking book entitled *Intellectual Property and Human Development: Current Trends and Future Scenarios* published in 2011, PIIPA examines the social impact of IP laws as they relate to health, food security, education, new technologies, preservation of biocultural heritage, as well as contemporary challenges associated with promoting the arts. It explores how IP frameworks could be better calibrated to meet the socioeconomic needs of countries at different stages of development, with local contexts and culture in mind.

Carlos A. Primo Braga, Director, Economy Policy and Debt at the World Bank, notes that the book "takes up many of the critical issues concerning the future of intellectual property regimes in a globalized economy. By bringing a human development perspective to the analyses of the costs and benefits of IP, this collection underscores not only the importance of a multidisciplinary approach in this area, but also the need to think innovatively about 'communal' forms of innovation. This effort by PIIPA will become an important point of reference for all those interested in analyzing how IP can become an effective tool for human development."

The book can be downloaded free at www.piipa.org.

BOOSTING THE VALUE OF COLOMBIAN AGRICULTURE

In June 2012, PIIPA and the International Center for Tropical Agriculture (CIAT) launched a project funded by the Canadian International Development Agency to generate higher and more sustainable income for agricultural producers, using IP to improve the brand value of their products.

Colombia boasts a rich array of tropical fruits, and leveraging the development potential of its biologically diverse resources is a high national priority. The production and processing of high-value tropical fruits offer an effective means of raising the incomes of small farmers and rural communities.

Since the mid-1990s, a great deal of research has focused on characterizing the genetic diversity of fruit species, such as papaya and various *passiflora* (passion fruit) species, which have significant commercial value and income-generating potential. The knowledge generated from this research is essential for improving the varieties currently produced and for identifying new fruit options that might appeal to consumers in foreign markets. Top agricultural goods currently include coffee, fruits (bananas), fresh flowers, live trees and plants, and sugar.

The project has three components. The first phase involved a countrywide agricultural IP review. This baseline report examined which institution(s) and/or businesses, or growers, generate the greatest quantity of potentially protectable or patentable inventions of high-value agricultural products and the frequency with which these inventions are being patented. The second stage of the project relates to IP capacity building. In January 2013, at CIAT's headquarters in Cali, Colombia, PIIPA, in collaboration with the Colombian IP office (*La Superintendencia de Industria y Comercio*) and the Ministry of Commerce ProExport office, conducted an IP and export training program for agricultural producers from across the country. The final component involves the provision of one-to-one IP counsel for selected small and medium-sized producers to enhance their IP strategies and make recommendations for trademark registrations and patent applications.

This project has highlighted the importance of implementing an IP-focused national agricultural research policy and of securing IP rights within such a policy framework. There is now demand to replicate the training program in other Colombian cities and to conduct similar projects in neighboring countries.

OPERATION NAP

PIIPA has also been working with the African Artists Collaborative (AAC) and the Filmmakers Association of Nigeria USA (FAN-USA) to tackle the pirating of Nollywood films in the US.

An IP strategy was rolled out in 2008 involving:

- a copyright registration campaign;
- use of the Digital Millennium Copyright Act (DMCA) to persuade Internet service providers (ISPs) that streaming a work is in violation of US copyright laws and infringes artists' copyrights;
- cease and desist letters issued to US store fronts; and
- a logo initiative entitled *Copyrighted in the US* with major African film distributors to increase awareness about the protection that copyright provides.

To date, the project has registered over 100 African films and removed infringing materials from over 50 websites. As a result of these efforts the three legitimate distributors who account for 90 percent of all Nollywood-distributed films in the US saw revenues increase by 20 percent.

For centuries, African visual art, music, literature, textiles, clothing, and now films, have been exported to exponentially expanding global markets. African artists have long been at a disadvantage compared to their counterparts in the Americas and Europe. A huge amount of music, film, art and other African works is being pirated openly in Africa, the US and Europe within niche markets which boast that no legal repercussions will arise from their flagrant disregard of copyright law. This is a serious drain on the earning capacity of African artists and producers who travel to the US and elsewhere. It is also the source of a great deal of frustration as these artists often do not have access to legal representation and, as a consequence, are rarely able to gain any compensation or legal redress.

Operation NAP is helping Nollywood filmmakers to secure their IP rights and is creating value for an entire industry. Furthermore, it gave the Nigerian Export-Import Bank (NEXIM) confidence to fund the first-ever A-list Nigerian/US production, *Doctor Bello* released in 2012.

THE ROAD AHEAD

For over a decade, PIIPA has remained committed to serving the IP needs of innovators and public interest organizations in developing countries. We invite all who believe they have an IP need to apply for assistance. We are also working with international partners, such as WIPO, to develop projects that promote IP as a development tool to create economic opportunity. ♦

For more information about PIIPA's services visit www.piipa.org.



Photo: Courtesy of PIIPA

PIIPA is working with Nigerian artists and filmmakers to tackle piracy of Nollywood films in the US.



PIIPA is a US-based international nonprofit organization that works to help bridge the IP knowledge gap in developing countries.



SPAIN'S NEW DESIGN GENERATION

An interview with Juli Capella

By Catherine Jewell,
Communications Division, WIPO

The exhibition, *Bravos: Groundbreaking Spanish Design* organized by the Permanent Mission of Spain to the United Nations Office in Geneva in collaboration with WIPO was held at WIPO's headquarters in Geneva from February 5 to 28, 2013.





Martín Azúa
Stool Flod



Diego Ramos
Silla Wrinkle's Beauty (with Luis Eslava)
Prototype. "Experimentation is an essential
element in the creative process."



Díez+Díez Diseño
Kyoto lamp
"Our work aims to be essential,
sincere and simple."



Nacho Carbonell
Sculptures of Concrete Animals
"I like to think of objects as living things."



Curro Claret
Florero Chapapote – Vase
made from oil spilled
from an oil tanker on
the coast of Galicia.



Patricia Urquiola
"I like to think of design as a way of
finding a balance between objects,
people and their surroundings."

An exhibition showcasing the diversity, depth and dynamism of Spanish design opened at WIPO in February 2013. The exhibition, *Bravos: Groundbreaking Spanish Design*, curated by renowned Spanish architect and designer Juli Capella, features 21 of Spain's new generation of designers. Mr. Capella shares his views about the distinctive quality of Spanish designers and their work.

How did this exhibition come about?

Amid growing overseas interest in Spanish design, I was asked by the Spanish government to put together material showcasing Spain's latest generation of designers and their work. The result was an exhibition that features some of Spain's most talented and successful designers, and an accompanying book, *Bravos*, highlighting the richness and diversity of Spanish design. As we are in the 21st century, I selected 21 of the country's most innovative and exciting designers. I wanted to show different styles from different parts of Spain, so each one has a different style or displays a different "ism" – minimalism, neo-baroque, neo-arts and crafts, humoristic and so on.

I believe in Spanish creativity. Each country has its strengths – Switzerland is known for its watches and its chocolate, Spain for sand and sangria... but also for its creativity. We have a rich artistic heritage that includes painters such as Miró, Picasso and Dali. But through the exhibition, and my book, we want to draw attention to other areas of creativity, specifically the depth and diversity of Spanish design, and to remind the world that Spain is home to a wealth of creative design talent.

What is distinctive about Spanish design?

I think Spanish design offers a fresh and vibrant alternative to the products coming out of other design-rich countries, such as Germany or Japan. This has to do with the way industrial design has evolved in Spain. Most Spanish designers, for example, don't use high-tech equipment. Industrialization came late to Spain; indeed, some areas of the country remain untouched by the industrial revolution. Unlike Germany and Japan, Spain has never been an industrial powerhouse, but we are very good at designing furniture, lamps and urban spaces, as well as social architecture and interior design.

Other characteristics of Spanish design include its ingenuity, its humor and its use of irony. Unlike their German or French counterparts who tend to be more restrained, Spanish designers have no fear of color and delight in producing bright, warm and "happy" objects.

Many designers are rooted in tradition. Patricia Urquiola's work, for example, is inspired by her grandmother's embroidery. Spanish designers love taking something from the past and re-engineering it for contemporary use, and even adding

Simplifying design registration

WIPO's Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications (SCT) is currently focusing on ways to simplify industrial design registration procedures. Designers seeking to register and protect their designs are required to meet certain formal requirements and follow certain procedures. These are often complex and vary from one jurisdiction to another.

The proposed draft Design Law Treaty (DLT) seeks to establish a legal framework for the simplification and harmonization of industrial design formalities and procedures, making it easier for designers to protect and leverage the value of their creative output. "Discussions are well advanced at this stage and we hope will mature over the course of the next 12 months," noted WIPO Director General Francis Gurry at the opening of the *Bravos* exhibition. The WIPO General Assembly will take a decision on convening a diplomatic conference for the adoption of a design law treaty later this year.

Similar "business simplification" treaties – the Patent Law Treaty adopted in 2000 and the Singapore Treaty on the Law of Trademarks adopted in 2006 – have simplified procedures associated with applying for patents and registering trademarks, respectively. It is anticipated that a design law treaty will have a similar impact, making it easier for designers to protect and harness the value of their work.

a touch of humor. Today's young Spanish designers, like designers across the globe, are also very environmentally aware.

Today, the opportunities for sharing ideas and information are unprecedented. Many of the country's top designers have studied abroad and have friends from many cultural backgrounds. Today's designers are also part of the Internet generation and have no difficulty keeping up to date with everything going on in the world of design. International frontiers have broken down, and it is easy to produce what you want where you want. Today, design is defined much more by its style than by the country from which the designer hails.

How would you characterize the evolution of design in Spain?

Spain has a strong artistic and craft tradition, but industrial design developed slowly in the country for a number of reasons. We had no real industrial revolution to speak of; the dictatorship from 1939 to 1976 was a period of isolation, and a blinkered view of the commercial value of design within Spain's business community hampered the development of the discipline in Spain.

In the 1990s, however, with a series of high-profile events, including the Olympic Games in Barcelona and Seville Expo '92, Spanish design took off. These were the boom years and played a key role in enabling Spain's design scene to flourish and mature. Although not quite yet among the *avant-garde*, Spanish designers are increasingly acquiring international acclaim. Patricia Urquiola, for example, is considered one of the best designers in the world.

Although Spain has a lot of creative output, it doesn't necessarily offer designers what they need to develop their work. Many of them live abroad and work with producers outside the country. Many Spanish companies perceive design as an expense rather than an investment. It will be very difficult to change this perception, especially in the current economic crisis in which investing in design is not a top business priority, but that is the only solution for companies to remain competitive. Design is key to adding value to a product. Europe has become too expensive for manufacturing goods, but it is well placed to design and create high-value, quality goods.

Why is design important?

From an economic perspective, design is a source of value. However, I have a humanistic approach to design and am convinced that it can contribute to a better world. Through design, we can improve the living standards of poor communities around the globe by, for example, designing clean water systems for communities in Africa. We can save lives by designing good highway signage systems that help reduce the

number of road accidents. We can design recycling systems that cut waste and reduce pollution. Design is not just about producing an object; it is also about analyzing and solving problems. The most important aspect of design is its ability to improve our lives and the way in which we organize the material world.

Why is it important for designers to be able to protect their designs?

Without protection there is no incentive for creativity, and with no creativity we will go back to the cave.

It takes much less effort to copy a design than to create one, so if you don't protect your design, it's too easy for others simply to copy it. The protection conferred by design rights gives designers an incentive to create and to innovate. This is a good thing for society, because it gives consumers more choice and access to better products and often at better prices.

What needs to be done to promote greater respect for the rights of designers?

It is notoriously difficult to clamp down on unauthorized copying of designs. I think the only constructive way forward is to actively and positively demonstrate the economic and social benefits of encouraging innovation and creativity. We need to lead by example. It sounds utopian, but I think it is the only way. We should not just focus on prosecution; that is a negative message. Governments need to think out of the box and foster a groundswell of support for design and innovation. Negative messaging doesn't work; we need to demonstrate a positive alternative to mindless copying and highlight the benefits of innovation.

What challenges are designers facing today?

Sustainability is the number one challenge for designers. Design is the key to achieving sustainability. Although often associated with luxury goods, design plays a central role in molding our everyday material world. Every chair is designed – from the most expensive to the cheapest, someone, somewhere, designed it. I don't accept that design is for the rich and glamorous. Design is for everyone and can help pave the way to a better life. Of course, sophisticated design that is more akin to art exists, and we can all appreciate that, but it is important that design enters people's daily lives. Better design does not necessarily mean expensive objects. It can also mean cheaper and more eco-friendly products. ♦



Renowned Spanish architect and designer Juli Capella is also the author of the book *Bravos*, which explores the views and diverse approaches of the 21 designers featured in the exhibition.

PROTECTING BROADCASTERS in the digital era

Radio and TV broadcasters are critically important in developing and sustaining an informed and engaged society. The EBU and other broadcasters around the world are convinced of the urgent need to update the rights available to them.

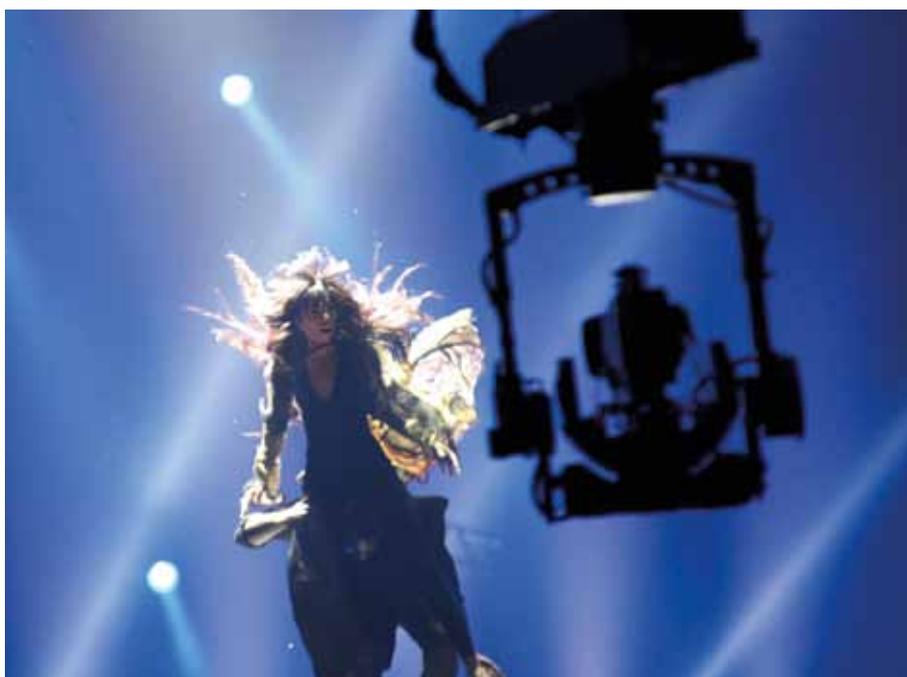


Photo: EBU

Since the 1960s, the development of transmission technology and receiving equipment has caused broadcasting to evolve considerably. New ways of distributing services have been created as well as new types of programs and services. Significant increases in channel capacity have enabled broadcasters to offer the public a larger choice of scheduled programs. The development of cable networks and broadcasting satellites has opened up a greater number of signal transport options, and satellite technology has increased the global dimension of broadcasting. The massive ongoing conversion to digital transmission of programs and content is creating countless opportunities for efficient and cost-effective delivery of high-quality content and for interoperability with other electronic media. In the digital environment, however, broadcasters are facing a severe problem of signal piracy. In view of these and other challenges arising from the evolution of broadcasting, WIPO's member states are working to develop an updated international legal framework that addresses present-day operating realities. The following interview with **Ingrid Deltente, Director-General of the European Broadcasting Union (EBU)** offers a broadcaster's perspective on the issue.

Can you explain why the rights of broadcasters need to be updated?

The current international legal framework has not been updated since 1961, and is not proving effective in tackling the rampant piracy of broadcast signals that has become a global “mass market phenomenon.” In August 2012, a *New York Times* article entitled “Internet Pirates Will Always Win”, noted that, according to weblog Torrent Freak, the top pirated TV shows are downloaded several million times a week. Losses from broadcast piracy are substantial. In Canada, for example, loss of revenue to the television industry from satellite theft alone was estimated in 2000 at over US\$500 million. In the Asia-Pacific region, Pay-TV piracy grew from an estimated US\$952 million in 2004 to some US\$1.06 billion in 2005, reflecting a continuing trend.

Signal piracy is not just a problem for broadcasters. By undermining the investments made by broadcasters, inadequate protection eventually undermines the public interest, making it increasingly difficult for broadcasters to meet rising consumer demand for time and place-convenient access to broadcast signals, such as through hybrid TVs, tablets, smartphones and the like. The WIPO-administered Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations protects against unauthorized re-broadcasting, but only if this is done via “wireless” means and at the same time as the initial broadcast. It is, therefore, not a sufficient means to combat piracy of broadcasts on the Internet or any other digital platform.

Protection of rights, however, is only one side of the coin. Like many other right holders, broadcasters want to make as much content available as possible via legal offers, through linear and non-linear means (i.e., broadcasting (over any platform) and on-demand services), to accommodate time- and place-convenient access by consumers via any platform and on any type of receiving device. As content users, EBU broadcasters also make every effort to propose solutions that simplify the “clearance” of rights so that our programs can be lawfully transmitted and viewed using the growing range of available consumer devices. However, the bottom line is that as long as the protection of broadcast signals remains inadequate, the ability of broadcasters to deliver diversified programming is endangered.

What would be the consequences of business as usual?

For broadcasters, piracy means the loss of compensation from entities that retransmit their signals, such as cable or IPTV operators. It also means loss of revenue from advertising (in particular where it has been stripped from the program), and possible reduced technical quality. Broadcasters pay billions of euros to produce, or acquire and distribute content of the highest technical quality, and have paid tens of billions more

to convert analog transmission systems to digital systems. Without appropriate protection of the broadcasting signal, the returns on this significant investment are under threat.

There are other far-reaching, significant consequences, for example, in broadcasting sports events. Broadcasters pay hundreds of millions of euros for exclusive rights to broadcast these events. When such broadcasts are transmitted without authorization, over the Internet for example, the pirate is unfairly appropriating part of the value of the program and diminishing the value of the broadcaster’s rights, its advertising revenue, its sublicensing income and reputation. These are serious consequences for broadcasters and for the general public, insofar as it puts the funding of sports events, including top-tier global events, at risk.

It is widely recognized that radio and TV broadcasters are critically important in developing and sustaining an informed and engaged society. They play a crucial role in fulfilling development objectives, such as ensuring the public’s right to receive a diversity of independent information. They also foster democratic and other fundamental social values, such as basic freedom of expression, by providing platforms for citizens to publicly air their concerns, and offering quality educational programming. Public service broadcasters, in particular, serve the needs of minority and other interest groups, including those with low levels of literacy and those living in remote locations. Broadcast piracy undermines investment in these programs. As such, it not only affects creators who contribute to the production of the programs but also weakens the regulatory policy that underpins them.

While many countries support updating the international framework governing the rights of broadcasters, a few voices still oppose a new treaty. How do you respond to this view?

The EBU and other broadcasters around the world are convinced of the urgent need to update the rights available to broadcasters – first and foremost because of the rising levels of piracy facing the industry. A recent study by international consultants, Detica, jointly commissioned by Google/PRS, concluded that “live television today is the fastest-growing segment of copyright infringement.”

Second, those who oppose updating the rights of broadcasters would not appear to grasp why broadcasters need protection in the first place nor the nature of the protection that currently exists. Broadcasters are responsible for planning, producing or acquiring, scheduling and transmitting their daily output of programs. Enabling the general public to enjoy radio and television programs (via a program-carrying signal) requires major technical, organizational and financial investment by broadcasters.

Third, broadcasting makes a major contribution to the economy. A WIPO study produced in 2012 on the economic contribution of the copyright industries found that broadcasting is the third largest of the core copyright sectors, after press/literature and software. The broadcasting sector's contribution to the economy is more than twice that of the music sector and more than three times that of the film industry.

In order to be able to protect and build on their sizeable investment, broadcasters must have the proper means to authorize or prohibit use of signals, both in upstream and downstream markets. This means that the broadcast signal must be protected from the moment it is created (as a pre-broadcast signal) through to its primary use to broadcast, or retransmit, programs and against any unlawful secondary exploitation. The Rome Convention, concluded in 1961, recognizes this need. To date, over 90 countries have acceded to or ratified it. However, while the rights of performers and producers of phonograms have been internationally updated to address the new operating realities of the digital era, a similar exercise for broadcasters is yet to be concluded.

How do you respond to claims that new rights for broadcasters would impede freedom of expression, stifle innovation in consumer devices or create additional problems for Internet Service Providers (ISPs) or Creative Commons (CC) licencees?

These concerns are not founded. In Europe, for many years now, broadcasters have enjoyed a fairly high level of protection, and these types of issues have never been raised and have never presented any serious problems. With respect to ISP liability, when an ISP is notified of an infringing work, the process of take-down is the same whether the infringement involves an MP3, video or text file. The same process would apply for infringing broadcasts. If ISPs are exempted from liability in relation to the acts of their users, this exemption would remain in place under new arrangements on broadcasting rights. The responsibility of an ISP regarding the unauthorized use of a broadcast would remain the same as it currently does for content. The same is true for CC licenses. These will not be affected by a new legal framework. Any CC licence that includes a broadcast under today's legal rules would continue to be possible under new arrangements.

Similarly, broadcasters do not believe that the legitimate private use or development of time-shifting devices such as digital video recorders would be harmed, because

(a) the proposed Treaty does not require any broadcaster to protect its broadcasts with technical protection measures; and

(b) the rights granted to broadcasters would not include the control of private home use to the extent it is covered by limitations or exceptions contained in all copyright-related international treaties administered by WIPO.

Any country in which the national copyright law provides for a private use exception with respect to copyright-protected material is (and should be) entitled to apply exactly the same exception to broadcasts. If the exceptions that apply to broadcasts were to be different from those that apply to content, then the former would ultimately be ineffective because protection of content is normally broader and longer than for broadcasts. For these reasons, and insofar as the core activity of broadcasters is to provide reliable, high-quality information and as broadcasters play a unique role in giving voice to citizens' concerns, the suggestion that better protection for broadcasters could impede freedom of expression is untenable.

Would a new treaty on broadcasting affect other right holders, such as producers or performers?

A new treaty would not impinge on the rights of authors, performers or producers. On the contrary, all those with rights in the content of broadcasts would automatically benefit from strengthening the rights of broadcasters. If a broadcaster can more easily obtain an injunction against unauthorized use of its broadcast signal, this also puts an end to the unauthorized use of the program content. Those with rights in the content of a program will naturally continue to be able to exercise their own respective rights against pirates, as these remain fully independent from those of broadcasters. In cases where broadcasters wish to grant a license to a third party, they can only grant rights that they themselves hold. Use of the program-carrying signal will not be possible, therefore, if those with rights in the content do not wish to license the material contained in a particular program. At the same time, film producers remain entirely free to license their own rights to any third party, even on the broadcasters' own territory, as long as such a licensed use does not conflict with the rights granted by that producer to the broadcaster(s) concerned. However, this is a contractual matter, independent of any proposed new arrangements.

In 2007 many international non-governmental organizations (NGOs) representing authors, music publishers, performers, phonogram and film producers issued a "Joint Position of Right Holders". In this statement, a wide range of right holders express support for a treaty that would give broadcasters effective tools to address the core issues in today's technological and business environment. Broadcasters and other right holders are in the same boat on this issue.

From the perspective of broadcasters, an updated international framework for broadcasting organizations is crucial if they are to continue to meet the growing consumer demand for time- and place-convenient access to high-quality broadcast material. ♦

BROADCASTING RIGHTS AND SPORT

Adding Value

By *Rafael Ferraz Vazquez*,
Intellectual Property Lawyer



Photo: istockphoto @ Laura Young

The sale of broadcasting and media rights is a key income stream in the business of sport.

Without broadcast technology, many sports fans around the world would not be able to share in the excitement of major sporting events. Broadcasting technologies have transformed the spectator experience, making the many thrilling performances featured in top-tier sporting events available on multiple platforms and in multiple formats.

The Olympic Games were first televised in Berlin in 1936 and broadcast to an estimated 162,000 people using just three cameras, only one of which was capable of live transmission. Zeppelins were used to ferry news reels around Europe. Just over 75 years later, thanks to major advances in broadcast technology, an estimated 4.8 billion viewers were able to tune into seamless coverage of the 2012 London Olympic Games in high definition and 3-D formats, along with a dazzling array of angles, effects and tools to view and review every detail of the event.

The sale of broadcasting and media rights has become a key income stream in the business of sport. The sector has benefitted in multiple ways from the huge injection of financial resources derived from the sale of these rights. It has created opportunities to nurture the potential of talented athletes and to boost the long-term financial viability and performance of teams that are then better placed to attract the best athletes. Such is the importance of broadcast revenue that some sports have sought to attract broadcasters and viewers by adapting their rules. For example, volleyball has adopted a new scoring system that makes it easier to predict the duration of matches. Similarly, the tie break was introduced in tennis matches, along with yellow tennis balls to make it easier for viewers to follow matches on television.

MEDIA REVENUE OVERTAKES TICKET SALES

Broadcasting and media rights sales income already surpasses ticket sales as a primary source of revenue in most sports. Many clubs, including, for example, Spain's premier soccer team, Real Madrid C.F., have experienced a shift away from ticket sales toward sponsorship and television rights as principal revenue sources. In the 2011/2012 season, the club received over 512 million euros (some US\$664 million) in revenue from the sale of broadcasting rights.



The critical importance of broadcasting rights as a means of funding major sporting events is most evident with respect to top-tier global sports events. The sale of broadcasting rights for the Brazil 2014 FIFA World Cup has already generated some US\$537 million. From 2009 to 2012, Olympic broadcasting revenue amounted to US\$3.914 billion.

Broadcasting rights also help boost other revenue streams, such as in stadia advertising, corporate sponsorship deals and naming rights, all of which acquire added value because of the visibility that broadcasting affords.

NEGOTIATING RIGHTS

From the viewpoint of broadcasters, as the most expensive type of broadcast content, sport is a highly prized TV product.

Broadcasting rights may be negotiated as a single bundle for one territory or may be split according to the type of rights and media involved, for example, for television, or mobile or Internet broadcasts. Even when a single package is negotiated, sublicensing can result in the fragmentation of rights. Rights may be divided as follows:

- live broadcasting – the most important and valuable right. This attracts the highest TV audiences, but interest falls abruptly once the event concludes;
- Webcasting – live streaming on the Internet is gaining audiences. Many events – including the Olympic Games, Formula 1 and tennis events – are webcast live and in high definition in many territories;
- delayed broadcasts/streaming – this format still attracts large audiences;
- packaging of highlights – commonly used for informational purposes, this has become a popular source of online content. Online users can view their preferred highlights on demand.

RULES OF THE GAME

The intellectual property (IP) laws governing broadcasting vary significantly from country to country. This can make it difficult for those organizing and selling broadcasting sports rights, insofar as their room for maneuver in negotiating deals may be affected by the degree of exclusivity enjoyed by local broadcasters.

The Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations of 1961 establishes minimum standards of international protection for broadcasting organizations. Under the Convention, broadcasting organizations have the right to authorize or prohibit certain acts, namely, (a) the re-broadcasting of their broadcasts; (b) the fixation of their broadcasts; (c) the reproduction of fixations of their broadcasts; and (d) the communication to the public of television broadcasts if such communication is made in places accessible to the public against payment of an entrance fee.

Although the Rome Convention provides a basic level of protection, it is silent on a number of issues, such as cable broadcasting, that have become relevant in today's digital

environment. Recognition of the need to modernize the IP protection available to broadcasters prompted a review of existing international standards by WIPO member states as far back as the mid-1990s. This issue remains under negotiation in WIPO's Standing Committee on Copyright and Related Rights (SCCR).

ILLEGAL RETRANSMISSIONS EXPAND

Although the rights of broadcasters are provided for within national laws, the illegal retransmission and streaming of sports events continues to expand, especially in the on-line environment.

Digital piracy is the direct result of the combination of two factors, namely, the popular appeal of sport and the widespread availability of low-cost technologies that make it possible for infringers to illegally retransmit broadcasts with relative ease and little investment.

Digital piracy can occur through two main channels of retransmission. First, peer-to-peer networks, where Internet users stream the retransmission carried by peer-to-peer (P2P) networks. The quality of such transmission is directly proportionate to the number of online users: the greater the number of users the larger the number of packets exchanged and the better the quality of the streaming. Second, unicast streaming, where the content is stored on a server and transmitted to each user individually. The quality depends entirely on the technical processing capacity of the server and Internet speed.

Digital piracy poses a serious threat to the economic value of broadcasting rights. In sports coverage, this value is ephemeral. Viewer interest in a contest peaks just before the final result is known. Thereafter, the genie is out of the bottle, and interest falls dramatically. This characteristic of sports content adds urgency to the need to crack down on digital piracy, to ensure that a modern legal framework for right owners is in place and that outdated legislation does not prejudice the interests of broadcasters and sponsors and, ultimately, the financial well-being of sports organizations.

Right owners are concerned about the scale and impact of digital piracy. During the 2010 FIFA World Cup, over 18,000 illegal broadcasts were identified by FIFA during its tournaments. According to Sven Schaeffner, head of the FIFA TV World Cup Office in Brazil, in addition to investing "considerable resources in delivering high-end products to its clients, "FIFA also makes great efforts to protect its rights and the rights of its media rights licensees by putting in place a wide range of monitoring systems, including, without limitation, satellite monitoring, broadcast and Internet monitoring, as well as other measures to safeguard broadcast and other IP rights." ♦



Olympic Games Broadcast Revenue (US\$)

Rome 1960:	1.2 million
Tokyo 1964:	1.6 million
Mexico City 1968:	9.8 million
Munich 1972:	17.8 million
Montreal 1976:	34.9 million
Moscow 1980:	88 million
Los Angeles 1984:	286.9 million
Seoul 1988:	402.6 million
Barcelona 1992:	636.1 million
Atlanta 1996:	898.3 million
Sydney 2000:	1,331.6 million
Athens 2004:	1,494 million
Beijing 2008:	1,739 million

Source: International Olympic Committee (IOC)

Digital Piracy during the 2010 FIFA World Cup

18,227	cases of digital piracy
16,426	live user-generated content (UGC) streams (90% of all infringements)
12,638	of the live UGC streams removed in real time

Brazil limbers up for sports bonanza

As the thrills and spills of the London 2012 Olympic Games fade, the focus now is on Brazil. The country is preparing to take center stage in the sporting universe in the run up to the 2016 Olympic Games in Rio de Janeiro – a first in South American sporting history. Over the next two years it will also host the FIFA Confederation Cup in June 2013 and the FIFA World Cup in 2014.

Brazil is currently the world's tenth largest audiovisual market. Sport has traditionally been an important source of broadcast content in the country and currently accounts for some 27 percent of total weekend air time. As host to major sporting events in the coming months and years, Brazil has taken steps to optimize the economic value of these high-profile events by safeguarding the interests of broadcasters and sponsors.

In 2009, the Brazilian parliament enacted the Brazilian Olympic Act (Law 12,035/2009) and the so-called World Cup Law (Law 12,663/2012) in 2012. These laws, similar to those adopted by other host nations in the past, are designed to combat ambush marketing, regulate advertising in and around official sporting venues and clamp down on digital piracy.

The Brazilian World Cup Law goes much further in protecting the interests of right owners than Brazil's pre-existing legislation in this area, the so-called Pele Law (Law 9,615/98). For example, the World Cup Law prohibits anyone but the official broadcaster from capturing and broadcasting images of events. However, it does permit use for non-commercial purposes, although this is limited to up to 3 percent of a match, or 30 seconds of a ceremony. It also requires that FIFA or its local broadcaster provide a compilation of highlights up to two hours after each match. Other provisions grant protection of trademarks associated with the event, prohibit unauthorized association with the event's marks and establish expedited infringement proceedings during the event.

In contrast, the Pele Law establishes, as an information right, both access to venues and the capturing of images for journalistic purposes. In response to a dispute between media organizations and event organizers on this issue, with respect to the 2007 Pan American Games, the Brazilian courts held that the Pele Law allowed media organizations to capture and use images for journalistic purposes. It is, however, unlikely that such an understanding will be forthcoming in relation to the World Cup Law which, notwithstanding the Pele Law, governs access to and use of images specifically in relation to the FIFA World Cup 2014. Although the Brazilian Olympic Act regulates the IP relating to the 2016 Olympic Games in Rio, it remains silent on broadcasting rights.

Whatever the benefits that accrue to Brazil as host to major sporting events in the coming years, it seems clear that IP rights in general, and broadcasting rights in particular, will continue to play a key role in generating the levels of investment necessary to fund these spectacular events. If past experience is anything to go by, Rio 2016 not only promises a raft of new sporting achievements, but also the breaking of new records in terms of revenue generated from the sale of broadcasting and other media rights.

WHERE IS AFRICA ON THE INTERNET?

By *Adama Sanneh*, Director,
Lettera27 Foundation

In 2003, Kenyan journalist and novelist Binyavanga Wainaina wrote a satirical essay entitled “How to write about Africa”, advising journalists how they should write about Africa if they want to be published and read. He wrote:

“Never have a picture of a well-adjusted African on the cover of your book, or in it, unless that African has won the Nobel Prize. An AK-47, prominent ribs, naked breasts: use these. If you must include an African, make sure you get one in Masai or Zulu or Dogon dress.”

“In your text, treat Africa as if it were one country. [...] Don’t get bogged down with precise descriptions. Africa is big: 54 countries, 900 million people who are too busy starving and dying and warring and emigrating to read your book. The continent is full of deserts, jungles, highlands, savannahs and many other things, but your reader doesn’t care about all that, so keep your descriptions romantic and evocative and unparticular.”

Binyavanga was drawing attention to the widespread misrepresentation of the African continent by mainstream media, which fail to capture the diversity, complexity and rich heritage of Africa and its recent achievements.

The consequences of stereotyping a whole continent are multiple. In addition to perpetuating often false perceptions about famine and poverty, it undermines commercial interest in the region and reduces opportunities for engagement and collaboration. It can also have a far-reaching and negative impact on the socioeconomic development prospects of many of its countries.

Access to a rich source of contextual information is key to changing the way the continent is viewed from outside, as well as changing the way Africans interact with each other and the rest of the world.

Expanding use of the Internet, mobile phones and social networks, however, is making it possible for anyone with a connection to tell their own story. Every day the continent is becoming increasingly connected.

Over the past decade, the number of Internet users in Africa increased 9 times faster than in Europe and 20 times faster than in North America. Today, over 110 million people living in Africa regularly use the Internet, with an anticipated 10 million new users online every year.

Thanks to these powerful communications technologies, the “idea” of Africa is being changed from the bottom up, albeit slowly. In terms of information, Africa remains the least visible continent on the Internet. Wide-ranging and up-to-date information on



There are more Wikipedia articles written about Antarctica than all but one of the 54 countries in Africa. The Share Your Knowledge program seeks to redress this balance by supporting cultural institutions in the use of existing content and the creation of new Africa-relevant content on Wikipedia.

Photos: Courtesy of Lettera27 Foundation

WikiAfrica's achievements since 2010

30,000 Wikipedia contributions about Africa;

Expansion and improvement of existing Africa-related content by promoting the participation of experts;

A catalyst for the online community in Africa and beyond to actively participate in generating new Africa-relevant content;

Creative Commons licenses adopted by over 70 cultural institutions, with many of them sharing content online.

Africa is conspicuous by its absence. This is the case whether you are searching for events, people and places of global historic importance, literature, science, art, accomplishments, thoughts or news. For the two billion people who now use the Internet as their primary source of information, there is little opportunity to improve their understanding of African history, current affairs or the continent's future prospects.

Since its launch in 2001, Wikipedia has emerged as the single most important and popular online source of freely accessible information. It has become the most effective secondary reference source, the most edited and discussed online encyclopedia and among the first entries to appear on search engines. As such, Wikipedia provides one of the most promising ways to help address the critical imbalance in the availability of factual information about Africa past and present.

In spite of its proven capacity to generate information, the fact is that, compared to other countries, those in Africa have the fewest Wikipedia contributors per capita. As reported by Mark Graham in his article "Wikipedia's known unknowns," published in *The Guardian* on December 2, 2009, practically the entire continent of Africa is poorly represented on Wikipedia. There are more Wikipedia articles written about Antarctica than all but one of the 54 countries in Africa. In fact, there are more articles about the fictional places of Middle Earth and Discworld than many African countries.

Recognizing Wikipedia's great potential to rectify this situation, in 2010, the Lettera27 Foundation, together with the Africa Centre, launched the WikiAfrica project. In 2011, the Africa Centre based in Cape Town, South Africa, became a WikiAfrica partner.

WHAT IS WIKIAFRICA?

WikiAfrica's principal aim is to give Africa greater visibility on Wikipedia by expanding the range and amount of Africa-relevant information on the site. Since its launch, it has generated over 30,000 contributions, including texts, quotes and images, as well as audio and video files.

For the past two years, the focus has been on working with cultural organizations, museums and archives (as well as bloggers and journalists), encouraging them to contribute knowledge and content to Wikipedia. In the process, the project has identified and made accessible a wealth of archival material.

The project's objectives are to create partnerships with organizations holding Africa-related archival information; to expand access to content while respecting copyright; and to encourage more people to contribute Africa-specific content to Wikipedia.



A USER-FRIENDLY LICENSING SOLUTION

The project team quickly recognized that if it was to succeed in “migrating” African content from the websites and archives of cultural organizations to Wikipedia, it needed a simple, user-friendly solution that would enable contributors to copy, paste, edit and post material onto Wikipedia without abusing the rights of the content owners. Creative Commons licenses provided such a tool.

As Lawrence Lessig explains, the Creative Commons system “affirms a belief in copyright, because it is in essence a copyright license, but it also affirms the values that underpin those creative environments in which the rules of exchange are not defined by commerce but depend on the ability to share and build on the work of others freely.” (See wipo.int/wipo_magazine/en/2011/01/article_0002.html). As opposed to the traditional “all rights reserved” model of copyright, Creative Commons licenses, Mr. Lessig explains, are effectively “a some rights reserved model, whereby certain rights are reserved by the copyright owner and others are released to the public.”

For the WikiAfrica team, Creative Commons licenses offers a flexible, low-cost solution that facilitates the flow of Africa-related content (and management of its associated rights) to Wikipedia.

With a view to promoting the Creative Commons licensing model, and to encouraging the uploading of free content onto Wikipedia, the Lettera27 Foundation launched its Share Your Knowledge program. Share Your Knowledge is a pilot training program supported by tutors and lawyers specializing in intellectual property, offering guidelines on best practices and case study materials. The program is designed to help cultural institutions better organize and leverage the use of their content and foster the creation of new Africa-relevant content on Wikipedia. Under the program, cultural institutions can boost their visibility by making their content available under a Creative Commons license via Wikipedia.

Under the terms of the license, anyone can use uploaded material freely and free of charge, provided the original author of the content is credited. Moreover, any new content, such as artwork, videos, etc., deriving from the original material must be distributed under the same licensing terms. “It’s like starting a Creative Commons infection,” notes the program’s promotional video (see: www.youtube.com/watch?v=ZpYmtRmPdUc).

INCREASED ONLINE VISIBILITY

By encouraging institutions to place their content on the world’s most recognized and easily accessible reference source, the program promotes the active engagement of experts and enthusiasts. Under the program each cultural organization owns, creates or commissions a variety of content – news, publications, research, databases, music, artworks, essays, documents, videos and photographs. In this way it boosts

About the Africa Centre

Established in 2005, the Africa Centre (www.africacentre.net) is an international arts and culture centre and social innovator based in Cape Town, South Africa. The Centre’s activities are driven by a determination to actively participate in developing and enriching Pan-African cultural and social exchange.

About the Lettera27 Foundation

Lettera27, established in July 2006, is a non-profit foundation with a mission to support the right to literacy and education, and to promote access to knowledge across the world and especially in developing countries.
www.lettera27.org

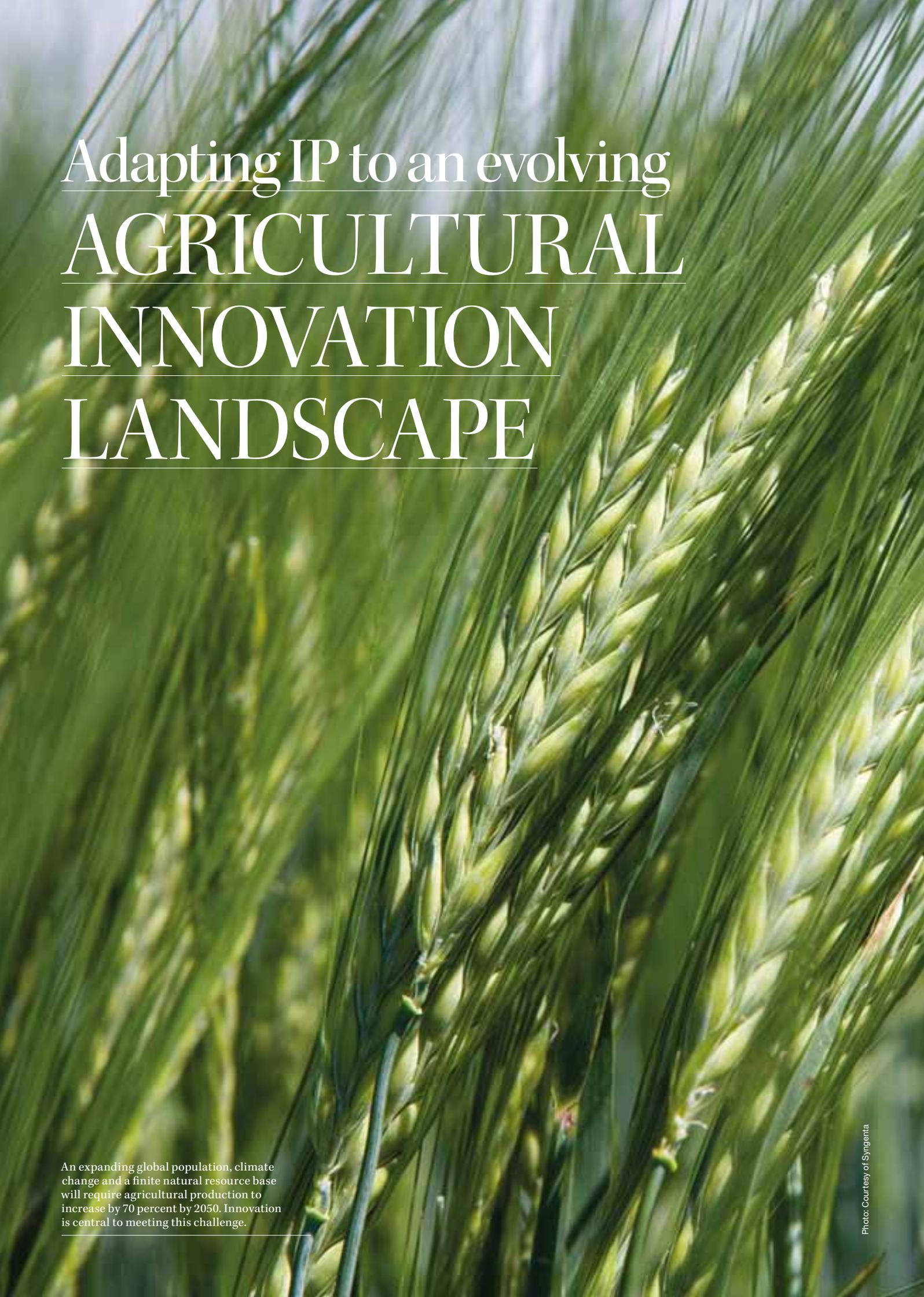
both the quantity and quality of Africa-specific information on Wikipedia. Participating organizations have seen a dramatic increase in their online visibility and impact.

Although the drive to expand Wikipedia to change perceptions about the continent will take time, energy and commitment, the broad availability of powerful communications technologies and online collaborative platforms promises to accelerate the process.

PROGRESS IN MOBILIZING AFRICA-RELATED CONTENT

Within just two years, the WikiAfrica project has made significant progress in terms of mobilizing royalty-free cultural content and propagating new sources of Africa-related content. It remains committed to exploring new ways to leverage the power of the Internet and other modern communications technologies to boost knowledge production and dissemination, while ensuring incentives and rewards remain in place for creators to continue to enrich our lives and promote intercultural understanding through their work.

Einstein once said, “No problem can be solved from the same level of consciousness that created it.” If we continue doing what we have always done in the same way, nothing will change. It is only by adopting new, more creative approaches that we can hope to overcome present-day challenges and create new pathways for development. The WikiAfrica initiative is one small but important step in changing perceptions about Africa and generating new opportunities for the continent. ♦



Adapting IP to an evolving AGRICULTURAL INNOVATION LANDSCAPE

An expanding global population, climate change and a finite natural resource base will require agricultural production to increase by 70 percent by 2050. Innovation is central to meeting this challenge.

*By Dr. Michael A. Kock,
Head of Intellectual Property, and
Christine Gould, Global Public Policy
Manager, Syngenta International AG*

More than ever, innovation is needed to meet the challenges of a rapidly-growing world population which is poised to increase from 7 billion today to almost 9 billion by 2050. Higher calorie demand and an increased use of crops for biofuels will require agricultural production to increase by 70 percent by 2050 (see *OECD-FAO Agricultural Outlook 2010-2019* – <http://tinyurl.com/2clvf56>). Climate change and decreasing availability of water and farmland will add further complexity to the situation. We need to meet this challenge by producing more with less – less land, and fewer inputs, including less fertilizer. This will only be possible if we maximize agricultural innovation in areas such as seeds, biotechnology, crop protection, resource-saving agricultural practices, storage and transportation. Similarly – and even more importantly given the complexity of this endeavor – we need to develop solutions that make it possible to integrate the variety of innovative elements that are often owned by different parties into fully integrated solutions. While most agree with the need for innovation, there is a fierce debate about the role of intellectual property (IP) in this context.

IP RIGHTS FOR PLANT-RELATED INNOVATIONS

It is clear that IP as such does not feed the world. However, it does provide the invisible infrastructure that enables innovation and progress in plant breeding.

Only a few decades ago, plant breeding was an empirical science based on trial and error. Today's plant innovations are developed using sophisticated science and technology, including cell biology, genome and proteome research, gene mapping, marker-assisted breeding and hybridization. Developing new crop varieties is a lengthy and costly process, with plant science companies investing approximately 15 percent of their annual turnover in seed-related research and development activities. The development of beneficial traits is expensive, time consuming and risky: even for non-genetically modified traits it can take 8-10 years and many millions of euros to bring them to market. Since the resulting seed products can be easily reproduced by farmers and "copied" by competitors, some form of enforceable commercial protection is required – otherwise there would be no incentive to make such investments.

The need to protect the IP rights of plant breeders was recognized by legislators as early as the 19th century. Until 25 years ago, plant-related innovations were almost exclusively protected by plant variety protection (PVP). The PVP right protects the specific variety as characterized by its essential, often phenotypical, characteristics. Only varieties with properties resembling all of those characteristics are protected. PVP can be seen as a type of "copyright" for plant varieties in that it prevents the unauthorized copying (propagation) of a protected variety for commercial purposes.

PVP laws contain a statutory breeders' exemption that allows for the use of a protected variety for breeding other varieties, and also enables competitors to "extract" and use individual characteristics or genes. While PVP protection is necessary and well adapted to protect certain achievements in plant breeding, it is neither suitable, nor intended, to protect specific genes or traits or improved methods of breeding.

For new traits derived from highly technical processes such as genetic modification or complex marker-assisted breeding, the patent system is an essential protection tool. It has higher requirements for protection, such as novelty and inventiveness. An important benefit of the patent system is the disclosure requirement, which enables other breeders to work with, and further improve upon, prior inventions.

Together, PVP and patents form a synergistic and complementary IP system. Each protects different facets of plant innovation: PVP protects a new plant as a whole but cannot protect a single part, such as a specific gene, and patents protect the part, but (in general) not the whole.



Photos: Courtesy of Syngenta

Today's plant innovations are developed using sophisticated science and technology. Developing new crop varieties can take 8 to 10 years and costs millions of euros.

National laws governing the patentability of plants vary significantly among countries (see <http://tinyurl.com/d5knqoo>). The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) administered by the World Trade Organization (WTO) requires countries to provide protection for plant varieties "either by patents or by an effective *sui generis* system or by any combination thereof (TRIPS Article 27(3)(b))." WTO members may also exclude "essentially biological processes for the production of plants" from patentability.

Recently, the Enlarged Board of Appeal at the European Patent Office (EPO) interpreted this exemption in the precedent-setting "Broccoli" (G2/07) case. They found that a breeding process "is, in principle, excluded from patentability," if it "contains or consists of the steps of sexually crossing the whole genomes of plants and of subsequently selecting plants." It does not matter how technical or inventive a breeding process is. This lack of patent protection for methods of marker-assisted (smart) breeding may cause innovators to protect their innovations as trade secrets. This would negatively affect the speed of innovation insofar as there would be no public disclosure of such innovations as is required under the patent system.

SHAPING THE FUTURE

While the impact of patents on traditional plant breeders is currently limited, it is fair to assume that the progress of science in breeding will lead to an increasing number of patents, which in turn may decrease breeders' freedom to operate (FTO). Under PVP, infringement is essentially caused by what a breeder does, whereas under patent law, it is caused by what a breeder uses. In contrast to the PVP regime a patent infringement can occur "accidentally" and even unintentionally without using a competitor variety.

While FTO diligence is common in all areas of technology, it requires a change in the ways breeders work. For example,

breeders will need to place greater emphasis on building legal and IP capabilities, monitoring FTO and IP landscapes, filing for oppositions and negotiating licenses. Avoiding these changes by calling for the abandonment of patents in this area is a short-sighted solution that will have unintended consequences for innovation. Abandoning patents is akin to "killing the goose that lays the golden egg." Current technology may become freely available, but there will be no incentive for future innovation.

MOVING TOWARDS INCLUSION

Thus, the plant breeding industry and legislators face a dilemma: without IP, companies lack the incentive to take the risks necessary for successful innovation; without broader access to technology, the innovation life cycle and development of integrated solutions will be hampered.

IP is a tool developed by society to foster innovation. In and of itself, it is neither good nor bad. It is the way in which it is used that determines whether it has a constructive or a destructive impact. The current negative perception of the patent system arises primarily from its use to exclude others. However, patents can also be used in a positive, constructive way, for example, to foster licensing and technology exchange. The key challenge is in re-calibrating the use of the patent system to maximize its benefits (by preserving incentives for innovation and knowledge sharing) while minimizing any limitations in terms of access. Such change will only be possible by adopting an approach that moves away from using IP as a means for exclusion towards its use as a means for inclusion.

INTEGRATED SOLUTIONS

Today's world is characterized by an unprecedented push towards openness; collaboration and integration are viewed as fundamental drivers of innovation. While the seed industry is limping somewhat behind other industries, such as the



Photo: Courtesy of Syngenta

Modern agricultural solutions require integration of multiple innovations. Syngenta is facilitating this process within the seed industry with the recent launch of its TraitAbility e-licensing platform and is also leading an industry-wide licensing initiative.

electronics industry, with respect to technology integration, the need for open innovation is unquestionable in this sector. Modern agricultural solutions require integration of multiple innovations in the areas of, for example, seeds, biotechnology, crop protection, grain storage and transport.

Developing a new seed variety also requires integration of many beneficial traits such as resistance to biotic and abiotic stresses, higher yield and nutritional value. No single entity – not even large multinational companies – has all the elements in hand to effectively meet the diverse needs of farmers around the world.

KEEPING PACE WITH AN EVOLVING INNOVATION LANDSCAPE

Just as inhabitants need to adapt to a changing natural environment, so too does the IP system need to keep pace with an evolving innovation landscape. If IP stakeholders are unable to develop and adapt the use of IP to this changing environment, the system risks losing societal support and may eventually become “extinct.” As noted by Charles Darwin, the father of the theory of evolution, it is not the strongest who will survive in a changing environment, nor the most intelligent, but the one most responsive to change.

Adapting the IP legal framework to present-day realities is crucial to ensuring the creation and broad dissemination of

plant breeding innovations. However, with the globalization of the breeding industry, the chances of establishing harmonized and flexible legal changes rapidly are very small. That said, there is nothing to stop IP owners and users from proactively and pragmatically adapting their use of IP within the current legal framework.

NEW APPROACHES TO IMPROVING ACCESS

Syngenta is taking the lead in the seed industry in this regard and is currently developing two new approaches to making patented seed-related innovations available, providing “free access but not access for free” under standardized, fair, reasonable and non-discriminatory (FRAND) terms. Given the regulatory complexity of the agreements, particularly with respect to stewardship and liability, these initiatives are confined to non-genetically modified plants.

THE TRAITABILITY E-LICENSING PLATFORM

The first initiative, the Syngenta e-licensing platform, TraitAbility (www.traitability.com), makes available some of the company’s most important native trait technologies and a range of research tools for biotechnology. Interested parties can easily obtain a license (through an electronic shopping-mall similar to the Amazon or iTunes e-stores).

Some of the benefits of the Syngenta e-license system include:

- Easy and quick access to licenses via the Internet; no need for lengthy and complex negotiations;
- Transparent, fair, reasonable and non-discriminatory (FRAND) licensing conditions, applicable to all plant breeders or other interested licensees;
- Access to a portfolio of patent-protected enabling technologies that can be used for breeding any crop, including:
 - a free research license for academic or not-for-profit parties
 - a standard license agreement for other entities, with commercial terms adapted to the licensee's size (e.g., small, medium or large);
- Access to a portfolio of patent-protected native traits relating to Syngenta's commercial vegetable varieties. This allows:
 - transparency regarding Syngenta commercial varieties that contain the patented traits, thus reducing the risk of breeders unintentionally using a variety with a patented trait to develop a new variety;
 - free access to licensed native traits during development and breeding of new varieties;
 - royalty payable only if the newly-developed and commercialized variety contains the patented native trait.

DEVELOPING AN INDUSTRY-WIDE LICENSING PLATFORM

Syngenta is also working with its partners, including small and medium-sized seed companies, to design an industry-wide licensing platform for vegetable traits. The aim again is to ensure easy access to these traits using transparent licensing conditions that carefully balance the interests of patent holders and licensees. This initiative enables the integration (stacking) of innovations from different parties and eliminates any risk that royalty payments may become a limitation to the development of an integrated solution.

To ensure it is widely adopted, the initiative includes a "pull-in" mechanism requiring licensees to make their own patents available to the platform. It operates on a "give-and-take" basis whereby each party that accesses a patented technology via the platform is required to provide access to their own patents under the terms of the platform. Everybody, irrespective of patent ownership, can participate in the platform. The initiative is not intended to replace bilateral licenses but rather to provide a safety net should bilateral negotiations fail. A concrete proposal detailing the industry licensing platform was submitted for review by the competent competition law authorities.

“IP bashing” has become fashionable, but abandoning IP is a short-sighted and risky business.”

CREATIVE SOLUTIONS NEEDED

The challenges of meeting the food, feed and fuel needs of a rapidly growing global population are unprecedented. The global challenge to produce “more with less” requires the creation and integration of agricultural innovations, not only in the developed world but especially in developing countries.

“IP bashing” has become fashionable, but abandoning IP is a short-sighted and risky business. It ignores the fact that it is possible to think out of the box and find new ways of using the IP system to incentivize innovation, while also improving access to beneficial innovations. A sincere effort to tackle the innovation needs of the agricultural sector can only be made by the consolidated efforts of all stakeholders, including legislators and technology developers. We must work together to find creative solutions to leverage inventions – not by blocking others from using them but by making them broadly accessible. Only through such an alliance can the current perception of “no patents on life” – born of a myth based on a fundamental misunderstanding of the patent system – change to “more patents for life” and support the positive contribution IP can make in fostering innovation for the benefit of all. ♦

ENCOURAGING PHARMACEUTICAL INNOVATION in middle-income countries

*By Tim Wilsdon, Vice President,
and Eva Fiz, Consulting Associate,
at Charles River Associates*

With each newspaper report on new investments in China or Brazil (and research center closures in Europe), the changing landscape of pharmaceutical research and development (R&D) is becoming ever more evident. However, the factors driving these changes, the importance of intellectual property (IP) and the implications for government policy remain subjects of contention and debate. To better understand the dynamics of innovation within the pharmaceutical industry, the International Federation of Pharmaceutical Manufacturers and Associations (IFPMA) asked economic consultancy firm Charles River Associates (CRA) to analyze the conditions that enable pharmaceutical innovation to thrive and the potential future implications for innovation policies, with a specific focus on a selection of key middle-income countries.

Drawing on interviews with policymakers, international and domestic companies, and academics, CRA assessed the innovative activities in middle-income countries and the degree to which these activities can be associated with public policy in a range of case study countries (Brazil, Colombia, China, India, Malaysia, South Africa, the Republic of Korea and the Russian Federation).

Although there is increasing innovative activity in all countries considered, the opportunity to develop innovative activities from basic research through to clinical development varies from country to country. To be successful, a jigsaw of policies is needed, including a coordinated industrial and health policy, strong IP protection and an environment that encourages partnerships among the different stakeholders.

RECENT TRENDS

To understand recent trends and policy challenges, it is important to differentiate between types of biopharmaceutical

innovation. Innovative activity is typically divided into basic research (sometimes described as drug discovery), preclinical research and clinical trials (which themselves are divided into Phases I to III (registration), and Phase IV (post-registration) trials).

Biopharmaceutical innovative activities are primarily concentrated in high-income countries; however, there is a clear growth trend in these activities in middle-income countries. Between 2005 and 2010, industry R&D spending increased by 455 percent in Asia-Pacific (excluding Japan), 112 percent in Latin America, and 303 percent in India.

Early-stage research is undertaken by international pharmaceutical companies working closely with leading academic centers in research hubs. Historically, these have focused on regions such as Boston and San Francisco in the US and London and Cambridge (UK), Uppsala (Sweden) and Munich (Germany) in Europe, and Singapore in Asia. Among middle-income countries, however, China stands out as the home of 12 R&D centers. A few R&D hubs are also established in India, Brazil, the Russian Federation and Indonesia.

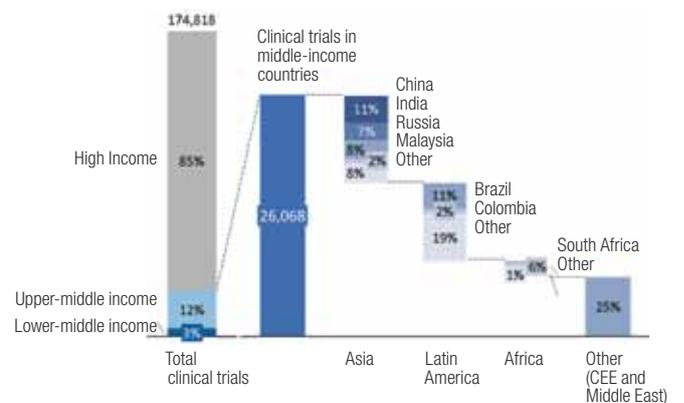
The trend towards biopharmaceutical innovative activities in middle-income countries is even clearer when looking at later stages of the R&D process. For example, clinical research is undertaken in many locations with middle-income countries now hosting 15 percent of global clinical trial activity. China, India, the Russian Federation and Brazil have captured the largest number of trials within those markets.

Ultimately, the success of the innovation strategies of middle-income countries should be judged on their outputs. Although it is difficult to tie medicines developed by the international industry to a particular market, there is evidence of incremental innovation, where medicines are tailored to the local markets in

Location of R&D hubs by international companies



Total of clinical trials in high and middle-income countries



middle-income countries. Furthermore, there are a significant number of innovative products in Phases II and III, and a number of commercialized novel medicines have been developed indigenously in some case study countries, such as the Republic of Korea, China and India. However, at the present time there are no international blockbuster drugs emerging from the case study countries.

THE ROLE OF IP IN DETERMINING R&D LOCATION

The factors determining the location of innovation are complex and difficult to disentangle. It is clear that to develop innovative activity (particularly early-stage research) governments must have a coherent long-term policy that is implemented effectively.

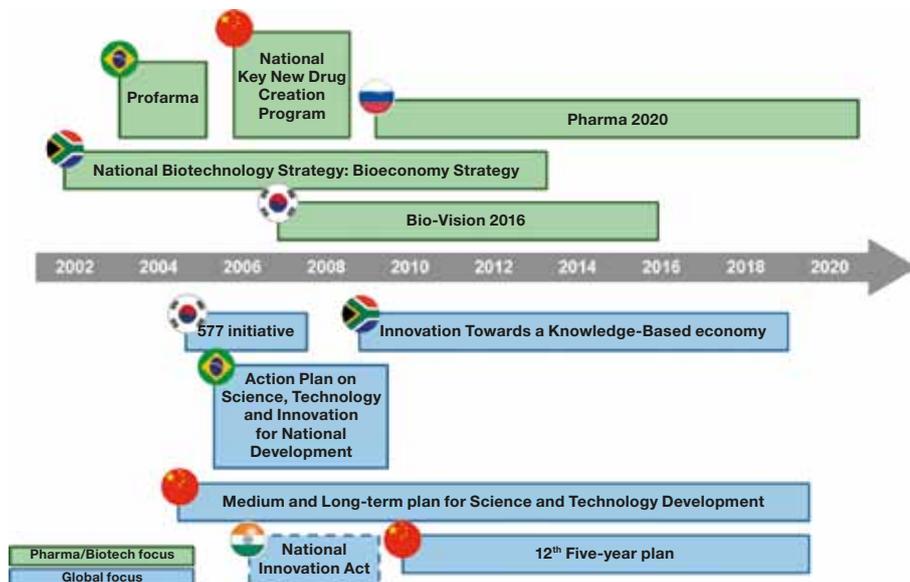
The biopharmaceutical process of innovation is long, often taking 10 to 12 years to progress from proof of concept to global commercialization. As investment in early-stage research is not a linear process, it is difficult to assign clear time frames or costs to the patented outputs that result. Given the unpredictable timing and the significant costs associated with establishing new research centers, it is unsurprising that decisions regarding location are rare but, when they do occur, they are strategically important. In future, decisions on new investments are likely to be even more difficult, given the ongoing trend to consolidate R&D sites. However, as illustrated above, although the great majority of international R&D sites continue to be in the US and Europe, the importance of China as an R&D hub has increased dramatically.

This is, in part, due to China’s long-term commitment to promoting innovation in the pharmaceutical industry, which is seen as an important signal that the future innovation environment in China promises to be favorable. China has applied coherent plans to encourage both public and private biopharmaceutical innovation since 2006.

Location of innovative activities at each stage of the R&D process

Source: CRA analysis. The location of R&D hubs is based on public information of IFPMA members as of August 2012. The number of clinical trials is based on www.clinicaltrials.gov.





National innovation strategies

Source: CRA analysis.

*The Indian National Innovation Plan was drafted in 2008 but not implemented. The new innovation plan currently being drafted, the Science and Technology Innovation Policy, is expected to be announced in 2013.

**Amendments to the program were proposed due to budget concerns.

The requirements for developing strong innovative capacity differ depending on whether consideration is given to early-stage research or later-stage development. Early-stage and preclinical research requires the best academic and research capabilities. All companies interviewed agreed that the availability of “talent” was the central justification in considering the location of their early-stage facilities. Although talent can be recruited to a location, a world-class institution or research group was seen as the essential building block in developing this capability. Moreover, to be effective, academia needs to create a culture of collaboration with private companies, which would inevitably be involved in the development of the medicines. Such a culture takes time to develop and is lacking in the majority of the countries included in the analysis.

Clinical development relies on considerable expertise and experience in managing and supervising trials according to international standards. The motivation for undertaking these trials increases greatly when a product is destined for the domestic market, and local evidence and clinical support is required for its appraisal. Not all countries have the market size or even the population to encourage large scale clinical trials. A staged, targeted, consistent and coordinated policy framework is therefore required to build capabilities to undertake the large-scale trials needed for late-stage clinical development.

The prevailing innovation model depends on patents as a basis for securing a return for all those who invest in different ways at different stages of the innovation process. In light of this, decisions about where to locate basic and preclinical research facilities depend, to a large extent, on the IP regime of the country. International and domestic companies will only invest in the risky research process if it is possible to protect the IP associated with their investments. Based on the interviews, policymakers reported that confidence in their IP regime was crucial, and robust IP rules could represent a key competitive advantage in encouraging domestic innovative activity.

The study found that international companies would only invest in research in locations with sufficiently strong IP protection. This is one of the reasons why China has been relatively more successful in attracting inward investment in research. For domestic pharmaceutical innovators who are more heavily reliant on rewards from the domestic marketplace, the importance of IP is even greater.

To a lesser extent, decisions regarding the location of clinical trials depend on the protection available during the trial process. Overall, IP protection plays a role in prioritizing clinical trial sites, because all things being equal, companies would rather conduct trials in countries where their patent rights will be upheld. The interviews revealed that if the objective is to develop an innovative biopharmaceutical industry (either by fostering domestic companies or attracting investment by international companies), IP is a necessary (although not sufficient) building block.

PARTNERSHIP IS KEY TO EARLY-STAGE RESEARCH

The case studies also illustrate that once the basic infrastructure is developed, public investment in R&D is not enough to ensure a sustainable innovative industry. Partnership is vital for encouraging early-stage research. For clinical research, partnerships appear to develop with less government involvement. Market forces, in particular, seem to be primarily responsible for the development of domestic clinical research organizations (CROs) and their success in attracting clinical trials.

The global pharmaceutical industry has played a significant role in fostering innovation in emerging markets over the last 10 years. This is perhaps partly in response to the slower growth in its core business in western markets. The industry has adopted a strong, positive approach to engaging with middle-income markets (particularly China). Not only has it been investing in local marketing affiliates, but also in partnering with the emerging university and government research institute fraternity and, in a number of cases, with established independent corporate research centers.

FURTHER RESEARCH NEEDED

Although there is a vast literature on the determinants of innovation and innovation policy in general, there are still considerable gaps in the current evidence and research. For example, further study is required to better understand the factors that determine different types of foreign direct investment and how these relate to the characteristics of a given IP regime. ♦

Summary of conclusions

Policies need to be tailored to the market size and population of each country;

Building capabilities over time in the areas in which a country can compete internationally requires considerable time and investment and involves the development and step-wise application of targeted programs;

Fostering innovation throughout the drug development pipeline from basic research through to clinical development requires a jigsaw of policies including a consistent policy framework, a coordinated industrial and health policy, strong IP protection and an environment that encourages partnerships among stakeholders.



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