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CUTTING-EDGE
SCIENCE INSPIRES
GROUND-BREAKING
ART p.30

GLOBAL INNOVATION INDEX 2014: THE HUMAN FACTOR IN INNOVATION p.2 | BACTERIA AS A VEHICLE FOR DRUG DELIVERY p.7
ACCESSIBLE BOOKS CONSORTIUM: BREAKING DOWN BARRIERS TO ACCESSIBILITY p.19

CONTENTS

- p.2 Global Innovation Index 2014:
The human factor in innovation
- p.7 Bacteria as a vehicle for drug delivery
- p.11 Innovation gathers pace in renewables sector
- p.14 In the Courts – *Alice v CLS Bank*:
United States Supreme Court
establishes general patentability test
- p.19 Accessible Books Consortium:
breaking down barriers to accessibility
- p.25 Video games: computer programs
or creative works?
- p.30 Cutting-edge science inspires ground-breaking art
- p.38 Egypt and Tunisia underscore the importance of IP

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Front cover:
The choreography in Gilles Jobin's new
contemporary dance piece, QUANTUM,
generates movements that reflect how
particles and their forces behave.
Photo: Gregory Batardon

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GLOBAL INNOVATION INDEX 2014: The human factor in innovation

By *Catherine Jewell*,
Communications Division and
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As the global economic recovery gathers pace and becomes more broad-based, policy-makers are focusing on the search for sources of future growth and employment. But despite growing optimism about the global economic outlook, governments continue to face a basic dilemma: limited scope for fiscal stimulus and public investment but a strong need for investment and future-oriented pro-growth policies to sustain growth and employment. In this context innovation and entrepreneurship are becoming ever-more important. But what needs to be done to stimulate these key drivers of economic growth? How can policymakers track global innovation trends, assess progress and identify priorities? The Global Innovation Index (GII), now in its 7th year, offers decision-makers a practical “tool for action”. It provides a rich series of metrics that benchmark the innovation capabilities and performance of 143 countries. As firms and governments show growing interest in identifying and energizing creative individuals and teams to harness future growth, this year’s GII explores the critical role of the human factor in innovation.

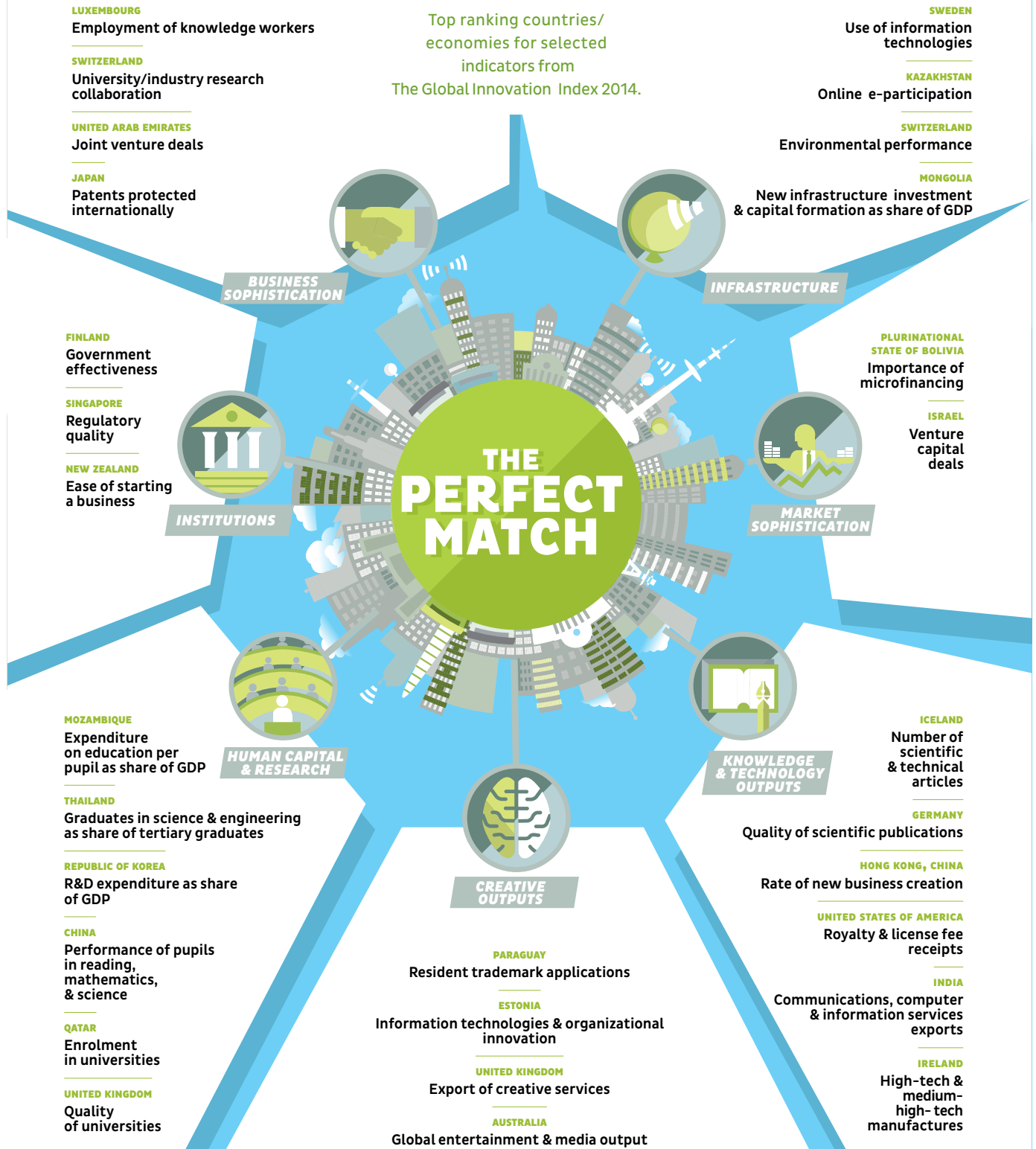
GII 2014 was launched in Sydney on July 18, 2014, at the Business 20 (B20) meeting, a forum through which the private sector produces policy recommendations for the annual meeting of the Group of 20 (G20) leaders, to be hosted by Australia in November 2014.

This world leading report tells us about the progress we have made with our innovation policies and systems worldwide. Knowing how we are faring on the innovation front

The GII 2014 is available at: www.wipo.int/econ_stat/en/economics/gii/

The Global Innovation Index 2014

IN A PERFECT WORLD FOR INNOVATION, WHO WOULD DO WHAT?



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is important because innovation is a key driver of economic growth and wellbeing in this 21st Century”, said Australia’s Minister for Industry, Mr. Ian Macfarlane at the GII launch. “This is increasingly a central part of the trade and economic agenda which is the focus of much of the B20 and G20 discussions,” he added. “Reports like the GII provide direction on how we can boost our innovative outcomes giving us a deeper understanding of the many factors that drive innovation.”

The GII is “a comprehensive map of the capacity of countries to innovate and thus compete on the world stage,” said WIPO Director General Francis Gurry. Noting that some US\$1.6 trillion are invested in knowledge creation each year, he said, “innovation is the desired outcome of that investment and is the key to competitiveness in the knowledge and technology-intensive industries.”

“Innovation is increasingly the basis of competition in the global economy,” he added, underlining its central role in improving productivity, new product development, new market opportunities, job creation and as the source of competitive advantage. “Beyond economics, innovation is also the means by which we achieve improvements in our quality of life and address the major challenges facing society,” he said, highlighting issues such as food security, public health and climate change. “If we do things in exactly the same way as we do them now then we will make no impact on any of these challenges,” he added.

RANKINGS

For the fourth consecutive year, Switzerland topped the GII’s rankings, followed by the United Kingdom and Sweden. For the first time, Luxembourg entered the top 10, ranking ninth. Among the top 20 rankings, “there is a very high degree of stability” noted Bruno Lanvin, Executive Director of INSEAD and co-author of the report.

The top 25 countries consistently score high across most the Index’s 81 indicators, have well-linked innovation ecosystems and demonstrate strong capabilities in areas such as innovation infrastructure (including information and communications technologies), business sophistication (including innovation linkages, knowledge workers, and knowledge absorption); and innovation outputs (such as creative goods and services and online creativity).

PERSISTENT INNOVATION DIVIDE

The GII 2014, however, confirms the continued existence of global innovation divides both between and within income groups. “We see a divide that is not reducing as fast as we were hoping,” noted Mr. Lanvin.

All top 25 countries are high-income economies but upper-middle income countries China (ranked 29th) and Malaysia (ranked 33rd) are showing signs of breaking into the top tier in the coming years.

In terms of quality of innovation, the report shows that top performing middle-income economies are closing the gap on high-income economies. “China significantly outperforms the average score of high-income economies across the combined quality indicators,” noted Cornell University’s Soumitra Dutta, co-author of the report. “To close the gap even further, middle-income countries must continue to invest in strengthening their innovation ecosystems and closely monitor the quality of their innovation indicators,” he said.

FOUNDATIONS FOR OPTIMISM

While the report indicates that many developing countries are still lagging behind in terms of their innovation performance, there are grounds for optimism. Countries



Photos: © WIPO 2014. Photo: Gavin Jewitt Photography



Photo: WIPO / Sacha Wunsch-Vincent

in Sub-Saharan Africa showed the most significant overall improvement in GII 2014 rankings. Of the 33 sub-Saharan countries featured in this year's index, 17 have climbed in ranking, with Côte d'Ivoire showing the biggest improvement. In fact, this region boasts the highest number of "innovation learners" – economies that perform at least 10 percent higher than their peers in terms of gross domestic product. This, Mr. Lanvin noted, shows "that something is happening even in the poorest parts of the globe regarding innovation. Governments are taking notice, efforts are being made and people are given more opportunities to translate innovation into success," he said.

These results "indicate important trends for the future," noted Mr. Dutta, "they show which economies are learning faster and where probably a lot of future growth in the economy and other interesting innovative ideas will emerge in the future."

BRICS economies, however, are performing unevenly. Four improved their positions: Brazil by 3 places to reach 61st rank, the Russian Federation by 13 places to reach 49th, China by 6 places to reach 29th and South Africa by 5 places to reach 53rd position. The progress of China and the Russian Federation in the rankings is among the most notable of all countries. In fact, China's ranking is now comparable to that of many high-income countries. India, however, slipped back 10 places to 76th position this year.

A VALUABLE BENCHMARKING TOOL

The GII makes it possible to analyze the innovation performance of different income groups and by region. In this way, it can illustrate important relative competitive advantages and help decision-makers glean important practical lessons for improved performance. As underscored by Mr. Dutta, it offers business leaders valuable insights

For this year's GII launch, Australia's Minister for Industry Ian Macfarlane joined authors of the report and its partners in Sydney at a gathering of international business leaders (known as B20) in the run up to the G20 Summit to be hosted by Australia in November 2014. Left to right: Australia's Minister for Industry Ian Macfarlane, WIPO Director General Francis Gurry and Executive Director of INSEAD Bruno Lanvin.

in terms of where to invest R&D resources and set-up manufacturing plants. It also offers policymakers useful examples of best practices that can be leveraged and integrated into national policy environments for countries to become more competitive.

Co-published by Cornell University, INSEAD and WIPO, in collaboration with the Confederation of Indian Industry, du and Huawei, the core of the GII consists of a ranking of the innovation capabilities of world economies. Recognizing the critical role of innovation in driving economic growth in all economies, the GII goes beyond traditional measures of innovation and includes a total of 81 indicators. It is a valuable benchmarking tool for the continual evaluation of strengths and weaknesses in innovation performance. The GII 2014 rankings are calculated as an average of innovation inputs which embody national innovation activities (including institutions, human capital and research, infrastructure, market sophistication and business sophistication) and innovation outputs (including knowledge and technology outputs and creative outputs) which capture actual innovation results.

THE HUMAN FACTOR IN INNOVATION

The GII 2014 explores the central role that human capital plays in the inception, implementation and diffusion of innovation and helps to explain why innovation champions remain top performers while some of the larger emerging economies are showing uneven innovation performances. Countries that have made visible efforts to maintain or enhance the quality of their human resources through education and life-long learning include the Republic of Korea, Finland and the UK (among high income countries) and China, Argentina and Hungary (among middle-income countries).

The report includes a series of chapters that focus on the importance of improving skills as a key means of boosting innovation, increasing productivity, stimulating economic growth and improving social welfare and equality. It discusses how a country's stock of human capital drives economic growth and affects its ability to innovate or catch up with more advanced and innovation-efficient economies. It also offers a detailed discussion of the far-reaching impact of the human factor which goes well beyond the supply-side of innovation, playing an important role in how innovation is received, accepted and diffused. It further discusses how globalization has eased mobility of people across geographic and cultural boundaries. Today, countries, like corporations, need to compete for talent. Recent studies show that around 75 percent of migrant inventors from low- and middle-income countries reside in the US with China and India

standing out as the two largest middle-income countries of origin, followed by Russia, Turkey, Iran, Romania and Mexico. Against this backdrop, countries are keen to reverse so-called brain drain and to retain and attract the talent required to fuel innovation, sometimes by simply involving their skilled diaspora. Although only a handful of countries, such as Morocco, have successfully brought about dynamic reverse migration, when supported by government policies and economic liberalization, it can be a means of attracting inward flows of talent.

GI: AN EVOLVING MODEL

The GII has grown over the years to become a unique means of tracking innovation capabilities and performance around the world. The GII model is revised every year to improve the way innovation is measured; for this reason, the scores and rankings from one year to the next are not directly comparable. The GII, however, is focused on improving the ways in which innovation is measured and understood and providing decision-makers with the means to identify effective pro-innovation policies and practices.

While high-income economies continue to dominate the rankings, the GII 2014 shows that innovation divides continue to exist both across and within income groups and regions. The persistence of these can be traced to the challenges of making progress in all indicators covered in the GII model. In addition to interesting regional trends – uneven performance among BRICS and significant improvements across Sub-Saharan Africa – the GII underlines the crucial importance for lower-income economies to continue to explore ways to create policy environments in which new sources of innovation-based growth can flourish. ♦

BACTERIA

as a vehicle for drug delivery

By **Catherine Jewell**,
Communications Division,
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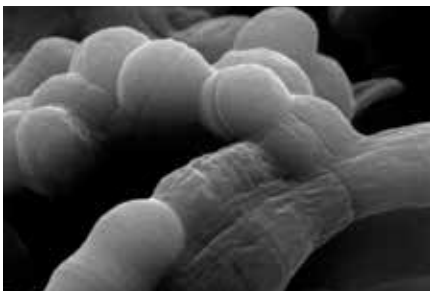
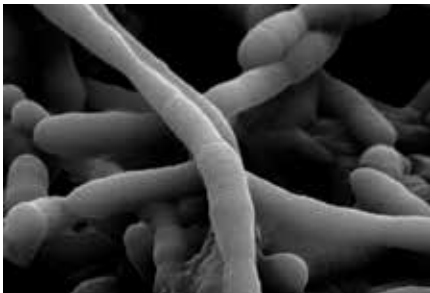


Photo: Daniel Nunez, INRA, Paris, France

ActoGeniX's core technology, TopAct™, was developed by scientists at the University of Ghent in 1994 and was first patented in 1996. TopAct™ transforms the non-pathogenic food bacterium *Lactococcus lactus* into a delivery vehicle for a therapeutic protein, known as an ActoBiotic™ which can induce healing in the body.

ActoGeniX, a small Belgian biotech company, is breaking new ground in developing a new class of drugs to treat gastrointestinal, immunological and metabolic diseases (such as Type 1 diabetes) which afflict millions. Established in 2006 as a spin-off from research carried out at the University of Ghent and the Flanders Institute of Biotechnology (VIB), ActoGeniX's technology, known as Actobiotics™, promises to revolutionize treatment of these chronic conditions. Emil Pot, General Counsel at ActoGeniX, explains how the technology works and why intellectual property (IP) is so important for the growth of the company's business.

ACTOBIOTICS™: A PROMISE OF MORE EFFECTIVE TREATMENT

ActoGeniX's core technology, TopAct™, was developed by scientists at the University of Ghent in 1994 and was first patented in 1996. TopAct™ transforms the non-pathogenic food bacterium *Lactococcus lactus* into a delivery vehicle for a therapeutic protein which can induce healing in the body. Using sophisticated genetic engineering techniques, a gene that is essential to the survival of the bacterium outside the body is removed and replaced with one that contains the code (or recipe) for secreting the desired therapeutic protein. In this way a so-called ActoBiotic™ is produced. "We basically engineer food-grade bacteria which have been used for millennia in cheese-making and encode it with a therapeutic protein. Once a patient swallows it, it starts producing the therapeutic protein of interest," Mr. Pot explains. "It has got very broad application and can be used, in principle, for any DNA-based polypeptide – antigens, allergens, cytokines and antibodies."

ADVANTAGES OF THE TECHNOLOGY

This pioneering technology offers exciting possibilities for treating a wide range of diseases. ActoBiotics™ can be taken orally and are safer and more effective than drugs administered by injection. "The big advantage is that because of its oral application, it locally targets specific diseased areas. For example, if you have mouth ulcers resulting from radiotherapy, you can apply the medication directly to the inflamed area instead of applying it systemically, and thereby avoid a lot of side effects. It is very safe," Mr. Pot explains.

"Our manufacturing approach differs from other biologics companies in that whereas they discard the bacteria once the therapeutic proteins are isolated, we throw away the proteins and keep the engineered bacterial cells. These then act as vehicles that can carry a whole range of therapies to a specific treatment area."

ActoBiotics™ are very cheap to produce, compared to other biologics which can involve complex and costly processes. "We simply ferment, harvest and formulate the bacteria either as a capsule for intestinal delivery or as a mouth rinse for buccal applications," Mr. Pot notes.



WHAT ROLE FOR INTELLECTUAL PROPERTY?

Intellectual property has been at the heart of the company's business strategy from the outset. During the company's incubation, where efforts focused on broadening the technology's application, the emphasis was on ensuring adequate IP protection was in place. By its launch in 2006, ActoGeniX already boasted 12 patent families covering different aspects of its technology. "When we decided that the technology was mature enough to get sufficient financing, we had 12 patent families already. That is quite a lot for a spin-off company."

This approach, however, made it possible for the company to attract the necessary finance to go forward. "This strong patent portfolio was instrumental in obtaining a substantial first round of financing of 30 million euros." Seven years on, the company has some 32 patent families comprising more than 150 individually granted patents in major markets (e.g. China, Europe, Japan and the US) with around 50 patent applications still pending.

"IP management is a very important aspect of the company's business strategy, because we are developing drug products based on a unique platform for the oral delivery of therapeutic proteins and antibodies which are normally administered by injection. In order to maintain our competitive advantage and create value for our shareholders it is extremely important to have an active IP management strategy in place," he explains.

DEALS WITH BIG PHARMA

Developing a drug and taking it all the way through clinical trials to market approval can cost well over a billion dollars. "For clinical development of drug products you need a lot of money, so we need to partner with the big pharmaceutical companies. Our strong focus on IP management supports our business strategy to enter into valuable deals and collaborations with such companies."

This approach is already bearing fruit. In November 2012, ActoGeniX sealed a research collaboration agreement with Merck (known as MSD outside the US and Canada) to develop antibodies for an undisclosed indication using its ActoBiotics™.

A year later, in December 2013, the company joined ranks with Stallergenes, a global leader in allergen immunotherapy, to develop and commercialize novel allergy drugs based on its technology. Worth an estimated 170 million euros, this partnership promises to significantly increase the efficacy of treatments for indoor (mites, dust, etc.) and outdoor (birch, ragweed, grass) allergies as well as food allergies with a

reduced doses of allergens. "The people at Stallergenes really believed in the application of our technology platform in the field of allergies," Mr. Pot notes.

Under the terms of the deal, ActoGeniX will use its technology to create and deliver clinical product candidates that express and secrete a range of allergens to treat some of the most prevalent allergies. If Stallergenes exercises its option on any of these product candidates, it will have full development and exclusive worldwide commercialization rights on them. ActoGeniX will be eligible for milestone payments and tiered royalties on future net sales of products according to a company press release.

"Without a strong IP portfolio we would never be able to execute such agreements, or secure the financing we need to move forward," Mr. Pot observes.

A MULTI-LAYERED APPROACH TO IP

ActoGeniX has adopted what might be termed a belt and braces approach to IP protection. "We have adopted a multi-layer strategy. Each product is protected by multiple patents covering different aspects of our technology. This means that anyone that wants to copy our product will infringe a whole bunch of patents and will have to invalidate a whole series of patents in court. It is pre-eminent for all our potential partners that our IP is very strong. Without IP they wouldn't be willing to invest so much money in the company," he explains.

In a competitive market, ActoGeniX's survival hinges on its ability to continually stay ahead of the curve in developing its technology. The first patents on the technology will expire in 2016; and the company's ability to attract high-value licensing deals depends on the continued development and protection of its technology offering. "We try to constantly file patents to extend the protection available to a product. In the world of drug development, it can take between 8 and 10 years to develop a product. That means that a significant chunk of the life of your patent is consumed without you ever seeing a return. That is why it is important to keep filing patents on new developments so you can get a return on the huge investments made," Mr. Pot explains.

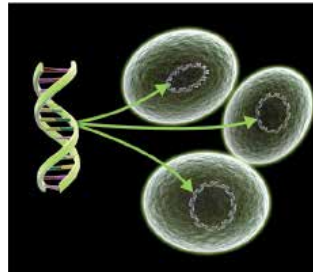
IP EXPERTISE IS ESSENTIAL

"A correct understanding of IP is essential because you need to make sure IP covers all future product strategies. There are also important decisions to make in relation to the territories in which to file and validate patents to make sure proper IP protection is maintained," he said underlining the importance of assigning responsibility for IP management to a qualified IP professional.

THE CONCEPT OF ACTOBIOTICS™

Genetic engineering of *Lactococcus* to create an ActoBiotic™ by chromosomal insertion of one or multiple genes

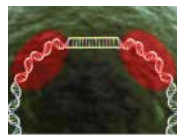
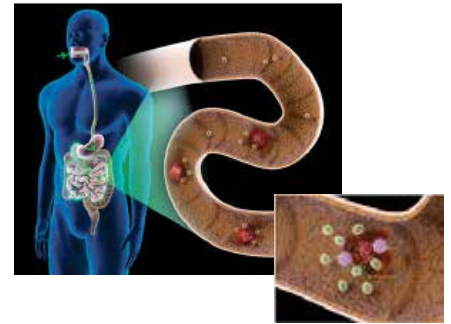
Coated capsules with freeze-dried Actobiotic™ are taken orally by the patient



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Containment system preventing survival of excreted bacteria outside of the human body

ActoBiotic™ released in gut and locally secreting therapeutic at site of disease

Photo: ActoGeniX

PERSPECTIVE ON OPEN INNOVATION

As a small company with just 22 employees, ActoGeniX lives by open innovation. “Open innovation is very important to us because we don’t have everything in-house,” notes Mr. Pot. “We believe we are the world experts in the area of genetic engineering, so we keep this core technology in-house, but work relating to pre-clinical studies or toxicity studies we farm out to other companies that are far more experienced than we are and can do the job faster. In this respect, open innovation saves us time and money, but the challenge, of course, is to ensure that contracts are in place that secure our IP rights and ensure we are fully entitled to use any results of work undertaken at our own discretion. With IP you are always looking around the corner.”

THE PCT: SUPPORTING SMES

A small company, with a global reach, ActoGeniX uses WIPO’s Patent Cooperation Treaty (PCT) to file its patent applications internationally. “The PCT buys us time to determine whether it is really worth pursuing a patent at the national level. This can be a costly affair, so the PCT offers us valuable time and cost savings.”



CHALLENGES

While ActoGeniX's IP-intensive strategy is central to its business strategy, securing sufficient financial resources for filing and validating the patents is a constant challenge. "It is critical to educate company managers and investors about how important IP is for an innovative company so they release sufficient funding for filing and maintaining the company's patent portfolio," he says.

External challenges relate to the need for a more supportive environment for SMEs. Tax breaks and the need for companies to be able to acquire IP rights at reasonable cost and to effectively enforce their rights are important ways in which governments can support small businesses, Mr. Pot believes.

Patent quality is another key area of concern, given the increasing threat of patent trolls. Policymakers "need to be sure that patent quality is improved and that there is increasing legal certainty. Young innovative companies rely heavily on patents and can face devastating consequences under the threat of a damaging lawsuit or if their patents are invalidated by the court," he explains. Many IP-related challenges confronting SMEs, he believes, could be addressed through more and better training programs for SMEs to raise IP awareness, improve intellectual asset management and create opportunities for engagement with IP officials.

On top of the need to address patent quality, "all kinds of other practices and rules put pressure on the alleged infringer to settle with a patent troll," Mr. Pot notes. Take, for example, a pharmaceutical company that, after obtaining approval to market a potential multi-billion dollar product, receives a letter from a patent troll claiming infringement and threatening a lawsuit unless a hefty licensing fee (in the hundreds of thousands of dollars) is paid. Under such circumstances, he explains, the alleged infringer is likely to settle out of court rather than delay getting his product to market and face uncertainties associated with a complex and lengthy trial. "This all puts pressure on the alleged infringer and favors the patent troll. Incentives need to be put into place to make it less favorable for patent trolls to bring cases, but as long as trial costs are not attributed to trolls when they lose, the situation is unlikely to change."

THE FUTURE

With a number of products in the early stages of clinical research, the company is seeking partners that can help it further develop, expand and commercialize its product range. "There are a lot of indications that we can address but we only have so much time and so much money. We could partner with companies to develop therapies for allergies, auto-immune diseases, rheumatoid arthritis and Type 1 diabetes while we ourselves focus on developing inflammatory bowel disease therapy."

As the incidence of non-communicable diseases rises, so too does the need for safer and more effective treatments. As a pioneer and dominant player in the delivery of a new class of orally administered, locally acting, biological drugs, the prospects for ActoGenix look very promising. IP has played a central role in establishing the company and in fuelling the continuous development of its technology. IP will, no doubt, continue to shape the company's fortunes and help meet medical needs for better and more effective treatments for a broad range of chronic diseases. ♦

Tips for innovative companies:

- Assign responsibility for IP management
- Strengthen in-house IP expertise
- Keep up to date with the latest development in IP laws and regulations
- Educate managers and investors about the importance of IP in protecting core technologies and securing high-value licensing deals
- Maintain proper IP protection in key markets
- Release sufficient funds for filing and maintaining a patent portfolio
- Be aware of the impact of lawsuits arising from allegations of infringement, including those from patent trolls.



INNOVATION GATHERS PACE in renewables sector

By **Sarah Helm**, Manager,
CambridgeIP, UK

Climate change is one of the biggest challenges of our time. Global greenhouse gas emissions, a main driver of climate change, continue to rise with recent observed concentrations of carbon dioxide (CO₂) reaching unprecedented levels. There are, however, encouraging signs that the technologies needed to tackle climate change – so-called climate change mitigation technologies (CCMTs) – are being developed and becoming more widely available. A recent report published by WIPO and Cambridge IP, a UK-based innovation consultancy, points to striking increases in commercial innovation in four key renewable energy technology sectors, namely, biofuels, solar thermal, solar photovoltaic (PV) and wind. The report, *Renewable energy technology: Evolution and policy implications, evidence from patent literature*, tracks global trends in innovation and technology ownership in these rapidly growing sectors. The report also presents broad analyses of renewable technologies markets and policy frameworks within which they operate including information on investment levels and case studies on technology deployment in each of the focus areas.

TECHNOLOGY: THE KEY TO CLIMATE CHANGE MITIGATION

International negotiations relating to climate change, most notably in the context of the United Nations Framework Convention on Climate Change (UNFCCC), have emphasized the key role of technology and its transfer in helping to stabilize greenhouse gas concentrations (Article 4.5). Success in this area, however, hinges on the global adoption of climate change mitigation and adaptation technologies and policies that support their effective transfer. While many CCMTs exist, ensuring they get to where they are most needed and are adapted to local conditions remain significant challenges. To develop effective policies that support technology transfer in this area, policy-makers and other stakeholders need a sound understanding of what is happening in these technology sectors. When novel and improved CCMTs are combined with appropriate policy frameworks and financing, they have the potential to provide global and regional climate change benefits opening pathways to low-carbon development, greenhouse gas reductions and job creation.

MINING OPPORTUNITIES FOR TECHNOLOGY DEVELOPMENT AND DIFFUSION

Patent documents are a rich source of structured and reliable information about inventors, technologies, innovation and technology ownership. Analysis of patent data, relating to a specific technology or industry can reveal important information about the origins of a technology, how a technology space is developing and how the composition of industry players is evolving. It can also identify the most important (commercially or scientifically) technologies within a given sector. Patent data analyses can help shape commercial decision-making and the formulation of effective public policy. They can also help identify opportunities for innovative partnerships by highlighting areas of technological similarity and overlap. Information on the geography of filings and the innovation capacity in different areas can accelerate technology diffusion between markets and help identify knowledge networks and technological strengths. This, in turn, can support technology transfer between economies.

CLIMATE CHANGE MITIGATION: A FAST-MOVING AREA OF INNOVATION

The report compares patenting activity for the four focus technology sectors during the periods 1975 to 2005 and 2006 to 2011. It shows that patent filing rates in the four focus CCMTs (see Table) began to rise in the 1990s and took off from 2006, outstripping global patenting performance (which grew on average by 6 percent per year) with annual growth rates of 24 percent across all focus areas. More patents were filed in these areas in the 5 years to 2011 than in the previous 30 years. Such dynamism is a likely response to market conditions, including increased levels of R&D investment, shifts in policy incentives, such as feed-in tariffs, and technological advances, such as more cost efficient manufacturing.

OVERALL RENEWABLES ATTRACT HIGH LEVELS OF INVESTMENT

Investment in renewable energy and fuel in 2012 stood at US\$224 billion. While this fell short of the record US\$279 billion invested in 2011, investment in renewables in 2012 remained 8 percent higher than in 2010. Uncertainty in policy environments in developed markets, and the need to generate capacity in these markets, are thought to have driven the 2012 decline in investment.

In real terms, however, the overall investment remains high and is driving innovation in areas such as new materials and improved performance, as well as in process manufacturing and operation and maintenance applications.

UNPRECEDENTED INVESTMENT BY DEVELOPING ECONOMIES

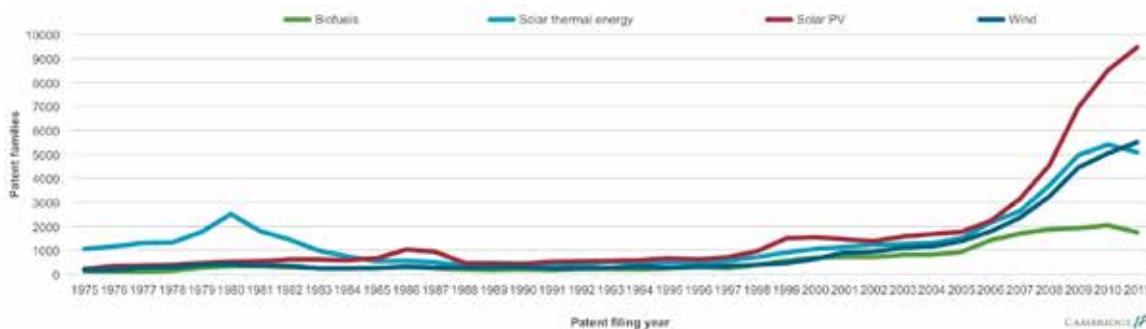
The report cites a 2012 study by the United Nations Environment Programme (UNEP) and the Frankfurt School which shows that developing economies are playing an increasingly central role in the renewable sector accounting for 46 percent of all renewable investment in 2012. In that year, total investment in renewables in developing economies rose to an unprecedented US\$112 billion. The US and China continued to make the highest levels of investment in renewable energy in 2012 and remained primary patenting locations for renewable technologies. Other major growth markets for renewables included India, Brazil and South Africa. Greater investment into more diverse markets could also indicate an enhanced capacity for technological solutions to be deployed on a global scale. This presents an opportunity to create knowledge transfer networks that share pathways to development.

CHANGING PATTERNS OF TECHNOLOGY OWNERSHIP

The report also points to shifting technology ownership with increased patent activity across the focus areas from players in emerging economies. In the area of biofuels, for example, the majority of entrants in the top 20 league table are new; eleven of them are headquartered in China. Moreover, 25 percent of all biofuel patent applications between 2006 and 2011 were filed in China. This could be indicative of China's increasing role in the manufacturing of established biofuel technologies for large corporate suppliers, such as Mitsubishi (Japan) and Sinopec (China). It further indicates that China is emerging as a major investor in biofuels innovation.

In the area of solar thermal, 16 of the top 20 technology owners are new entrants; half of them come from China. Similarly in the solar PV patent landscape, China and the Republic of Korea emerged as major entrants, driven in large part by the rising number of patents held by LG and Samsung. Solar thermal is the only CCMT in which all of the top 20 patent holders are based in Asia.

Global patent application trends for selected CCMTs: 1975 - 2011



Patent family filing trend over time for selected CCMTs.

European companies, however, feature more prominently in the wind energy space, reflecting the base of operations of technology owners and the current markets in which wind technology is most heavily deployed and invested. Patent filings in Europe, Japan, the Republic of Korea and the US account for 40 percent of wind energy-related filings.

The report shows that in recent years, most patent applications across all four focus areas have been filed in China and the Republic of Korea.

DIVERSE INDUSTRY STRUCTURES AND DRIVERS

The report confirms that the four CCMTs are at different stages of maturity. Wind energy for example, is a more mature and established renewable energy technology than the others. It also has the highest concentration of IP ownership when measured by patents. By contrast, the biofuels sector, the least mature renewable energy technology, has a relatively low concentration of patent ownership with a high level of participation from universities and public sector research institutions.

INTERNATIONALIZATION OF MARKETS

A marked rise in the use of the Patent Cooperation Treaty (PCT) – a cost-effective mechanism that streamlines the process of filing for patent protection in multiple jurisdictions – points to the increasingly global nature of markets for patented technologies in the focus areas. Since 2006, over 30 percent of the patents filed within the four CCMT areas were filed through the PCT, nearly double the rate of PCT filings between 1975 and 2005.

Technology classification	Average annual growth rate	
	1975-2005	2006-2011
Biofuels	9%	13%
Solar thermal	3%	24%
Solar PV	10%	33%
Wind	9%	27%
Global patent filings	3%	6%

Table: Global patent filing rates

The rapid development of CCMTs around the world suggests that technology will continue to play an important role in solving the global challenge of climate change. Comprehensive and up-to-date patent mapping that highlights key features of emerging technology landscapes provide invaluable, evidence-based insights that enrich the debate on the role of technology and innovation in moving to a low-carbon future. The patent landscapes reviewed in this report provide evidence of increasing rates of global commercial innovation and interest in CCMTs from a range of players across developed and emerging economies. These findings provide food for thought and underline the importance of efforts to facilitate continued discussions around IP and technology transfer at the international level. ♦

ALICE v. *CLS BANK*: United States Supreme Court establishes general patentability test

By *Julia Powles*,
Researcher,
University of Cambridge, UK

Every patent must satisfy the requirement for patentable subject-matter – or, as it is sometimes known, patent eligibility, or the requirement for “an invention”. In effect, the claimed invention must be the *sort of thing* that could lead to a patent.

Most countries define subject-matter negatively – things are patentable unless they are excluded by statute or case law. Once this requirement is satisfied, the assessment then turns to fact-specific criteria such as novelty, non-obviousness, industrial applicability, and sufficient description. If the subject-matter requirement is not satisfied, then it’s game-over for the patent.

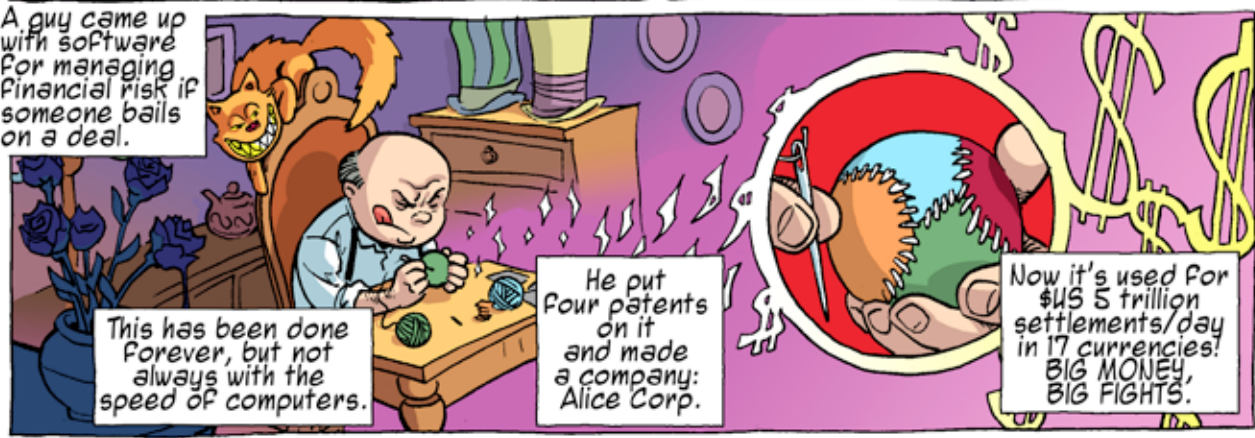
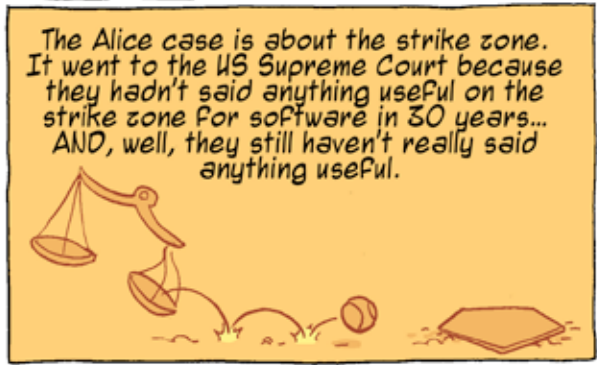
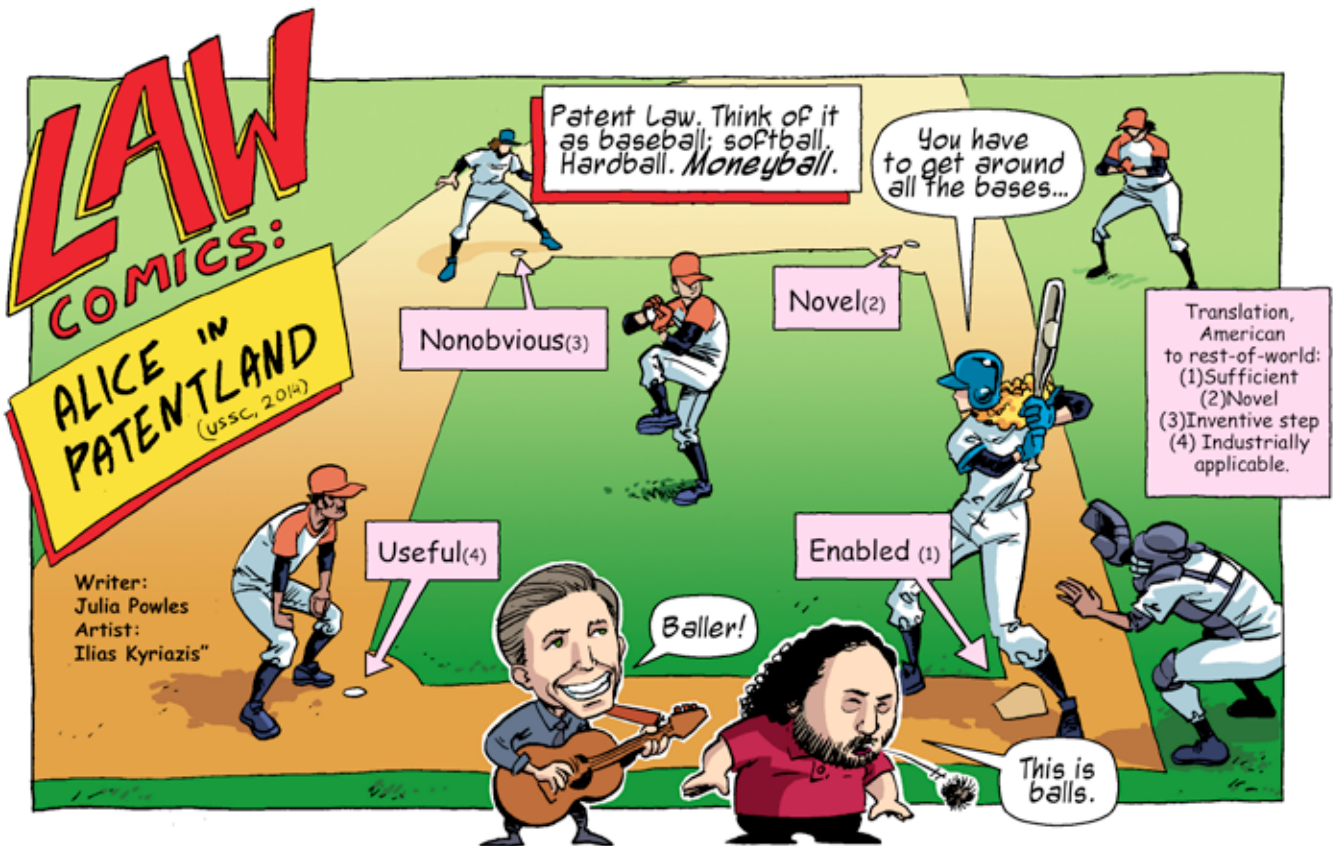
Subject-matter is a negligible concern for the vast majority of patents. However, due to either express or implied exclusions, it can be a real sticking point in particular domains – most notably, software, biotechnology, and diagnostic and business methods. As an early ground for striking out patents, the subject-matter requirement may seem attractive to patent systems suffering intense backlogs and perceived misuse and abuse. This broader context may reflect why, in the last five years, the United States Supreme Court has issued four influential subject-matter rulings after a nearly 30-year hiatus: *Bilski v. Kappos* (www.wipo.int/wipo_magazine/en/2010/06/article_0009.html), *Mayo v. Prometheus*, *AMP v. Myriad* (www.wipo.int/wipo_magazine/en/2012/06/article_0006.html) – all covered in previous editions of this magazine – and, most recently, the highly-anticipated case of *Alice v. CLS Bank* (www.supremecourt.gov/opinions/13pdf/13-298_7lh8.pdf).

ALICE’S ABSTRACT IDEAS

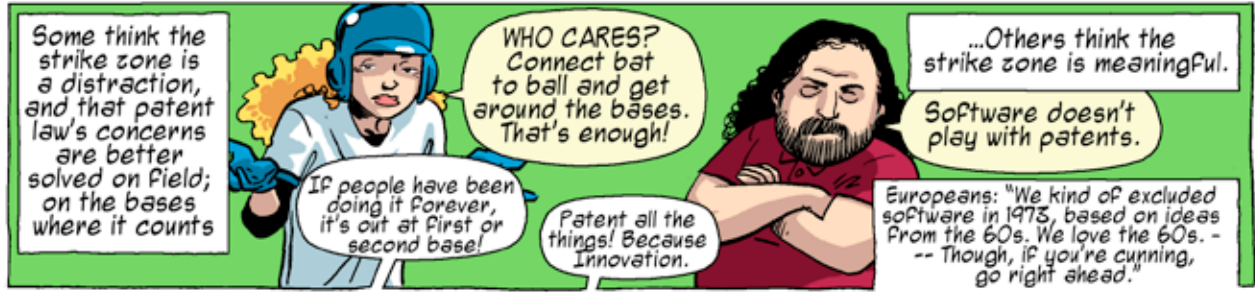
Alice attracted a great deal of interest largely because the patents in issue involved a business method implemented by a computer. Many pundits seized on the case as an opportunity for much-needed guidance on software patenting. However, it was clear from the facts and the hearing that this was unlikely to happen. When the Supreme Court issued its ruling on June 19, 2014, it opted for a narrow basis for its decision, closely tied to the facts at hand, and omitting broader guidance (or, indeed, any mention of the word “software”).

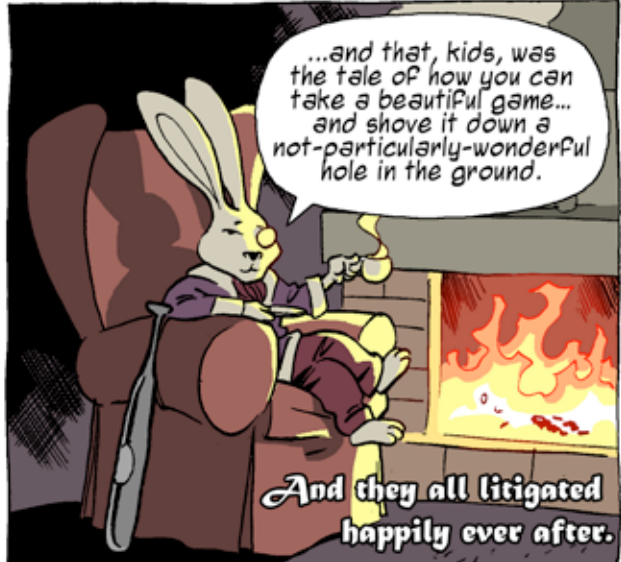
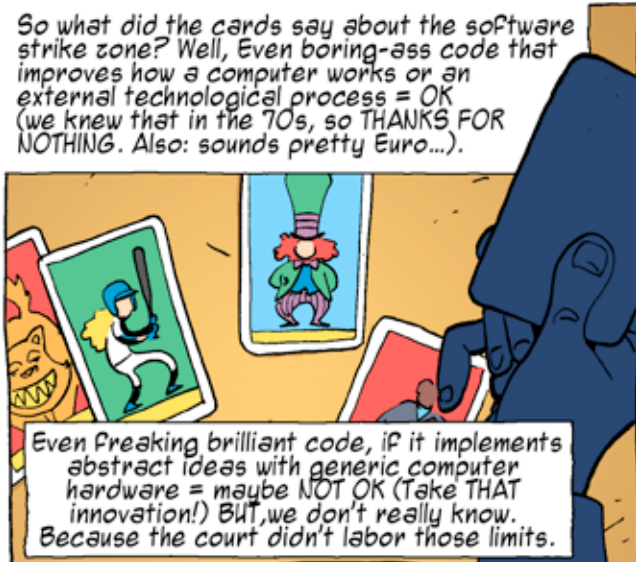
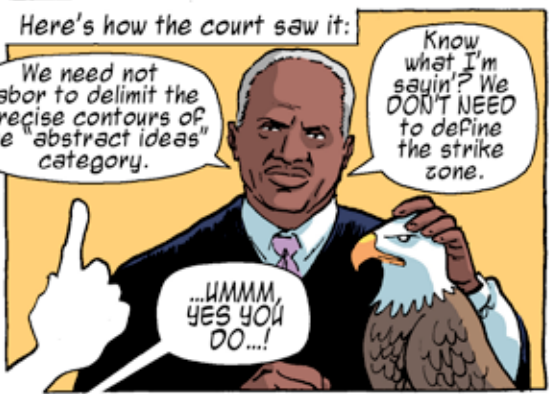
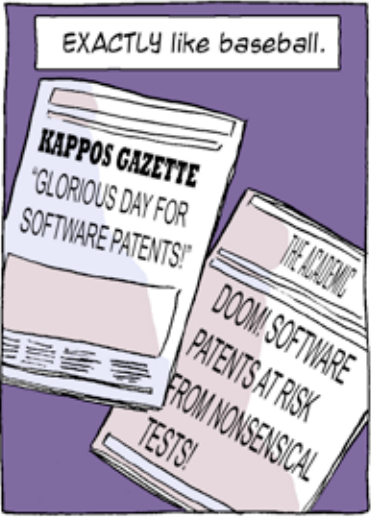
The four patents in *Alice* concerned intermediated financial risk settlement (i.e. mitigating the risk that one party to an agreed transaction fails to pay or to satisfy other conditions). The Supreme Court distilled the claims as variants on: a method for exchanging financial obligations; a computer system configured to carry out the method; and a computer-readable medium containing program code for performing the method. The parties to the case were the patentee, Melbourne-based *Alice Corp*, which had no relevant trading activity in relation to the patents, and New York-based *CLS Bank International*, which engaged in \$US 5 trillion settlements daily employing the patented methods.

A comic strip rendering of the issues
addressed in *Alice v. CLS Bank*



The ONLY issue in the Alice case was whether the inventions were in the strike zone. In US law, this includes everything except abstract ideas (the problem here), laws of nature, or natural phenomena.





Massive thanks to Fotis Vergis for flair and flourish.

Under section 101 of the US Patent Act, “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may be eligible for patent protection.” The US courts have developed three exclusions to this broad provision: laws of nature, natural phenomena, and abstract ideas. In the *Alice* decision, which concerned the “abstract ideas” exclusion, the Supreme Court stated that the principle undergirding these exclusions is “pre-emption”, which it related to the notion that the basic tools, or building blocks, of scientific and technological work must remain in the public domain.

The Court recognized, however, that at some level, “all inventions... embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.” Lest the exclusions “swallow all of patent law”, the Court sought to distinguish patents that claim the building blocks of human ingenuity from those that integrate those building blocks into “something more”.

BILSKI RELOADED, WITH DASHINGS OF MAYO

One of the primary reasons the Supreme Court heard the *Alice* case was that the Federal Circuit *en banc* decision (www.cafc.uscourts.gov/images/stories/opinions-orders/11-1301.Opinion.5-8-2013.1.PDF), issued on May 10, 2013, had yielded a deeply fractured set of opinions, failing to agree the nuances of the appropriate test for patent eligibility. Among the causes were perceived inconsistencies in the Supreme Court’s precedent. The Supreme Court in *Alice* therefore took the opportunity to articulate a single, uniform subject-matter test. That test, itself a generalization from the earlier case of *Mayo v. Prometheus*, involves two parts:

First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts [i.e. law of nature, natural phenomena, or abstract idea].

If so, we then ask, “[w]hat else is there in the claims before us?” To answer that question, we consider the elements of each claim both individually and “as an ordered combination” to determine whether the additional elements “transform the nature of the claim” into a patent-eligible application. We have described step two of this analysis as a search for an “inventive concept”—i.e., an element or combination of elements that is “sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.”

Applying this two-step test led the nine justices of the Supreme Court to find unanimously that *Alice*’s patents were invalid for lack of patentable subject-matter. Unhelpfully for future guidance, the Court considered it need not “labor to delimit

the precise contours of the “abstract ideas” category”. Within its reasons, however, it gave several examples of abstract ideas: fundamental economic practices; certain methods of organizing human activities; an idea in itself; and mathematical relationships/formulas. Turning to the second step, the Court concluded:

We hold that the claims at issue are drawn to the abstract idea of intermediated settlement, and that merely requiring generic computer implementation [i.e. a data processing system, a communications controller, and a data storage unit] fails to transform that abstract idea into a patent-eligible invention.

In the end, the *Alice* ruling is remarkably proximate to the factual findings in *Bilski v. Kappos* – where a risk-hedging business method was found to be an ineligible abstract idea – as well as to the legal findings in *Mayo*, where, in applying the two-step test, a diagnostic method was deemed an ineligible law of nature, applied with only conventional steps, and was therefore ineligible.

By contrast, *Alice* sits somewhat less comfortably with *AMP v. Myriad*, a decision subsequent to *Mayo* that notably omitted reference to the two-step test. Instead, *Myriad* was decided in accordance with older authorities that involved biological subject-matter – *Diamond v. Chakrabarty* (<http://supreme.justia.com/cases/federal/us/447/303/case.html>) and *Funk v. Kalo* (<http://supreme.justia.com/cases/federal/us/333/127/case.html>). In *Myriad*, the Court held that isolated genes were unpatentable natural phenomena. More problematic, particularly in light of the *Mayo/Alice* test, was its finding that lab-generated cDNA is patent eligible, despite the fact that it is produced from isolated genes (i.e. natural phenomena), with the addition of only conventional, routine steps.

IMPLICATIONS FOR SOFTWARE PATENTS

More meritorious computer-implemented inventions were not directly addressed in the *Alice* decision, except to the extent that the Court confirmed the uncontroversial proposition, established by cases in the 1970s and 80s, that inventions improving the functioning of a computer itself (i.e. for speed, efficiency, or security), or effecting an improvement in any other technology or technical field, are patentable.

Alice emphasized very strongly that merely stating an abstract idea, while adding the words “apply it” with a generic computer and generic computer functions, is not sufficient. This emphasis, while it holds instinctive appeal, creates difficulties if applied to other types of non-computer-based inventions. It also fails to accommodate the way in which computer-implementation may

allow an idea to be realized at a scale and speed impossible through other means, with considerable programming skill required in order to achieve such an outcome.

Incongruously, it is plausible under the *Mayo/Alice* test that a sophisticated idea, implemented using generic code and computing platforms, might not be patentable; while a generic idea, implemented using unusual platforms, may be.

An interesting aspect of the *Alice* ruling is the way that the Court characterized *Diamond v. Diehr*. This is an important Supreme Court authority from 1981, concerning a computer-implemented method for calculating temperature within a rubber mould during a step-wise rubber curing process that was found to be patentable. Adopting a reading of *Diehr* that appears to be novel within US Supreme Court precedent – even if it chimes with international authorities – the Court in *Alice* described the invention in *Diehr* as patentable because it used an otherwise unpatentable equation to “solve a technological problem” and “improve an existing technological process”. This reflects an interesting shift in the US jurisprudence, and a possible gravitation towards the approach of Europe and other jurisdictions.

A decision of the Federal Circuit shortly after *Alice* gave an indication of how it may be applied more broadly. In *Digitech v. Electronics for Imaging* (<http://law.justia.com/cases/federal/district-courts/california/cacdce/8:2012cv01324/540000/89>), the Federal Circuit rejected a patent that claimed a method for manipulating data in a digital image processing system. The reasoning was that the patent claim:

recites an ineligible abstract process of gathering and combining data that does not require input from a physical device... Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible.

The bounds of expressions used in the *Alice* decision, such as “generic”, “technological”, “inventive concept” – and the magical quality of “transformation” into “something more” – will doubtless be picked over in cases to come.

THE MERITS OF A SUBJECT-MATTER REQUIREMENT

One question not explored in *Alice*, but worthy of broader reflection, is whether the requirement for patentable subject-matter is even useful to the patent system at all. The problem with the requirement is that it is a coarse filter and encourages satellite

debate of the nature described above. It involves potentially eliminating patents based on limited information and deprives the patent system of its best qualities – namely, taking a set of claims at a particular point in time and comparing them against hard evidence to determine whether they objectively satisfy novelty, non-obviousness, industrial applicability, and sufficient description. Instead, subject-matter is an impressionistic, somewhat unpredictable assessment, and overlaps dangerously with novelty and inventive step. This is seen in the *Alice* case itself, where the Court was clearly influenced by the fact that intermediated settlement was a long-occurring practice.

The utility and application of the subject-matter criterion differs between jurisdictions. In Europe, it has led to a considerable standoff between the UK courts and the European Patent Office. The UK courts take the view that subject-matter should be a real threshold and have devised complicated tests for its assessment, while the EPO has a considerably lower bar for subject-matter, but it then considers exclusions on software, business methods, and other express exclusions “as such” at the novelty and non-obviousness stages, finding this a more practically workable solution.

One of the principal lures of the subject-matter criterion is that it stops weak patents from clogging the system. The problem is that it is rather an inefficient and ineffective tool for doing so. Tests such as that expounded in *Alice* and analogues in jurisdictions such as the UK might appear simple, but they turn on tortuous analyses of undefined and unspecific, yet familiar, terms. Particularly in the case of expressions such as “technological”, “technical” and “inventive concept”, there are further issues when these expressions are used in other parts of patent law in very different ways. This all confuses, rather than assists, understanding, and can mask what are in the end very subjective decisions.

Overall, *Alice*’s enduring significance comes from establishing *Mayo*’s two-step test as a general test for US patentable subject-matter. It will be fascinating to see if this produces any significant changes in software, biotechnology, and diagnostic and business method patenting, both in the US and internationally. ♦

ACCESSIBLE BOOKS CONSORTIUM: breaking down barriers to accessibility

*By Catherine Jewell,
Communications Division, WIPO*

Around 90 percent of those living with print disabilities reside in developing countries. Improving access to school books is a key priority of the ABC.



Photo: iStockphoto © Marilyn Nieves

Dipendra Manocha has been blind since childhood. Against all the odds, however, thanks to a supportive family and the encouragement of his teachers he made it through school and went on to study music at Delhi University graduating with an MPhil in 1992. Today, as President of the DAISY Forum, he is helping to put into place a communications and training infrastructure that is transforming the lives of people living with print disabilities (e.g. blindness, low vision, dyslexia) in India and beyond. Like millions of other students with print disabilities, Dipendra faced a severe shortage of course books in formats such as Braille, large print and audio, which would have allowed him to study independently. He had no choice but to rely on human readers who were not always as reliable as he would have liked, sometimes causing him to miss important deadlines. According to the World Blind Union (WBU), less than 10 percent of all published materials are available in formats that can be read by people living with print disabilities and many of these are available in English alone. Only by ending this global “book famine” will it be possible to help ensure that those living with print disabilities will be in a position to lead independent and productive lives.





Photo: WFP / Edward Harris



Children with visual impairments travel across Côte d'Ivoire to Abidjan to learn at a special institute that caters for their needs.

One year after the historic conclusion of the Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired, or Otherwise Print Disabled, WIPO and its partners are ramping up efforts to expand availability of and access to works in accessible formats.

Whereas the Marrakesh Treaty addresses the legal barriers to the international exchange of these works – it creates exemptions to copyright law that allow for the production and international exchange of accessible books without the permission of right holders – the newly formed Accessible Books Consortium (ABC), launched in June 2014, tackles practical barriers to access. “The Marrakesh Treaty is a means to an end and that end is getting books in accessible formats into the hands of the printed disabled,” said WIPO Director General Francis Gurry at the ABC launch.

The ABC gives practical expression to the policies laid out in the Marrakesh Treaty and strengthens the ecosystem for the production and distribution of books in accessible formats. “It breathes life into the legal framework that was established in the Marrakesh Treaty,” noted Mr. Gurry.

The “ABC will play a key role in spreading knowledge about the treaty and supporting the development of national policies in compliance with the Marrakesh Treaty and to developing the skills to take advantage of such national and international policies and systems,” explained Dipendra Manocha.

A MEETING OF MINDS

The Consortium brings together an alliance of organizations representing the print disabled, authors and publishers. All of these stakeholders “need to be in a dialogue in order to improve access,” noted Jens Bammel, Secretary General of the International Publishers Association (IPA). The Consortium “acknowledges the important role publishers play in providing access for persons with print disability,” he said, noting the IPA is “100 percent behind” the initiative.

Such collaboration is pivotal to the number and range of works available in accessible formats, noted Olav Stokkmo, Chief Executive of the International Federation of Reproduction Rights Organisations (IFFRO). “The key opportunity here is that persons who have print disabilities, through technology and co-operation, can get significantly improved access to books and other publications which were not previously accessible to them in appropriate formats.”

Each group plays a critical role in the value chain of publishing and distribution of accessible format works and in realizing the goal of inclusive publishing, where the same book is available at the same time and price as for sighted people. “The Consortium will help ensure that blind and visually impaired people receive accessible material in the quickest and most streamlined fashion,” explained François Hendrikz, Director of the South African Library for the Blind.

The Consortium’s work covers three main areas: capacity building; an international book exchange – the TIGAR service – to identify and facilitate access to works in accessible formats; and inclusive publishing.

BUILDING CAPACITY

Strengthening the skills and knowledge-base for the production and distribution of books, especially school books, in accessible formats (and local languages) in developing countries is a priority. Around 90 percent of people living with print disabilities reside in developing countries. Without the tools to learn how to read and write, the life chances of children with print disabilities narrow dramatically. The WBU estimates employment rates in developing countries among people with print disabilities is less than 10 percent.



The Accessible Books Consortium includes:

- World Blind Union
- DAISY Consortium
- International Authors Forum
- International Federation of Library Associations and Institutions
- International Federation of Reproduction Rights Organisations
- International Publishers Association

The ABC trains print disability support organizations, local publishers and government services in the latest accessible format publishing technologies. This will help expand the number and range of works available. In India, for example, only some 18,000 books are available in accessible formats (and the bulk of these in English only) compared to the collection of 184,084 accessible format books held by the US National Library Service for the Blind and Physically Handicapped.

“Books will become accessible when publishers produce in accessible formats, and organizations producing and distributing books to persons who are blind or have a print disability have the skills and capacity to undertake this work. This is particularly important in developing countries where there are often no libraries or organizations providing services to blind people,” noted WBU’s ABC representative Scott Labarre. The Consortium can “help us reach a day where all electronic books are born accessible,” he added.

MARKETING AND COST-SAVING OPPORTUNITIES

The aim is to strengthen the publishing ecosystem so that each link in the value chain works in support of accessible publishing and meeting the needs of print disabled people.

“The copyright holder and print disabled communities share an interest in developing technologies that enable publishers to produce accessible format copies in a cost efficient way,” Mr. Stokkmo explained. This not only creates marketing opportunities for publishers, but “will address the back list of books that are not born accessible and further expand the opportunity for publishers to serve the print disabled

Building capacity in Bangladesh

Thanks to funds from the Government of Australia, the ABC is training staff at Young Power in Social Action (YPSA), a non-governmental organization based in Bangladesh, in accessible format publishing technologies to expand the range of educational materials available to print disabled students at the University of Chittagong. The initiative is “a giant leap” notes YPSA’s Vashkar Bhattacharjee. “For the first time in the history of Bangladesh, we are making study materials available in accessible format [in Bengali] for visually impaired students studying in higher secondary level,” he said. Students are also very excited about the prospect of having access to a Bengali dictionary in accessible format in the near future.

Sierra Leone’s Deputy Minister of Social Welfare, Gender and Children’s Affairs, Mustapha Bai Attila, reads a braille book at an institute for visually impaired people in Abidjan, Côte d’Ivoire.

Current members of the TIGAR Service

- Australia: VisAbility (formerly the Association for the Blind of Western Australia)
- Brazil: Dorina Nowill Foundation for the Blind
- Canada: Canadian National Institute for the Blind
- Denmark: Nota – Danish National Library for Persons with Print Disabilities
- France: Association Valentin Haüy
- New Zealand: Royal New Zealand Foundation of the Blind
- Norway: Norwegian Library of Talking Books and Braille
- South Africa: South African Library for the Blind
- Sweden: Swedish Agency for Accessible Media
- Switzerland: Association pour le Bien des Aveugles et malvoyants; and the Swiss Library for the Blind, Visually Impaired and Print Disabled
- United States: National Library Service for the Blind and Physically Handicapped

community [and] offer a work to sighted customers and print disabled customers at the same time,” he noted.

“We want to mainstream accessibility so that mainstream digital publishing itself becomes accessible so we don’t have to re-publish information that is already available,” said Mr. Manocha.

BRIDGING TECHNOLOGY GAPS

The Consortium will also help narrow gaps in technology and infrastructure in developing countries. These are especially evident “when it comes to producing materials in accessible formats or being able to read digital files using assisted technology,” Mr. Manocha explained. In India, for example, text-to-speech technology exists in English and Hindi but not in the 21 other languages spoken in the country. “There is no text-to-speech engine available for the Punjabi language in India, so even if we have digital text files they cannot be read by the user. We need to bridge these gaps,” Mr. Manocha said. In many developing countries, where it exists, text-to-speech technology is often basic and expensive (costing up to a third of a monthly salary).

“To be able to participate in the international exchange of books we need to be able to capture information about the books that are being distributed, to whom and in what numbers,” noted Mr. Manocha. “These capacities need to be built in developing countries to create an environment in which publishers feel confident in sharing their materials with organizations serving the print disabled community.” This is one of the Consortium’s priorities.

THE TIGAR SERVICE

The ABC’s TIGAR Service supports broader access by facilitating the search for, and cross-border exchange of, books in accessible formats. To date, this unique global repository includes over 238,000 titles in 55 languages. Participating organizations (currently 12) can trawl the database to identify the works they need. The aim is to make TIGAR the global “go to” place for accessible titles.

TIGAR is “a fantastic way to ensure that everybody can find out what accessible format books exist around the world and contact those who currently have them,” noted Mr. Bammel.

The aim is to bring more partners on board. “We want to get as many of the libraries and related organizations serving the reading and information needs of people with print disabilities as possible linked to the TIGAR catalogue,” said Francois Hendrikz.

The TIGAR service will help ensure a user-friendly license-clearing mechanism is in place to facilitate the cross-border exchange of accessible format works. Until the Marrakesh Treaty enters into force – and then only in respect of countries that ratify it – rights need to be cleared by the relevant right holders before any international exchange can take place. “Having a database





Photo: WIPO / E. Berrard

India is the first country to ratify the landmark Marrakesh Treaty. India's Permanent Representative to the United Nations in Geneva, Ambassador Dilip Sinha hands over his country's instrument of ratification to WIPO Director General Francis Gurry in June 2014.

India is first to ratify the Marrakesh Treaty

Just one year after its conclusion, India became the first country to ratify the landmark Marrakesh Treaty which seeks to ease access to books for people with print disabilities.

India's Permanent Representative to the United Nations in Geneva, Ambassador Dilip Sinha said "India supports the Marrakesh Treaty for its human rights and social development dimension. The speedy ratification of the Treaty reflects India's commitment to facilitating access to published works for the millions of blind, visually impaired and otherwise print disabled persons."

"We hope other countries will follow India's lead quickly so the Treaty can enter into force and we begin to see real and tangible benefits for the world's blind and visually impaired community," he added.

The treaty will take effect when 20 ratifications or accessions are presented to WIPO.

that contains a list of all those books that are accessible and where to find them is terrific, but that is only a list unless we are able to move books from one country to another" noted Ms. Maryanne Diamond, Immediate Past President of the WBU and Chair, International Disability Alliance, who urged WIPO's member states to make ratification of the treaty a priority.

The TIGAR Service also helps generate significant cost savings by reducing duplication. When, for example, the South African Library for the Blind needs an accessible format version of *Harry Potter and the Chamber of Secrets*, they can acquire it from another participating library and use their resources to convert other titles. "We don't want one book to be re-published many times in accessible formats. If it has been converted into an accessible format once, that version should be shareable among various organizations to reach end users," Mr. Manocha said.

PROMOTING PUBLISHING IN ACCESSIBLE FORMATS

In support of the overriding goal of mainstreaming inclusive publishing – so published books are usable from the outset by both sighted people and those with print disabilities – the Consortium has established a Charter for Accessible Publishing.

The leading scientific publisher, Elsevier, became the first to sign up to the Charter at ABC's launch. "Elsevier is proud to become the first signatory of the new Charter," said Ms. Alicia Wise, Director of Access and Policy at Elsevier who applauded the ABC's leadership in this area. "At Elsevier we endeavor to

make our products fully accessible to all users, regardless of physical abilities," she added.

THE WAY FORWARD

The ABC's members are upbeat and enthusiastic about their ability to make a real impact. "We are really hoping the Consortium will help us in ending the book famine," Mr. Manocha said.

"We have a great opportunity to transform the lives of millions and millions of people. Blind people of the world watched with excitement the adoption of the treaty last year. We are waiting for our lives to be transformed and it is in our hands collectively to make this happen," said Ms. Diamond.

This crucial work, however, is resource intensive and requires much-needed financial support. The ABC's secretariat, located at WIPO's headquarters in Switzerland, is actively seeking financial or in kind contributions to help ensure this ground-breaking initiative reaches its full potential.

If you are interested in supporting the work of the ABC and want to help transform the lives of people living with print disabilities, contact Accessible.Books@wipo.int. ♦



VIDEO GAMES: computer programs or creative works?

*By Andy Ramos Gil de la Haza,
Bardaji & Honrado, Abogados,
Madrid, Spain*

Nintendo's iconic video game character Mario has been an industry staple since the early 1980s.

One of the first video games was created over 50 years ago when a student from the Massachusetts Institute of Technology (MIT) in the US wrote the code (rudimentary by today's standards) to create *Spacewar*, a game in which two players operate missile-firing spacecraft in an attempt to destroy the other. Although video games by their nature have a visual interface, in the early years, the creators of this new class of works were exclusively engineers and computer geeks. Visual displays left much to the player's imagination and were a world away from the sophisticated and seamless graphics featuring in contemporary games. While throughout the 60s and 70s the information technology (IT) component of video games dominated, the recent rapid evolution of computer science and technology has opened vast opportunities for creativity. Modern video games now contain multiple creative elements. How then are these works classed under the law? Are they computer programs or are they audiovisual works? Examining how these complex interactive works are treated in various jurisdictions is important because the approach adopted has a bearing on determining important issues such as authorship, remuneration, transfer of rights and infringement.

In the early years, the limitations of computer science meant that games such as *Spacewar*, *Asteroids* and *Pong*, were no more than pixels illuminating a monochrome screen. They used simple geometric shapes and had very basic functionality. At that time, when it came to protection, it was very difficult to distinguish between the underlying idea of a game, which does not qualify for copyright protection, and the expression or representation of that idea, which does. The challenge of drawing this all important distinction led, in the 1980s, to the first lawsuits relating to video games in which courts examined the legal nature of these simple visual works and their protection.

HOW ARE VIDEO GAMES CLASSIFIED UNDER THE LAW?

In one such case, the well-known US case, *Atari, Inc. v. Amusement World*, the court held that certain forms of expression were inextricably linked with the idea of a particular game (e.g. *Asteroids*) such that the visual component of the work did not merit copyright protection. At the time, games were almost wholly the creation of computer engineers with little or no role for scriptwriters, graphic designers, photographers or sound engineers. This helps explain why many specialized lawyers and industry players today view video games simply as computer programs. But are they right to do so? Before endorsing this view, it is important to note that, these days, studios rarely write computer code from scratch when developing a blockbuster game. They use middleware, a previously created and tested piece of software developed by an outside company, as the technical basis for a game. Only a small proportion of the code used is customized to a specific game. This saves studios time and money and as a consequence many very different video games, such as *Battlefield* and *Need for Speed*:

the Run share the same source code (Frostbite middleware). The distinctive elements of each game are created through code customization and use of original audiovisual components.

Modern video games stand out from other creative works in that they fuse audiovisual elements and software which drives the audiovisual elements of the game and enables player interaction. The complex and peculiar nature of these sophisticated works makes it difficult to classify them under the law. A recent WIPO study, *The Legal Status of Video Games: Comparative Analysis in National Approaches* highlights wide-ranging national legal approaches to protecting these works, with implications for the way those developing games are treated and the remedies available to them under the law.

WIDE-RANGING LEGAL APPROACHES

In some jurisdictions, such as Argentina, Canada, China, Israel, Italy, the Russian Federation, Singapore, Spain and Uruguay, video games are classed as functional software with a graphical interface. Other countries, such as Belgium, Brazil, Denmark, Egypt, France, Germany, India, Japan, South Africa, Sweden and the United States take a more pragmatic approach, recognizing the complexity of video games and favoring a "distributive classification", whereby each creative element of a game is protected separately according to its specific nature. Yet others, such as Kenya and the Republic of Korea, treat video games as audiovisual works.

AN UNEASY FIT

The study reveals an often uneasy fit between prevailing national legislation and the specific characteristics of the video game industry. For example, although, some treat video games as audiovisual works insofar as they are "a series of related images", unlike standard audiovisual works, such as films, video games are not "intrinsically intended to be shown" but are designed for player interaction.

Also, in terms of authorship, the legally recognized co-authors of a movie (e.g. scriptwriter, director and composer) differ from those involved in video game development (character and setting designers, animation designers, video testers and audio engineers). Whether or not these professionals hold any IP rights in a work will depend on their contribution to it and the specific requirements of each jurisdiction which generally requires some sort of original creative contribution to the work. As such, many key professionals with important roles, such as publishers and quality assurance testers, whose endeavors are pivotal to the commercial success of a video game, are not recognized as creators under copyright law. Clearly, as things stand at the moment, when determining which legal regime is most suitable to protect these works, the best approach is to examine the relative importance of the various technical and creative elements that go into the making of video games.



Photo: @Ubisoft

With 85 percent of its 9,200 people in 28 countries working on game development, Ubisoft has the second largest in-house creative team in the world.

INDUSTRY MOVES TOWARDS SELF-REGULATION

Confronted with a patchwork of differing national legal approaches and gaps in national law as well as the inability of national laws to keep pace with recent developments, such as online gaming, the industry has moved towards self-regulation.

In practice, many aspects of the relationship between video game producers and authors, independent contributors or even game players (such as remuneration or the legal status of creative elements) are regulated by contractual arrangements (See *Video Games and IP: A Global Perspective* – www.wipo.int/wipo_magazine/en/2014/02/article_0002.html). Such “contractualization” of copyright, however, is no guarantee that a fair balance is always struck in terms of how creators are remunerated and whether they receive their share in the revenue generated from the commercial exploitation of their works.

IP AWARENESS WITHIN THE INDUSTRY IS CRITICAL

The video game industry, especially in relation to mobile platforms, consists of a huge number of small game developers that lack formal professional representation and often do not have access to expert advice on how to acquire IP rights. The marketplace is full of small or medium-sized companies that exploit video games commercially without having acquired all appropriate copyright and related rights. For their own sake, that of right-holders and the long-term growth of the industry, these companies need to carefully examine the national laws governing IP to avoid costly and time-consuming legal problems. They will find that different rules prevail in different jurisdiction and that the recognized owner of rights in a work will vary from one jurisdiction to another, depending on whether it is classed as a piece of software or as an audiovisual work.



Photo: @Ubisoft

Creative elements of video games

1. Audio elements:
 - a. Musical compositions
 - b. Sound recordings
 - c. Voice
 - d. Imported sound effects
 - e. Internal sound effects
2. Video elements
 - a. Photographic images (e.g. Gif, Tiff, Jpeg)
 - b. Digitally captured moving images (e.g. Mpeg)
 - c. Animation
 - d. Text
3. Computer code (source code and object code)
 - a. Primary game engine or engines
 - b. Ancillary code
 - c. Plug-ins (third party subroutines)
 - d. Comments

ARE NEW LEGAL RESPONSES NEEDED?

As the evolution of the global video game industry continues to gather pace, the legal responses required may be very different from those crafted 20 years ago. Many new forms of commercial exploitation, beyond sales, are coming on stream, all with a bearing on IP rights, for example, through the merchandizing of key characters and identifiers, tournaments, competitions and the public communication of matches (or gameplays) on television and the Internet.

Modern interactive online video games which include tools for creating and developing new elements for a game, such as characters, levels and other creative elements, are, in fact, creating a whole new category of authors, the legal status of which remains largely untested.

Major video-game-consuming countries already have gaming circuits and professional leagues with significant income-generating potential. Major League Gaming in the US, for example, has 8 million registered users with nearly 12 million unique users visiting its website in 2012 alone. Major League Gaming championships are broadcast live over the Internet, attracting tens of thousands of participants and hundreds of thousands of spectators every year. These developments raise some very important questions. For example, can gamers use gaming platforms such as *FIFA14* or *Call of Duty: Ghost?* to organize tournaments, publish their own matches and earn revenue from doing so?

Users post hundreds of their on-line matches or “gameplays” on to YouTube attracting, in some cases, over 30 million viewers. While those that posted the video benefit from advertising revenue, the studio and authors that created the platform in the first place are effectively eliminated from the equation.

ARE SPECIFIC REGULATIONS FOR VIDEO GAMES REQUIRED?

These and many other questions relating to the legal status of video games as well as to evident gaps in national legislation in terms of authorship, systems of rights’ transfer and remuneration of video game creators, suggest that the time is ripe for an international discussion to evaluate the merits of adopting specific regulations for video games. Such a discussion might consider:

- the legal nature of these modern and complex works;
- the relationship between creators and producers;
- how to determine who is the creator of a video game;
- systems of presumption of transfer of rights to the producers;
- fair and equitable compensation systems for creators; and
- the rights of video game development studios in relation to exploitation of their works.

While it is extremely difficult to conceptualize an appropriate set of rules for the legal treatment of video games, some initial thoughts include:

- The need to foster international discussion towards an agreement on the legal classification of video games and a special regime that accommodates the specific characteristics of these complex creative works.
- Such a regime would define rights enjoyed by the right-holder with respect to a work. National regulations currently offer no guidance on the acts a right-holder may prohibit, such as public communication of a gameplay or its posting on the Internet.
- Any special regime for video games should recognize that these works represent a fusion of software and audiovisual elements. It should also include a presumption of transfer of rights (unless otherwise stated) in favor of the person who initiates and bears the risks associated with developing a video game, namely the producer.
- It would also favor a legal presumption that all those who performed a particular function (whether creative or technical) to create a game, are recognized as joint creators of the work as a whole. As in other industries, royalty provisions should also be foreseen to ensure that creators can share in the commercial success of a work.

International agreement on the legal protection afforded to video games, their creators and producers, will help to curb abuses arising from gaps in national law, and support the continued growth of this highly creative and vibrant global industry. ♦

Ubisoft, publisher of *South Park: The Stick of Truth*, is “always on the lookout for new ways to push back the boundaries of creativity and innovation,” notes its co-founder and CEO, Yves Guillemot.

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The American sound artist Bill Fontana, winner of the Prix Ars
Electronica Collide@CERN Award (2012-2013), turns the dormant
LHC into the world's largest musical instrument using his sound
sculpture which "mimics the protocol of a scientific experiment."



CUTTING-EDGE
SCIENCE INSPIRES
GROUND-BREAKING
ART

*By Ariane Koek,
Head of International Arts,
European Organization for Nuclear
Research (CERN),
Geneva, Switzerland*



Photo: Arts@CERN

During his CERN residency, the German artist Julius von Bismarck (right) teamed up with CERN theorist James Wells (left). Each had an interest in hidden worlds – places beyond perception. The artist's work *Versuch Unter Kreisen* (Experiment Among Circles), explores "the edge of our brain where we run up against the boundaries of our perception." He uses four oscillating lamps that synchronize on every 78th swing but are completely out of phase during the other 77, creating a dancing pattern of light.

The Large Hadron Collider (LHC) is transformed into the world's largest musical instrument. The chairs and tables in CERN's canteen are swept away to make space for contemporary dance. Thirty scientists are "kidnapped" and plunged into the dark spaces beneath the laboratory buildings to reveal what they see in their minds' eye. These are just three interventions by three different artists in residence under Collide@CERN, the main component of Arts@CERN, the flagship arts program set up by the world's largest particle physics laboratory sited on the Franco-Swiss border near Geneva, Switzerland.

These artistic interventions are one of the ways in which CERN's artists in residence make their presence felt at one of the busiest scientific laboratories on the planet – a global collaboration of over 11,000 scientists, engineers and technicians from 680 institutions in 100 countries. The artists create these unexpected events and performances to deliberately disrupt and challenge CERN's scientific community and to create new ways for scientists to look at and think about their work.

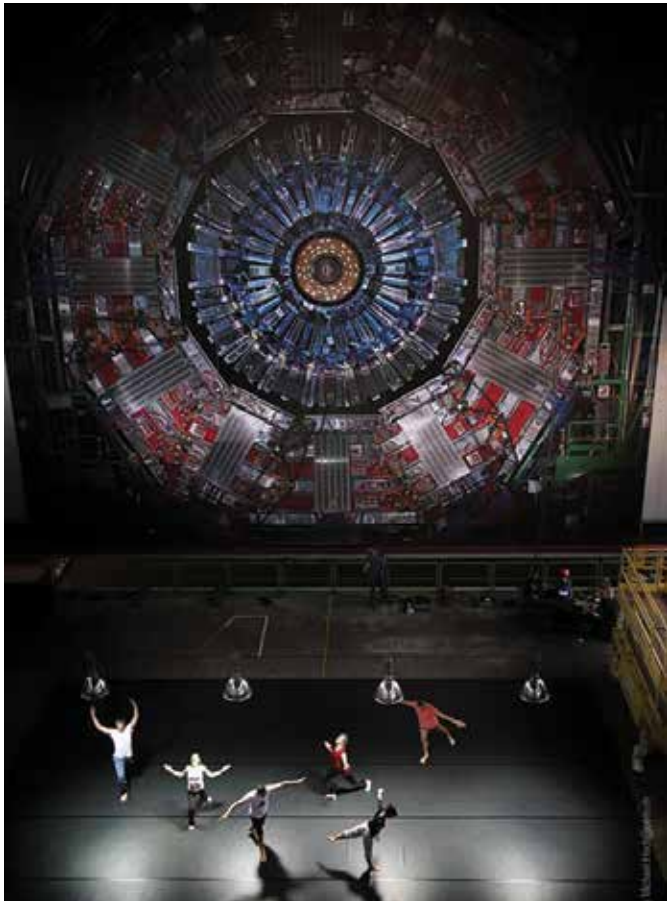
The interplay between the arts and science has always existed as a playful exchange of ideas and concepts, sometimes with spectacular results. Take for example, the work of Leonardo da Vinci as both inventor and artist. It is rare these days, however, for a major scientific research organization to invite artists in to work purely as artists rather than illustrators or describers of science. So why is CERN doing so at arguably one of the busiest and most significant moments in its working history?

WHY ARTS@CERN?

The reasons are simple, but varied. First, particle physics and the arts share a common purpose, they each try to explain and express our place in the universe. Particle physics does this through mathematics and equations whereas the arts appeal to our senses – touch, sight, taste, sound and smell – and individual emotions, knowledge and experiences. As noted by Julius von Bismarck, the first Collide@CERN artist in residence:

"The root reason why I am an artist is the same as it would be for being a scientist: finding out what there is out in the world and how I can contribute to our understanding of it. I am interested in making science sense-able – through the body and its senses..."

The arts and science are forms of fundamental research driven by curiosity, making CERN and the arts natural creative partners. Both generate new ways of looking at our world: CERN through its high energy physics at the Large Hadron Collider, which recreates the conditions at the beginning of the universe; the arts, through multiple imaginative ways of engaging with and seeing the world, including theatre, dance, architecture, literature, painting, sculpture and music.



Photos: top left – Arts@CERN; top right: Julian Calot; bottom left – Gregory Bataardon

The choreography in Gilles Jobin's new contemporary dance piece, QUANTUM, inspired from his CERN 2012 residency and discussions with CERN scientists, generates movements that reflect how particles and their forces behave. QUANTUM is now on world tour and will feature in the program of the prestigious Brooklyn Academy of Music (BAM) in New York in autumn 2014.



Photo:Arts@CERN



Photo:Arts@CERN



Documentary filmmaker Jan Peters from Berlin specializes in using Super 8 film technology. He is known for his playful and experimental use of accident and imperfection to make a film interesting and distinctive, and for exploring the dynamic between narrator and audience.

Bring the world of leading scientists together with that of cutting-edge artists in carefully curated creative collisions and you have the second reason for establishing the Arts@CERN program. Only by colliding different ways of thinking and viewing the world is it possible to generate new insights and accelerate an innovative culture, bringing new life and perspectives to routine ways of thinking and working. Where better to encourage such creative collisions, which challenge the *status quo* and push the boundaries of innovation and creativity, than at this internationally recognized research center renowned for its cutting edge engineering, technology and science?

Take, for example, Gilles Jobin's new contemporary dance piece, QUANTUM. Inspired from his Collide@CERN 2012 residency and discussions with CERN scientists, including anti-matter expert, Michael Doser, his new choreography generates movements that reflect how particles and their forces behave.

The world premiere of QUANTUM took place at the CMS Experiment Detector Hall at CERN in September 2013. This exciting event, which marked CERN's first partnership with the Théâtre Forum Meyrin, brought a dedicated dance audience to the heart of science. QUANTUM is now on world tour and will feature in the program of the prestigious Brooklyn Academy of Music (BAM) in New York in autumn 2014.

This points to the third reason for establishing the CERN arts program – bringing new audiences to science. By enabling “creative collisions” between artists and scientists, the world of science, which to many may seem impenetrable and daunting, full of big brains, big technology and complex mathematics, is opened up to the public. By using the ideas generated by CERN science (some of the raw materials of innovation and creativity) as springboards of the imagination, artists create works that appeal to our senses, individual experiences, and intuitions, allowing us to reach levels of understanding that standard science communications could never dream of. Through the medium of the arts, otherwise disinterested audiences are switching on to science and technology.

In 2013, through the various streams that make up the Arts@CERN program, the Organization was able to attract a new audience of some 7 million people, enabling it to reach a total of around 14 million people globally.

HOW THE COLLIDE@CERN PROGRAM WORKS

The program is carefully constructed to create the space and conditions for the creative process and interdisciplinary exchanges to take place.

The first step is to match the winning artists with an “inspiration partner” from within the CERN community. This process takes place during Collide@CERN artist induction days, organized three months before the residency begins. Matching artists with scientists is not always a straightforward process: it is



Photo: Arts@CERN

CERN's scientific community gather to listen to *Acoustic Time Travel* by Bill Fontana, one of the world's most renowned sound sculptors.

part psychology, part chemistry and part intuition. The arts producer (in this case, me) discusses with the scientists and artists involved to make the best match; one in which each will push the other to new levels of understanding.

The inspiration partner acts as a CERN guide, meeting the artist every week to discuss ideas and open doors to other people on the campus. The aim is for artists and their partners to exchange ideas and for each to inspire the other, through exposure to their different world views.

CERN theorist James Wells, for example, was matched up with the young German artist Julius von Bismarck because they shared an interest in hidden worlds – places beyond perception. Julius changes perceptions with his art, such as his work *Versuch Unter Kreisen* (Experiment Among Circles), which uses four oscillating lamps that synchronize on every 78th swing but are completely out of phase during the other 77, creating a dancing pattern of light. James, on the other hand, changes perceptions of our known world by creating equations that provide theoretical evidence of hidden worlds. While there is no obligation for the inspiration partners to produce a work of art together, sometimes, these “collisions” do result in a concrete outcome. Unexpectedly and spontaneously, two years after the residency, James and Julius are creating a public art piece together which combines their skills and creativity.

An additional obligation is imposed during the residency, which provides great freedom but with some constraints, another important condition for creativity. Together, the inspiration partners give public lectures at the Globe of Science and Innovation at the beginning and end of each three-month residency. These events attract many new visitors and many others who keep track of the progress of the creative collision throughout the residency via CERN's social media outlets.

Another element of the program, which may seem counter-intuitive, is that no defined outcome is expected during the residency. Why? Because a work of art takes an indefinable period of time to come to fruition. Collide@CERN respects and recognizes the dynamics of the creative process. Choose the right artist, the right inspiration partner, curate their residency so they meet people who will fire their imagination and it is almost guaranteed that something fruitful will emerge. To date, every single artist has created work as a result of their CERN residency – some even before their residency officially began.

The American sound artist Bill Fontana, known for his experiments with sound sculptures using urban landscapes, was so inspired during his induction visit to CERN that he made

a sound sculpture on the train from Geneva to Paris from the audio material gathered while on-site. His work which “mimics the protocol of a scientific experiment,” was used during his residency to turn the then dormant LHC into the world’s largest musical instrument.

Similarly, the current artist in residence, Japanese composer Ryoji Ikeda, one of the world’s leading data artists, working in sound and vision, has already acknowledged the profound influence his CERN induction experience has had on his work. His new work, *Supersymmetry*, presents an artistic vision of the reality of Nature through an immersive, sensory experience. It comprises two massive rooms of electronic and digital installations. The exhibition premiered at the Yamaguchi Center for Arts and Media (YCAM) in Japan earlier this year, and has just opened at Le Lieu Unique in Nantes, France. The exhibition pairs two installations, *Supersymmetry [experiment]* and *Supersymmetry [experience]*, echoing the relationships between experimentation and observation in modern particle physics and between representation and mathematical models.

The installation will continue to evolve throughout its international tour in line with the insights acquired by the artist during his residency at CERN. In this way, his work demonstrates the fluid, dynamic and ever-changing nature of creativity.

The CERN residencies are proving a rich source of inspiration. The work emerging from them is constantly evolving and developing. As Julius von Bismarck said, at the Ars Electronica Festival in Linz in 2012 “I have enough ideas from my residency to last another 30 years.”

NEW MODELS FOR CREATIVE EXCHANGE

In addition to the Collide@CERN residency program, Arts@CERN also includes a Visiting Artists Program and an artists’ research program. Under the Visiting Artists Program, one or two day curated visits are organized for 12 leading and emerging artists. These have included Finnish conductor Esa-Pekka Salonen, who is working on a new creative CERN-inspired musical project. Similarly, the young Dutch film-maker, Ruben Van Leer, is shooting a 20-minute opera-dance film called *Symmetry* with the soprano Claron McFaddon. And the internationally recognized Polish-born artist, Goshka Macuga, has been commissioned by the Centre d’Art Contemporain in Geneva to create an exhibit inspired by her visits to CERN, to be showcased in May 2015.

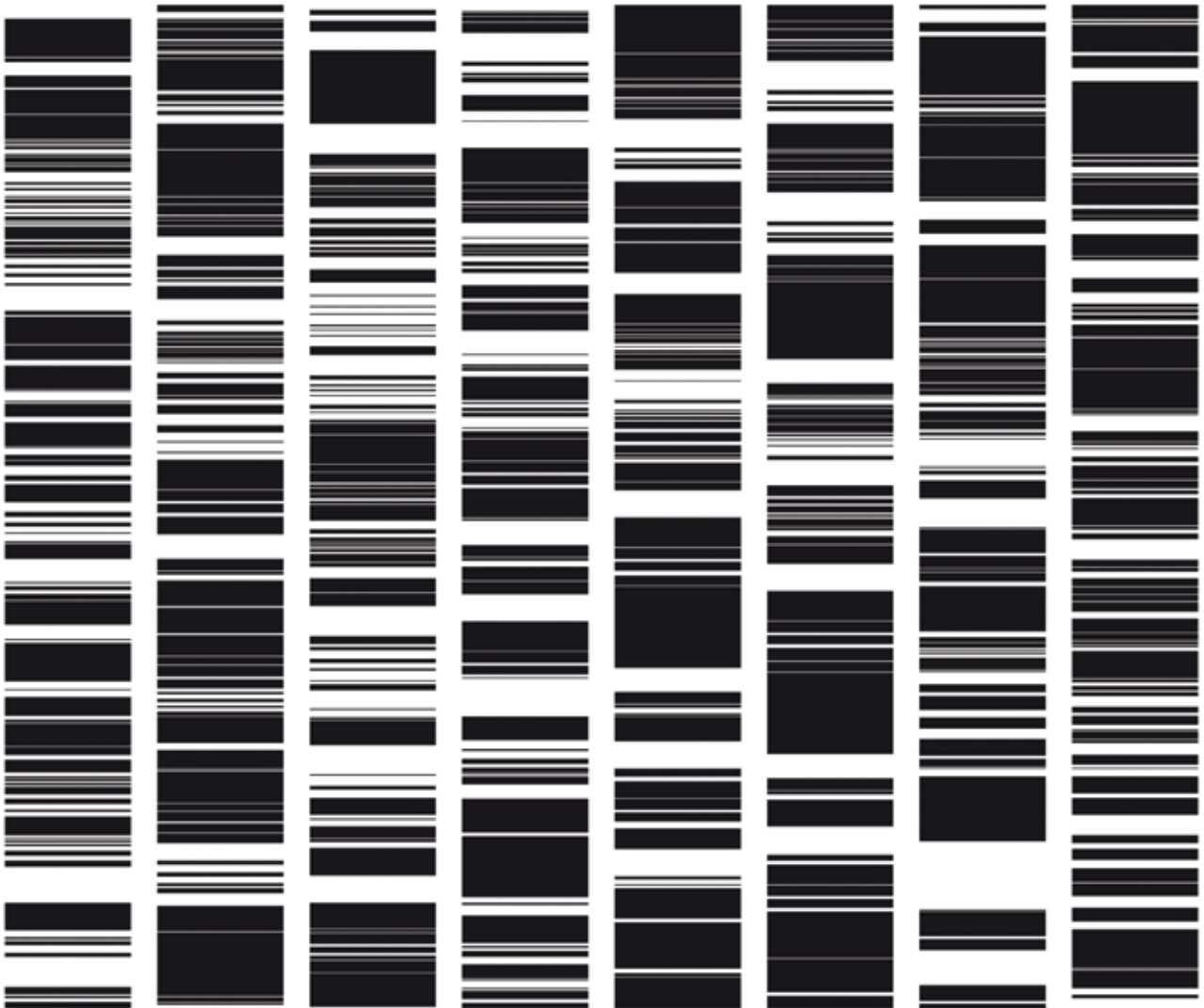
Accelerate@CERN, the Artists’ Research Program is the latest development of the Arts@CERN initiative. It reflects the international collaboration that makes CERN what it is. Every year, two countries hold an open art competition, the winner of which receives a fully funded one-month research placement at the laboratory. In this first year of the program, the artists will come from Greece and Switzerland.

The innovative, cutting-edge Arts@CERN program as a whole, however, comes at a cost, one which is borne by external funders. These currently include the City and Canton of Geneva (which fund the Collide@CERN Geneva award); private donors who fund the bulk of the Prix Ars Electronica Collide@CERN award for artists working in the digital sphere, and different foundations, cultural ministries and organizations which fund the Accelerate@CERN country-specific awards.

Thanks to these fully funded residencies and research opportunities, the selected artists are placed on a par with the scientists who also come to CERN with funding. Like their scientific counterparts, all participating artists are selected for their excellence by a highly qualified jury. This central feature of the Arts@CERN program places artists and scientists on a level footing and creates the conditions for mutual respect and exchange. In this way CERN is acknowledging and demonstrating that the arts, science and technology are equally important cultural forces.

We sometimes say that Collide@CERN is CERN’s latest experiment, colliding ingenuity, creativity and imagination, elements that are even more elusive than the Higgs Boson, discovered in July 2012, 40 years after it was postulated. We continue to express the beauty of these elusive human processes in the arts, science and technology, bringing them together to create and transfer new knowledge and to inspire present and future generations. That is what progressive 21st century organizations, whose purpose is to enrich the world, seek to do.

More information about Arts@CERN is available at: <http://arts.web.cern.ch> ♦



The audiovisual work, *Test Pattern*, by Japanese artist and composer Ryoji Ikeda, converts the digital data that surrounds us in everyday life into flickering barcodes to the accompaniment of an electronic soundtrack.

Visiting Artists 2013 include:

- Esa-Pekka Salonen, Finish conductor and composer. He is currently Principal Conductor and Artistic Advisor at the Philharmonia Orchestra in London and Conductor Laureate of the Los Angeles Philharmonic.
- Anselm Kiefer, German painter and sculptor. His work incorporates materials such as straw, ash, clay, lead and shellac. In his work, he addresses taboo and controversial issues from recent history.
- Arnoud Noordegraaf, contemporary Dutch composer and director of music theatre and opera. His work is typically multi-disciplinary involving a tight and precise combination of musical composition with film images and often theatrical elements.
- Goshka Macuga, Polish conceptual artist, Turner Prize nominee 2008. Her complex sculptural environments combine past facts with topical issues and present-day reality, highlighting affinities and connections which might otherwise pass unnoticed.
- Iris van Herpen, Dutch fashion designer, known for pushing the boundaries of Haute Couture.

Egypt and Tunisia underscore THE IMPORTANCE OF IP

*By Ahmed Abdel-Latif, Senior Programme
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Intellectual Property, International Centre
for Trade and Sustainable Development
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Adaptation of Egypt and Tunisia's New Constitutions Recognize Importance of the Knowledge Economy and Intellectual Property Rights by Ahmed Abdel-Latif, first published by the Centre for Mediterranean Integration, The World Bank, in March 2014

Last January, Egypt and Tunisia enacted new constitutions in the context of the political changes they have been witnessing since the 2011 revolutions that they experienced. While most public attention has focused on how these constitutions have addressed hotly debated issues such as the structure of government, the role of religion and fundamental freedoms, less attention has been given to how they have dealt with economic and social issues. However, for the first time in the history of these two countries, their new constitutions give high priority to building a knowledge economy and provide for the protection of intellectual property rights (IPRs).

The new Egyptian Constitution was put to a referendum on 14 and 15 January 2014 and approved by a large majority of Egyptians who took part in the vote. It replaces the 2012 Constitution enacted under former President Morsi as well as the 1971 Constitution. The new Tunisian Constitution was adopted by an overwhelming majority of the country's Constituent Assembly on 26 January 2014 and replaces the 1959 Constitution.

RECOGNIZING THE IMPORTANCE OF THE KNOWLEDGE ECONOMY

The constitutions of each country include clauses which recognize the importance of building a knowledge economy and emphasize the need to support scientific research, innovation and creativity.

The Egyptian Constitution stipulates that the "State guarantees the freedom of scientific research and encourages its institutions as a means towards achieving national sovereignty, and building a knowledge economy" (Article 23). The State also "supports researchers and inventors" and commits to "allocate a percentage of government expenditures that is no less than 1 percent of Gross National Product to scientific research which will gradually increase until it reaches global levels."

The commitment to allocate a specific percentage of government expenditure to scientific research is remarkable and unusual in constitutional texts. Interestingly, the same provision declares that the "State shall ensure effective means of contribution by private and non-governmental sectors and the participation of Egyptian expatriates in the progress of scientific research." Adopting a more conventional approach, the Tunisian Constitution envisages that "the State provides the means necessary to the development of technological and scientific research" (Article 33).

Between 2004 and 2010, governmental R&D expenditure in Egypt averaged around 0.25 percent of gross domestic product (GDP), below the average for sub-Saharan African countries (excluding South Africa) and barely one-tenth the average for the countries of the Organisation for Economic Co-operation and Development (OECD). Tunisia's expenditure on R&D was higher at around 1.1 percent of GDP in 2009.



Photo: iStockphoto © double_p

Street scene in Cairo, Egypt. In January 2014, Egypt enacted a new constitution which for the first time in its history, gives high priority to building a knowledge economy and provides for the protection of intellectual property rights (IPRs).

(<http://preview.tinyurl.com/oxqjqsf>) Egypt ranked 99th in the 2014 Global Innovation Index (GII) while Tunisia ranked 78th. It will be interesting to see what impact these constitutional clauses have on the economic and innovation performances of each country in the coming years.

In terms of cultural creation and creativity, the Egyptian Constitution commits the State “to promote art and literature, sponsor creators and writers and protect their creations, and provide the necessary means of encouragement to achieve this end” (Article 67). The Tunisian Constitution underscores that the “State encourages cultural creation” (Article 42).

IP CLAUSES: SIMILARITIES AND DIFFERENCES

For the first time, the constitutions of these two countries provide for the protection of IPRs although in different ways. In both constitutions, the wording is succinct: the Egyptian Constitution stipulates that the “State shall protect all types of intellectual property in all fields” (Article 69) and the Tunisian Constitution indicates that “intellectual property is guaranteed” (Article 41).

Neither constitution dwells on the broader public policy objectives underpinning the protection of IPRs. Yet, for several years, developing countries have argued, particularly at the World Intellectual Property Organization (WIPO) and the World Trade Organization (WTO), that the protection of IPRs is not “an end in itself” but rather should contribute to innovation and be supportive of wider socio-economic development objectives. In a similar vein, the US Constitution (Article I, Section 8, Clause 8) considers patents and copyright as means to promote the progress of science and the arts. National legislation that implements such constitutional clauses can elaborate on the rationale for IP protection in order to ensure that it is supportive of broader development objectives.

In Egypt’s case, the IPR clause further declares that the State “shall establish a competent body to uphold these rights and provide for their legal protection as regulated by law.” The exact mandate and powers of this body, however, remain to be specified. Is it intended to be a single unified body that will handle the administration of IPRs as in the case of some countries – such as the UK IP Office – or will it serve more as a coordinating entity to strengthen policy coherence and coordination in dealing with IP issues? In either case, policy makers should ensure that its mandate adequately incorporates public policy objectives and development considerations.

Each constitution places the protection of IPRs within a human rights framework. IPRs are addressed in a stand-alone provision





Photo: iStockphoto © WtFR

Panoramic view of Tunis, Tunisia. The constitutions of several Arab countries make reference to the protection of creators and inventors or the protection of private property, but few of them include an explicit reference to IPRs. Apart from Egypt and Tunisia, only the constitutional texts of Libya, Sudan and the United Arab Emirates (UAE) make such references.

in the Egyptian Constitution under the section dealing with public rights and freedoms, whereas the reference to IPRs in the Tunisian Constitution is embedded within a clause that guarantees the right to private property.

Both constitutions contain a number of clauses on the protection of culture, health, and heritage which can influence both the interpretation and implementation of the IPR clauses. For instance, each constitution enshrines a right to culture (Article 48 (Egyptian Constitution) and Article 42 (Tunisian Constitution)), a right to health (Article 18 (Egyptian Constitution) and Article 38 (Tunisian Constitution)) and the protection of cultural heritage (Article 50 (Egyptian Constitution) and Article 42 (Tunisian Constitution)).

While the constitutions of several Arab countries make reference to the protection of creators and inventors or the protection of private property, few of them include an explicit reference to IP or IPRs. Apart from Egypt and Tunisia, only the constitutional texts of Libya, Sudan and the United Arab Emirates (UAE) make such references.

THE CHALLENGE OF IMPLEMENTATION

The clauses relating to the knowledge economy in the constitutions of Egypt and Tunisia reflect the priority given to promoting innovation and creativity within the new socio-economic policies pursued since the Arab Spring. The reference to “building a knowledge economy” in the Egyptian Constitution is particularly revealing in this regard. The reference to private sector participation in research efforts reflects recognition of the weaknesses

that have characterized the national innovation system and the need to address them. It remains to be seen whether and to what extent this priority will have a tangible impact on the ground, particularly in light of the difficult economic circumstances prevailing in both countries, the limited resources available, and competing public policy objectives.

The reference to IPRs in the Egyptian and Tunisian constitutions is part of a general trend towards the “constitutionalization” of IP protection within a human rights framework deriving either from the rights of inventors and creators or the right to private property. It also reflects higher levels of awareness and engagement with IP issues since the adoption of the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

In light of the general wording of the IPR clauses in both constitutions, ultimately the manner in which these clauses are implemented through national laws and judicial decisions will be critical in ensuring that a balanced approach to IP protection is adopted; one which takes into account the level of development of each country and one which is supportive of their respective public policy objectives. ♦



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