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ISSN 1470-7489

PRINTING · Vanden Broele Group
PUBLISHER · Philippe Vanrie
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COVER ILLUSTRATION · *Surfing a Digital Tsunami*, by Pablo Diartinez (2019)
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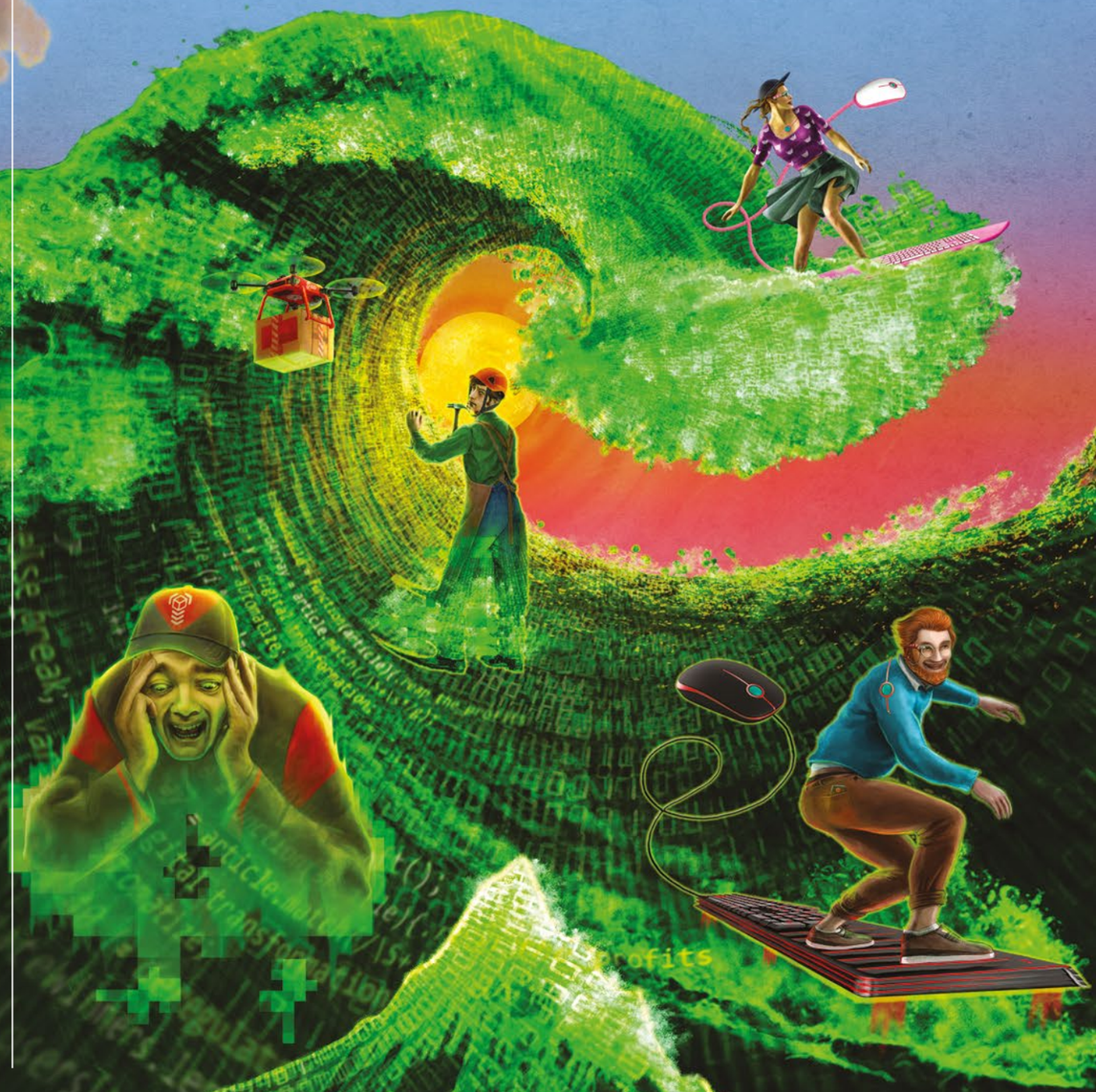
COLOPHON · Body copy text set on Tisa Pro (FontFont Foundry) and DIN 2014 (ParaType Foundry), headlines set on Epilepsia (by designer Mikolaj Grabowski).

The EUREKA magazine is published two times a year.
Opinions expressed within EUREKA magazine do not necessarily reflect those of the organisation.

EUREKA

INNOVATION BEYOND BORDERS



EDITORIAL

The EUREKA Magazine is back under new editorial leadership. As we bid farewell to Thomas Ehritz, Dominik Kirchdorfer takes the stage as the new Editor responsible for this issue. With him comes a different style and content. The EUREKA magazine is evolving and will now feature a greater focus on showcasing the societal impact of the EUREKA programmes and projects, as well as ideas and opinions of prominent figures from the innovation landscape.

While innovation is and will continue to be of great benefit to people, it can also be very disruptive, which is why this issue focuses on digital disruptions. We start with a grand feature on how innovation disrupts our society and how we have to adapt to keep reaping its benefits. The feature is written by none other than Sir John Higgins, former director general of DIGITALEUROPE and Senior Advisor on Digital at Burson, Cohn & Wolfe.

We follow this with an opinion piece by Andreas Schleicher, Director of Education and Skills at the OECD, on his views about the necessary changes for our education systems.

We then take a look at some of EUREKA's most recent success stories that are poised to change the world around us.

What does the EU have to say about the digital revolution? Here to give us her view on the future of copyright and the internet, is MEP Julia Reda, Vice-Chair of the Greens/EFA, member of ITRE & JURI[1] and rapporteur for JURI on the "harmonisation of certain aspects of copyright and related rights in the information society" package.

We do not forget about the private sector either. EUREKA's newest Innovation Hero, Renaud Schoemans, explains why he loves tackling new challenges in the epigenetics sector.

The Country Focus section remains an integral part of the EUREKA Magazine. In this issue we take a look at Belgium and the complex R&D landscape in its regions.

2018 marked the 10th anniversary of the Eurostars programme. In a short statement, MEP Dr. Paul Rübig, Rapporteur for the Eurostars report in the European Parliament back in 2008, pays homage to this successful programme. It has been a wild and long ride, but the team around Eurostars is only getting started, as Peter Chisnall, Head of Eurostars at the EUREKA Association explains in an interview.

We would like to thank all our readers for their continued support of the EUREKA Magazine. Big changes are ahead and we want to hear from you. Please fill out the survey on the last page of the magazine and return it to us o ensure you ocntinue receiving the magazine or fill out the electronic version at:
surveymonkey.com/r/eurekamagazine

Philippe Vanrie
Publisher, Head of EUREKA Secretariat
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1 European Parliament Comittees for Industry, Research and Energy, and Legal Affairs

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> *"change creates winners and losers"*

HOW DIGITALISATION AND AUTOMATISATION AFFECT ALL ASPECTS OF OUR SOCIETY.

By John Higgins. Illustrations: Pablo Diartinez.

SURVIVAL OF THE TRANSFORMED

"It is not the strongest species that survive, nor the most intelligent, but the ones most responsive to change." Charles Darwin's 'survival of the fittest' theory of evolution could also apply to organisations. As they adapt to changing circumstances, they adjust their responsiveness, effectiveness and efficiency. And that is what is taking place across the world as digital technologies transform business models: they are either adapting or dying.

But how is this digital transformation happening? What are the risks? And how is Europe doing?

So it is that taxi firms install new technology to keep up with Uber. Bricks and mortar retailers develop online businesses to fend off Amazon. There are entirely new entities like JustPark, an app that allows thousands of people to make a little extra cash from renting their driveway and provides reasonably priced convenient parking for drivers close to where they want to go. BlaBlaCar is a popular European app that allows people to share the cost of travelling between cities and has the side benefit of giving the driver a travelling companion.

Closer to home —literally in my case— is the service provided by a local utility company to move a gas meter during works at my home. No surveyor came out to take a look. The move was priced and agreed using Google Earth, a short phone call, and a very rapid email confirmation.

Every sector sees the opportunities. A recent report from Kantar Media, on the 2019 outlook for the advertising and marketing sectors, claims right up front that, *"Analytics and artificial intelligence will finally bridge the ROI divide"*. It goes on to tell its readers that AI is one of the greatest developments of our time. This is quite a claim for a sector that has struggled historically to find hard evidence of the value it claims to deliver.

HOW IS EUROPE DOING?

The European Commission's Digital Transformation Scoreboard measures Europe's progress. The 2018 report looks in depth at two of Europe's important sectors;

food and construction. It's a mixed picture. More than 70% of the companies surveyed have invested in digital technologies to improve their production processes, addressing that basic need to improve efficiency and effectiveness.

The Scoreboard draws some broader conclusions too. For example, it calculates that **the internet of things, used to improve traceability in supply chains, could reduce food loss by up to 35 million tonnes by 2030.** But the report concludes that although a first set of digital technologies has been taken up, large scale and coherent adoption of newer technologies is still at an early stage.

One factor affecting the faster adoption of digital technologies is their sheer number. The Scoreboard examines nine key digital developments and their uptake; social media, mobile services, cloud technologies, internet of things (IoT), cyber-security solutions, robotics and automated machinery, big data and data analytics, 3D printing and artificial intelligence. The Commission's Digital Intelligence Platform is able to take the European digital pulse and assess the popularity of the different technologies. It reveals that **after cybersecurity, the two biggest things on the radar in 2017 were artificial intelligence (AI) and blockchain.**

NOT TO EVERYONE'S TASTE

But there are problems too. Take personalised marketing, for example. On the face of it, it seems like a good thing: why wouldn't we want to hear of things we're most likely to need? **Many people, though, find personalised marketing to be intrusive and are uncomfortable with the use of their data in ways they don't fully understand.** Some find it frankly creepy.

The scale and reach of digital technologies can amplify issues that may not matter in the analogue world. Having friends performing songs at your party without paying royalties is one thing, featuring them on your new YouTube channel is quite another.

While today's digital technologies are, to some extent, simply the latest tools to help organisations improve, they are different in a couple of ways. **They enable entirely new ways of doing things rather than just steady improvement: more organisational revolution rather than evolution.** And the pace at which these new tools become available is faster than ever before. So fast in fact, that many feel it's not only beyond their ability to keep up, but also that the risk of being leap-frogged is so much higher.

> *"the pace at which new tools become available is so fast that many feel it's beyond their ability to keep up"*

WHAT'S HOLDING US BACK?

Getting digital transformation right matters for Europe. We need our companies to remain competitive, thrive and grow, provide jobs and pay taxes. European public service organisations like hospitals, social services and schools need to be as efficient as possible if they are to have any chance of meeting rising demand with fewer resources.

Of course, it is not just Europe that is benefitting from digital transformation. The developing world has many examples of digital progress too: these include innovations for digital currency and for shortening times to market for small food producers.

Change creates winners and losers. Some win because they have used digital technology to provide a better product or service or because improved efficiency means they can offer a lower price.

This is how markets and competition work. The creative sector has a long relationship with technology. The BBC was created by radio manufacturers who realised that no-one would buy a radio just because it looked good. People wanted something to listen to. Today the two sectors —broadcasting and equipment manufacturing— are often at loggerheads but still need each other badly. This relationship got more difficult the bigger the scale became.

AMPLIFYING FAULT LINES

Digital transformation has turned a couple of the weaknesses of the system into potentially serious problems.

First, although **it's inevitable that laws and regulations lag behind technological change, policymakers should be watching developments closely.** It takes time and careful monitoring and analysis to comprehend the many implications of the digital transformation.

For example, following the financial crash of 2008, traditional banks are subject to closer scrutiny by supervisory bodies. Digital technologies allow non-bank organisations to offer services that the average user would find hard to distinguish from those they've traditionally received from their retail bank. But these non-bank organisations are not burdened by such supervision and regulatory oversight and the associated compliance costs, and so can bring new services to the market much more quickly. A recent study by Bain had the telling sub-title, *"Alexa, move my bank account to Amazon"*.

A second concern is market power. In the analogue era companies gained monopolistic advantages slowly. Competition authorities (and the emerging monopoly's competitors) learned to see it coming and had time to act before the market was seriously damaged.

Companies using digital technologies and harnessing the network effect can gain at least quasi-monopolistic positions

very quickly. They can effectively destroy a market and accumulate disproportionate wealth long before competition authority processes, designed in the analogue age, can stop them.

LOYALTY —WHAT'S THAT?

Thanks to digital technologies, we can create organisations that are largely virtual. It's good that such entities can have very small, though rarely zero, environmental footprints —especially compared to, say, resource hungry manufacturing companies.

But virtual companies can switch geographic allegiance much more easily, leading to tax arbitrage and ultimately less money coming into the public purse. This in turn puts more pressure on public services already stretched by Europe's changing demographic and its ageing population.

A.I.: NEW OPPORTUNITIES, NEW QUESTIONS

The Commission's Scoreboard says the general perception of artificial intelligence is positive and optimistic. There is a steady growth in discussions with a stable engagement level. As Andrea Renda from CEPS in Brussels put it recently, *"the promise of AI is easy to spot if one considers two fundamental starting points. As AI lands on our planet, it finds a society that progresses in terms of life expectancy and the eradication of poverty and famine. But it is also fraught with contradictions and inequality, with unsustainable production and consumption patterns as well as deteriorating social relationships".* AI not only creates new types of opportunity it also raises some specific questions of its own, such as transparency of the algorithms, ethics, bias and discrimination. But perhaps the question asked most often is **what does it mean for jobs? The answer to that depends largely on how effectively we can give our current and future workforce new skills.**

AI has only started to be broadly useful thanks to the ready availability of big data, in combination with cheap and plentiful computing power and easy access to often open source AI tools such as Google's TensorFlow, Microsoft's Cognitive Toolkit or Theano.

The Commission's AI coordination plan was published in early December 2018, designed to encourage, cajole and coordinate member states' work on the topic. The AI high level expert group will complete its work on ethics in early 2019.

Burson, Cohn & Wolfe will produce a second BrAInstorm survey report later in 2019 looking at progress with AI in some key European sectors. It will be interesting to see whether the gap in attitudes revealed by the first survey has narrowed. We found policymakers generally thought that more regulation was needed while early adopters of AI were more prepared to monitor how the market developed and how existing legislation copes.

ACCELERATING PROGRESS

Some would like to turn back the clock on digital transformation, call a halt or at least slow down the pace of change. Clearly the first two options are non-starters. The third might be possible but risks undermining Europe's competitiveness. Our strategy should be thoughtful and considerate adoption and encouragement while in parallel identifying and tackling the issues, and minimising and managing risks.

We need fit and strong employers in Europe, developing world-class products and services at the best possible price, paying taxes and creating good jobs. We need effective public services able to meet changing, rising demand for healthcare, education and public security. Digital technologies are, like it or not, essential to achieving this.

> *"make it easier for organisations to teach their staff new skills they will need for the digital workplace"*

Slowing things down, even if possible, simply delays the realisation of these benefits. Instead, we need to focus our efforts on how to gain the rewards with as little negative impact as possible. The European Commission's Strategic Policy Forum on digital entrepreneurship brought together a group of people from diverse backgrounds to consider how this might be done.

CITIES SET THE PACE

The Forum spotted early that some European cities had a big part to play and were doing a better job than others in nudging their businesses down the transformation road. The result is that today we have a thriving Digital Cities Challenge.

The programme already has successful users of the blueprint we developed. The Amsterdam Metropolitan area is a mentor city. In early December 2018 a group of leading mayors signed a 'Declaration of Cooperation for Digital Transformation and Smart Growth'. It emphasises the importance of breaking down silos and increasing cooperation among cities for the good of the people who live there.

Other critical success factors include digitisation of a city's infrastructure such as transport, energy and water. This often means adding sensors to the infrastructure to collect and send back data. Successful cities make it easy to access both technology and the big data collected this way. Many cities support innovation hubs and fab labs, centres set up specifically to support digital fabrication.

NEW SKILLS PLEASE

The Forum also looked at the perennial skills problem. Not just how to fill the jobs gap but also how to equip the current workforce with the skills they need to play their part in their organisation's digital success. Since the arrival of the weaving loom and the steam engine, our societies have changed. They have adapted as their Darwinian instincts have kicked in to take advantage of these new wonders.

Medical practice today is transformed by new technology and this needs new skills, for example in nursing, which today is a graduate profession. And we create whole new ways of earning a living: the digital industries themselves employ over 8.5 million people across Europe.

Research by Empirica for the Commission suggests that by 2020 there will be between half and three-quarters of a million jobs unfilled. The creative sector has grown massively thanks to digital technologies.

It's no bad thing if the jobs of the future are those that require us to hone our unique human attributes such as emotional intelligence, intuition and judgement.

Yet although there are valuable pan-European networks like European Schoolnet and initiatives such as French President Emmanuel Macron-inspired networks of European universities, the EU institutions themselves have limited influence over Europe's creaking education systems.

Member states continue to guard education jealously as one of their national competencies and even, in many parts of Europe, devolve it to the regional level. A number of education ministers have told me first-hand that education systems are notoriously resistant to change. There is much truth in the assertion that schools teach children about the past and not their future.

TAKE PEOPLE WITH US ON THE DIGITAL JOURNEY

A key conclusion from the Forum was the vital importance of taking broader society with us on the transformation journey. A positive workforce —with some who can act as ambassadors to their family and friends— will only develop if people feel an investment in their personal development.

Another tangible outcome of the Forum's work is that sector-specific training and development toolboxes are being built to make it easier for organisations to teach their staff new skills they will need for the digital workplace of a transformed company. The results will be launched at a conference in Brussels in June 2019.

A third conclusion was the importance of data and especially what's known as big data. Big data's characteristics are typically volume, velocity, variability and veracity. Getting value from large amounts of fast-changing sets of data of mixed types and uncertain accuracy is an altogether different proposition from analysing the simple, consistent data many of us have dealt with previously.

Much of the European political and popular focus on data has been on how to keep data secure and, for personal data, how to ensure it's only used in the way its owner wants. But big data is a sort of rocket fuel for much digital progress. The Forum proposed gathering big data expertise at both a member state and pan-European level.

The focus should be on how to spread knowledge of the potential of big data for SMEs, public bodies and other interested parties. These sectors might be able to use it in ways that both stay within the new data protection laws and within what people feel is acceptable.

KEEPING DATA AND NETWORKS SAFE AND SECURE

Spies, thieves and data abusers are everywhere —or so you might believe. But public confidence in cybersecurity is essential for successful digital transformation. Travelling by coach and horses suffered from »

> *"a positive workforce will only develop if people feel an investment in their personal development"*

slow take-up while there were lots of highwaymen on the roads.

Kevin Mitnick is arguably **the world's most famous hacker. He was jailed for five years after he hacked into multiple government computers and more than 40 corporate systems. He has now put his knowledge in the public domain,** and the huge popularity of his books and public talks speaks volumes about the seriousness with which most organisations and crime fighting bodies take cybersecurity today.

The Scoreboard reports that adoption of cybersecurity technologies is highest among large firms with more than 250 employees. Interestingly social engineering, insider weaknesses and confidence tricking remain as big a part of the cybercrime world as they do of the analogue crime world.

Organisations and individuals can increase their protection from cybercrime by following the basics and thinking about cybersecurity in a similar way as they do with physical security. Fears about cyber safety need not hold up our digital journey.

WILL THE GLOBAL INTERNET SURVIVE?

Digital technologies can make national boundaries seem less important. But global sentiment is running in the opposite direction. Companies like Huawei have critical technology for the world's 5G networks that underpin many promising future developments like automated cars —in fact anything that relies on ultra low latency. Yet it is precisely these companies that are being caught up in the geo-political battleground between the US and China.

Dame Wendy Hall, former chair of the Chartered Institute for IT and Professor of Computer Science at Southampton University, argues in a recent paper that the internet risks being divided into four —she calls them the open, bourgeois, commercial and authoritarian internet. In Professor Hall's analysis, examples of each might be California, Brussels, Donald Trump and Beijing respectively.

> *"the internet risks being divided into four —the open, bourgeois, commercial and authoritarian internet"*

BURNING YOUR GARBAGE NOW POWERS YOUR COMPUTER

Around half of all energy is wasted as heat. But this 'waste heat' can be harnessed, alongside even low-temperature geothermal heat, to produce electricity with the help of clever technology honed for the global market thanks to international support from the EUREKA-Eurostars program.

Resource efficiency and so-called 'closed-loop' concepts that treat waste as a resource not a burden are part of a radical shift in attitudes towards a low-carbon, pro-sustainable future. Europe has invested heavily in this 'green growth' future, as reflected in the European Commission's Circular Economy Package, which encourages repair, reuse and innovative ventures to better use company assets, and other sharing economy models.

But can waste be an asset? Yes, waste heat, which can be found almost everywhere and is mostly dumped into the atmosphere or oceans —further adding to carbon emissions and climate change— can be converted to electricity.

"There is an urgent global demand for innovative solutions and smart applications for a sustainable society," notes the Netherlands Energy Research Centre, a partner in the Eurostars 'Heat-to-Power' project. *"That presents quite a challenge, but the rapidly growing market for sustainable energy offers tremendous opportunities for entrepreneurs who offer competitive products or services at an international level."*

In fact, waste heat and geothermal energy below a critical temperature are today considered one of the greatest untapped energy sources largely due to limitations in existing technologies, according to Climeon, the Swedish energy business whose green technology was at the centre of the Heat-to-Power project.

Climeon's product is the first recovery system to fully exploit waste heat from industry and low-temperature geothermal energy to produce a sustainable electricity source. The company focuses on several segments: maritime and engines, steel and cement production, and geothermal energy.

START-UP WITH PROMISE

The 30-month project helped Climeon optimise and improve its technology so that it can reliably generate electricity from as low as 60-80°C heat (waste or geothermal). Today, the patent-protected product offers market-leading performance in its core application areas, according to the project's leader Joachim Karthäuser, Chief Technology Officer at Climeon.

"When we applied for Eurostars, we were a small start-up with very promising results, obtained in cooperation with the Royal Technical High School in Stockholm (KTH). We were confident that we would be able to profitably convert 90°C heat into electricity, and the main idea was to push the boundaries even further down, i.e. we wanted to utilise 70°C heat to make the most of abundant thermal energy."

The heat conversion, he explains, uses a novel Rankine Cycle: *"In essence, a medium is evaporated, and the resulting gas under pressure drives a turbine*

WIDESPREAD IMPLICATIONS

Europe's continuing digital transformation has profound implications, not least for the research community. Governments are increasingly focused on the impact of research and seeking clearer demonstrations of its value, nowhere more so than in the field of digital technologies.

This transformation will require continuing improvements between researchers, research programmes, industry and wider society. International collaboration must be ready to weather the pressures on it. In turn research funders in the EU and member states need to understand that scale and speed is important if Europe is to match the coordinated and massive investment of China and the US. Allowing our research to remain fragmented across member states makes it even more difficult for us to keep pace with these two giants. Failure to address these points will simply push businesses and public service organisations to buy the tools and expertise from market ready US and increasingly Chinese big tech.

TIME TO GRASP THE OPPORTUNITIES

Few things are certain in Europe today. But Darwin's observations are as true now as they were 150 years ago. Europe's digital transformation is taking shape and is gathering speed. It offers opportunities for most organisations, developers of new technologies and the research community. We need to be ready to manage the risks and reap the rewards.

JOHN HIGGINS
is the former director general of DIGITALEUROPE, the European tech industry association. He was President of the European Commission's Policy Forum on Digital Transformation. He is a Senior Advisor in Brussels and London on digital for global communications company Burson, Cohn & Wolfe.

and an electrical generator, then the gas is converted/ cooled back to liquid state, and the process starts again."

The company received its first order in 2015 while the Eurostars project was still ongoing, and has since established a diverse customer base including shipping giants Maersk and Viking Line, as well as Fincantieri and Virgin Voyages, but also the Swedish steel-maker SSAB. It has also signed on a large Icelandic geothermal project and another in Kirchweidach, Germany.

HOT MARKET

Geothermal heat of 90°C or lower is much easier to find globally, and cheaper than higher temperatures, which opens up a vast market for Climeon's converter technology. Further growth is likely as more industries —especially energy-intensive production plants in areas like steel and cement— appreciate the potential cost-savings and environmental benefits of reusing waste heat. Another untapped market

> ***"the company received its first order in 2015 while the Eurostars project was still ongoing..."***

which the company has entered into, is to channel heat from large marine engines, such as cruise ships, back into the ship's own power system.

Leaning on the law of conservation of energy, Karthäuser explains that wherever there is spent heat, there is an untapped power source. *"Climeon's Heat Power System can be connected to almost any low-temperature heat source, from solar panels to paper mills to data centres ... thus producing significant amounts of clean electricity."*

Climeon was listed on the Nasdaq (First North Premier) in 2017, rapidly growing from a handful of workers to a team of more than 50 in under six years. This is thanks to a strong focus on selected markets, on-time delivery, quality and customer satisfaction, says Karthäuser. He also wants to give credit to all of the partners.

"Eurostars support enabled the cooperation with Sweden's Alfa Laval and IF Technology, as well as with ECN in the Netherlands," he notes. This led to a *"truly great network"* for further developing the technology; one which continues even after the project ended in 2016.

EUREKA EUROSTARS
PROJECT ID 8 097
HEAT-TO-POWER

COUNTRIES & NATIONAL FUNDING BODIES	**SWEDEN** Vinnova	**THE NETHERLANDS** RVO
TOTAL COST	**€1.54 M**	
DURATION	OCTOBER/**2013** TO APRIL/**2016**	
MAIN PARTNER	Climeon AB, Sweden www.climeon.com joachim.karthauser@climeon.com	
OTHER PARTNERS	**SWEDEN** Alfa Laval Corporate Ab www.alfalaval.com IF Technology Sweden www.iftechnology.nl	**THE NETHERLANDS** ECN, Energy Research Centre www.ecn.nl

OPINION EDITORIAL

EDUCATING STUDENTS FOR THEIR FUTURE NOT OUR PAST

BUILDING THE SCHOOL OF THE 21ST CENTURY IS NOT EASY, BUT DESPERATELY NEEDED

By Andreas Schleicher. Illustrations by Pablo Diartinez

It's so much easier to educate students for our past, than for their future. Schools are inherently conservative social systems. As parents we get nervous when our children learn things we don't understand, and even more so when they no longer study things that were important for us. Teachers are more comfortable to teach how they were taught than how they were taught to teach. And politicians can lose an election over education issues but rarely win one over education, because it takes way more than an election cycle to translate good intentions into better results.

The biggest risk to schooling today isn't its inefficiency, but that our way of schooling is losing its purpose and relevance. And when fast gets really fast, being slower to adapt makes education systems quickly disoriented. We live in this world in which the kind of things that are easy to teach and test have also become easy to digitise and automate. Education has won the race with technology throughout history, but there is no automaticity it will do so in the future. The future will be about pairing the artificial intelligence of computers with the cognitive, social and emotional skills and values of humans. If we want to stay ahead of technological developments, we have to find and refine the qualities that complement, not compete with, capacities we have created in our computers.

When we could still assume that what we learn in school will last for a lifetime, teaching content knowledge and routine cognitive skills was rightly at the centre of education. Today, the world no longer rewards us just for what we know —Google knows everything— but for what we can do with what we know. If all we do is teach our children what we know, they may remember enough to follow in our footsteps. It is only if we help them build a reliable compass and smart navigation skills that they will be able to go anywhere and find their way through this increasingly complex, volatile and ambiguous world.

The more knowledge that technology allows us to search and access, the more important becomes deep understanding and the capacity to make sense out of content. Understanding involves knowledge and information, concepts and ideas, practical skills and intuitions. But fundamentally, it involves bringing them together, integrating and applying them. And in a structurally imbalanced world, the imperative of reconciling diverse perspectives and interests requires people to become adept in handling tensions and dilemmas; striking a balance between competing demands —equity and freedom, autonomy and community, or innovation and continuity.

Tomorrow's schools need to help students think for themselves and join others in work and citizenship. They need to help students develop a strong sense of right and wrong and sensitivity to the claims that others make. At work, at home and in the community, people will need a deep understanding of how others think, whether as scientists or artists, and how others live, in different cultures and traditions. Whatever tasks machines may be taking over from humans at work, the demands on our capabilities to contribute meaningfully to social and civic life will always keep rising.

The good news is that our knowledge about what works in education has improved vastly. The first thing is that leaders in high-performing education systems have convinced their citizens to value the future. Chinese parents and grandparents will invest their last money into their future, the education of their children. In Europe we have already spent the money of our children for our own consumption.

But valuing education highly is just part of the equation. Another part is the deep belief that every student can learn, and to realise that ordinary students can have extraordinary talents.

And nowhere does the quality of a school system exceed the quality of its teachers. Top school systems select and educate their teaching staff carefully. And they provide an environment in which teachers work together to frame good practice, and they encourage teachers to grow in their careers. Top-performing school systems have also advanced from administrative control and accountability to professional forms of work organisation. They encourage their teachers to be innovative, to improve their own performance and that of their colleagues, and to pursue professional development that

»

leads to better practice. In top school systems, the emphasis is not on looking upwards within the administration of the school system. Instead it's about looking outwards to the next teacher or the next school, creating a culture of collaboration and strong networks of innovation.

And the best-performing school systems provide high-quality education across the entire system so that every student benefits from excellent teaching. To achieve this, these countries attract the strongest principals to the toughest schools and the most talented teachers to the most challenging classrooms.

Still, knowledge is only as valuable as our capacity to act on it and the road of educational reform is littered with good ideas that were poorly implemented. The laws, regulations, structures and institutions on which educational leaders tend to focus are just like the small visible tip of an iceberg. The reason why it is so hard to move school systems is that there is a much larger invisible part under the waterline. This invisible part is about the interests, beliefs, motivations and fears of the people who are involved in education; parents and teachers included. This is where unexpected collisions occur, because this part of educational reform tends to evade the radar screen of public policy. That is why educational leaders are rarely successful with reform unless they build a shared understanding and collective ownership for change, and unless they build capacity and create the right policy climate, with accountability measures designed to encourage innovation rather than compliance.

Many teachers and schools are ready for that. To encourage their growth, policy needs to shift toward inspiring and enabling innovation, identifying and sharing best practice. In the past it was sufficient to sort students because our economies could rely on a few highly educated individuals. Today, we need everyone to participate and contribute to the world.

In traditional bureaucratic school systems, teachers are left alone in classrooms with plenty of prescription on what to teach. Future teachers and schools are looking outwards to collaborate with the next teacher and the next school. The past was about delivered wisdom, the future is about user-generated wisdom.

The past was divided: we had teachers and content divided by subjects and student destinations; and the past was isolated: schools were designed to keep students inside, and the rest of the world outside. The future needs to be integrated, that means emphasising integration of subjects, integration of students and integration of learning contexts; and it needs to be connected: that means connected with real-world contexts, and also permeable to the rich resources in the community.

Instruction in the past was subject-based, instruction in the future will be project based. The past was hierarchical, students were recipients and teachers the dominant resource, the future is co-created, and that means we need to recognise both students and adults as resources for the co-creation of communities, for the design of learning and for the success of students. The future also needs to be collaborative, and that means changing working norms. Expressed differently, we are seeing a shift from a world of stocks —with knowledge that is stacked up somewhere depreciating rapidly in value— to a world in which the enriching power of collaboration is rising.

The goals of the past were standardisation and compliance, that is, students are educated in batches of age, following the same standard curriculum, all assessed at the same time. The future is about personalising educational experiences, that is building instruction from student passions and capacities, helping students personalise their learning and assessment in ways that foster engagement and talents.

In the past, schools were technological islands, that is technology was deployed mostly to support existing practices for efficiency gains. Future schools are empowered and use the potential of technologies to liberate learning from past conventions and connect learners in new and powerful ways. The past was interactive, the future is participative. We need to understand that learning is not a place, but an activity.

The future is also about more innovative partnerships. Isolation in a world of complex learning systems will seriously limit potential. Powerful learning environments are constantly creating synergies and finding new ways to enhance professional, social and cultural capital with others. They do that with families and communities, with higher education, with other schools and learning environments, and with businesses.

But in the face of all these challenges we should not be passive. While technology and globalisation have disruptive implications for our economic and social structure, they don't have predetermined implications. It is the nature of our collective responses to these disruptions that determines their outcomes —it's the interplay between the technological frontier and the cultural, social, institutional and economic agents that we mobilise in response.

ANDREAS SCHLEICHER

is Director for Education and Skills and Special Advisor to the Secretary General of the Organisation for Economic Cooperation and Development (OECD) in Paris. There he initiated and coordinated international comparative studies such as PISA (student performance comparison), PIAAC (adult education) and TALIS (learning and teaching) as well as country analyses and accompanying studies based on these, which create a global platform for educational policy and practice to stimulate and accompany reforms. As a key member of the OECD's senior management team, he supports the Secretary General in the implementation of the OECD Agenda for Promoting Social Progress. Andreas Schleicher studied physics in Germany and mathematics and statistics in Australia. He has received numerous awards and honours, including the Theodor Heuss Prize for "exemplary democratic commitment" and an appointment as honorary professor at the University of Heidelberg.

"NETFLIX WOULD HAVE NEVER BEEN SUCCESSFUL IN EUROPE""

VICE-CHAIR OF THE GREENS/EFA GROUP
JULIA REDA

ON HOW THE EU NEEDS TO ADAPT TO ENABLE A EUROPEAN DIGITAL MARKET TO GROW WITH THE HELP OF EUROPEAN SMES, BECAUSE THE INTERNET KNOWS NO BORDERS.

Interview by Dominik Kirchdorfer. Photos: Dominik Kirchdorfer & Public Domain

E! **Recently you have gained quite a bit of publicity with the debate around the copyright reform. Could tell us a bit about your work in the European Parliament?**

JR Certainly. I am Julia Reda, the only representative of the Pirate Party in the European Parliament. I am the Vice-President of the Greens/EFA Group and work on digital issues in the broader sense for the group. Copyright is my speciality, because I believe it is not possible to have a digital market without harmonising copyright law and making it fit for the digital age.

The copyright laws we are dealing with today were largely designed in a digital-free age and so the fundamental logic underlying copyright law quite often clashes with digital technology and the last update of copyright law was made in 2001, at a time when people were not carrying around smartphones in their pockets; which are basically little copyright infringement machines. Wikipedia was just starting out, there was no Facebook; a completely different world.

I think one of the big fundamental challenges we have with copyright and digital technology is that digital technology always makes copies, regardless of what you do. Take the example of emerging technology like Artificial Intelligence algorithms. If you have an image recognition algorithm, they need to process a huge amount of images in order to recognise patterns. All of these learning processes create copies.

All of this is regulated by copyright law, even though the purpose of copyright law was originally about controlling the dissemination of culture. If someone has 20.000 copies of a book in their basement, you can be pretty sure that the intention is to sell them or to give them away in some form and that is why copyright law forbids the copying as such. With computers it is completely different. An algorithm that looks at one million cat pictures in order to know what a cat looks like doesn't enjoy the work and there doesn't necessarily need to be a remuneration of the photographer. So, the entire logic of copyright law doesn't really work with digital technology.

E! **Is there not also a problem with different kinds of interpretation of copyright law in different countries internationally? There is this very interesting example of a programmer that creates an AI that then creates an artwork based on, let's say Rembrandt. Then the question is posed who the copyright belongs to. The investors of the company that employs the programmer, the company, the programmer, or is it the AI or even Rembrandt himself?**

JR There are definitely different interpretations of this. I would say the traditional continental European copyright system would probably say that there is no copyright, because the work was not created by a "creator" [meaning AI is not classified as a creator], so it is not original and therefore not protected by copyright. But the UK copyright system would probably consider the software programmer to be the copyright owner. So, there are fundamentally different approaches and I think for the online environment that is doubly difficult, because copyright applies on a territorial basis. That means if copyrighted content is accessible online from a particular country, then the right holder can sue you in that country. It is different from a lot of other areas of the law where you only have to worry about complying with the law in your own country, but if you are active online you basically have to comply with the law in 28 different countries.

E! **So that is where geo-blocking comes in.**

JR Yeah, it does. I think the European Commission was right in the beginning of this legislature, when they said: "*We need this Digital Single Market to allow European digital companies to compete.*"

A company like Netflix could have never been founded in the EU. Because buying all these rights for all these individual countries is just too cumbersome and the only reason why Netflix is successful in the EU now, is because they had a huge single market in the US that allowed them to grow and to be able to heavily invest in Europe and run at a loss for a while, while they were buying up all these rights. Now they are also making their own productions and of course they

don't have these problems anymore. But if we want European companies to be able to compete in the tech sector, then we have to do something about this.

E! **So we have to complete the Digital Single Market, otherwise, we will leave the field to other players.**

JR Yes, absolutely. The European approach to copyright has been to try and punish existing large technology companies, instead of actually allowing the competition for them to grow. It is almost as if European technology policy has given up on ever having successful tech companies growing in the EU. Instead they try to put in place laws that will somehow magically force Google or Facebook to share some of their profits with European entertainment companies. But what they often do not realise is that they actually entrench the positions of these big players. For example, on the discussion around upload filters, the position of the Council is that a platform like YouTube would have to either get licenses from all right holders in Europe or employ state-of-the-art upload filters. I think from the perspective of YouTube, the choice is very clear. They will employ upload filters, because they are building the state-of-the-art. Any European company that might not have the capacity to build their own content-ID might end up buying licenses where they can, and where they cannot, they will probably have to buy those filters from the American technology companies. It is really counterproductive.

E! **The filters seem quite hard to implement. It seems like it would be impossible for a smaller company and still very hard for even the biggest companies to create these filters, simply because they have to parse through a lot of existing copyrighted material in order to be able to recognise what is copyrighted and what isn't.**

JR Certainly. I would say it is impossible to build filters that accurately distinguish between copyrighted material and legal material. For some sectors, maybe music, they may be able to reliably catch a large number of infringements, but they will also catch a lot of legal content in the process.

E! **I guess also because derivatives are often actually legal. You are allowed to remix content.**

JR Exactly, but the incentives are very much tilted to one side. If the platform deletes too much, the worst that will happen to it is cause some reputational damage, but if they delete too little, they are directly liable for copyright infringement. The incentive is clearly there to block more.

But there are two different approaches to this topic. On the one hand you have the Council that basically says you are liable, unless you use filters to the state-of-the-art and then of course the filters do not have to be perfect. They just have to approach what is doable technologically.

This is perhaps nicer for the platforms, but still terrible for users, because their legal content gets caught in it. It is also bad for creators, because they simply will no longer get any money if platforms like YouTube decide they are just going to use filters now.

On the other side, you have the position of the Parliament that says you are liable for everything no matter what you do. This of course puts the platforms in an impossible situation, because of course they cannot get licences from every right holder in the entire world.

> *"the European approach to copyright has been to try and punish existing large technology companies, instead of actually allowing the competition for them to grow"*

E! **How did that position come to be?**

JR I think there is a fundamental lack of understanding of what it means. Basically if the Parliament adopts a position that forces platforms to do something that is impossible, either they don't want platforms to operate in Europe or they have not understood what they have adopted.

I can only judge the position by what it is, which is a direct liability for platforms for all copyright infringements of their users. Even if they do use filters, as soon as the filter makes one mistake, they are still liable. There is no way out.

E! **It sounds almost like a modern type of censorship.**

JR I think under the Parliament position it simply is not possible to run a platform in Europe legally. So, I think the question of censorship comes up more in the Council position, where the platforms are basically driven to use filters, whereas in the Parliament position, the platforms are stuck between two impossible scenarios. They have to use upload filters that don't make mistakes, which just don't exist, or they have to buy licences for everything. Basically, the law says: You cannot run a platform in Europe.

E! **Which also means that content creators have no place to distribute their content.**

JR Yes, in a way it is giving up. It is saying: "*This is not a sector where Europe is successful, so we are going to try and destroy it completely.*"

E! **Do you think it is a conscious "surrender", or do you think it just has to do with the fact that legislators don't know enough about technology, mainly because most of them are older and not as familiar with it as newer generations?**

JR I think there is a lot of different elements that come together. Some politicians do realise that it is unworkable, but they may support it anyway, out of a kind of political expediency, because they hope this problem will ultimately be solved by the Court. Of course, this will take time and we will have a lot of legal uncertainty, but it is politically costly to openly oppose the entertainment industry. They are very powerful in Europe and they have a lot of control over election coverage and things like that, so it is not a comfortable political position to be in. That is why a lot of politicians avoid dealing with copyright infringement.

E! **Perhaps you have some insights into why the entertainment complex is so interested in implementing upload filters in the first place? They must be aware that, yes, they will be able to enforce copyright law, but they are also limiting their own ability to distribute.**

JR I think there are differences in the interests of the different parts of the entertainment industry. For example, the music industry is more interested

in negotiating licences with the platforms. They probably think that if the platform has a choice between an overly expensive filter and a license, they will be more likely to negotiate the license. Unlike for other copyrighted material, for music you have relatively strong collection societies that can negotiate a deal. YouTube, for example, already pays the collection societies for music in Germany. It is just that they consider that they do not pay them enough for it. They want to have a bigger stick given to them by the law, in order to change the dynamics in the negotiation. I think their goal is not for platforms to actually use upload filters. However, if we end up with the text that the Council ended up adopting, that would be on the contrary to what the music industry originally wanted. The Council text confirms that, as long as you can use a filter, you don't have to pay. So, it is really counterproductive.

I think the reason for this may be, because in some ways the film industry is even more powerful and the film industry generally does want upload filters, because they don't want YouTube to pay them. They want to ensure that especially blockbuster films are not uploaded in the first place. They want to protect their cinema market etc.

E! **Do you think there will be a kind of countermovement or backlash from citizens that will eventually jump off the internet and turn to other alternatives, like a new darknet or something similar? Or do you think that people will simply accept these changes and continue with the internet, because it is convenient?**

JR This change has not been adopted yet and I am always more of a proponent of trying to find political solutions rather than trying to find technical solutions. The experience of the last twenty years or so, since the development of the internet, have shown that sometimes measures to close down the internet are successfully stopped. For example, in the early days there was no net neutrality regulation, because it was not needed and as the threat to net neutrality grew, increasingly countries started putting forward legislation to protect net neutrality.

At the same time, you have this monopolisation of access to the internet with wall gardens and people only experiencing the internet through Facebook etc.

So I think it is a struggle, but it should primarily be a political struggle. Of course, it is possible that if these fights are lost politically and also lost legally, because there is always the possibility of stopping these proposals in the Court of Human Rights, then as a last resort, it is possible that people will try to find a way around the internet and use different communication infrastructures. Of course, I also think that that would be pushing back the development quite a bit. The open internet has accelerated progress in quite a lot of ways and it would certainly be a dampener to it if it worked in a more centralised way.

E! **We have talked a bit about scenarios for how things could develop realistically, I would like to know what you personally would like to see if it was up to you, taken out of context from our current situation. How would you picture the development of the internet? What would you like to see?**

JR I think we really need to focus on measures that will increase competition and that break down the barriers of competitive advantages of some of the very large companies. For example, if I was the music industry, I would lobby for banning upload filters, because when you think about it, their problem with YouTube is that they have come up with a system for content ID that allows YouTube to break the negotiating power of the collecting societies. By using this filter, they can have every right holder one by one agree to the monetisation. So, the right answer for them would probably be the opposite of what they are currently doing. If you ban upload filters, then YouTube will be forced to either pay or remove the content upon request, neither of which they want to do.

If you translate this to broader questions, I think measures such as the intra-operability provisions that we have in the GDPR are a really good idea, as they allow users to switch more easily between offers. If you want to counter the kind of network effects that you have with large social networks, it is very important to interconnect them, so that you are not too locked into one company or one system and then it becomes easier for people to switch, when something better comes along. Enforcing net neutrality is extremely important. In the EU we have a net neutrality regulation, but it is not sufficiently applied to mobile applications. There is something called a zero rating, where basically mobile providers allow you to use certain applications without using up your data. These kinds of practices need to be clearly banned, in order to allow for competition from smaller players and free and open-source software. That way it is possible to more effectively address the power of large companies. I am also in favour of some of the transparency proposals that have been submitted by the European Commission. They have suggested some transparency obligations on online platforms, mostly in the business sector, for example, when platforms discriminate against companies, such as app stores, or platforms that sell; where they function as gatekeepers. I think transparency is often a kind of regulation that can be quite effective, as it levels the playing field between different players. I would go more in that direction and try to punish the big players in a way.

> *"the experience of the last twenty years or so, since the development of the internet, have shown that sometimes measures to close down the internet are successfully stopped"*

E! **I gather that European SMEs would need a lot more support from the European level to be able to grow. Is there any other specific policy you would suggest to empower European SMEs and do you also see a role to play for European SMEs in the digital sphere going forward in the establishment of the European digital market?**

JR Harmonizing European rules is often an important precondition, in order to be able to grow your business. Usually, when you start a business, you are familiar with one legal system and the more different the legal conditions are in another country, the harder it will be for you to go online. I think that an opportunity was lost with the GDPR, by putting in so many options for member states to an end where you don't really have one system for all of Europe at the end of the day. It is getting more common than it was before, but I think having one European copyright law, one European data protection law etc. will make the lives of businesses easier, as well as the lives of citizens, as they would know that the same rights that they enjoy in their own country are also applied abroad.

A lot of large companies often have a large influence on policy processes and so often things are just seen from their perspective. Politicians often pay a lot of lip service to SMEs and say: "*Oh, yes, they are the backbone of our economy.*" But when you look at proposals like the copyright directive, they have completely forgotten that small companies exist in the platform sector. They make assumptions such as if there is a platform that has a large number of uploads, it must be a large company, when this is not the case at all. When you look at revenues of some of the platforms with millions of users, you notice a lot of these companies are actually quite small. We should really look for real life examples of SMEs in the digital sector, when developing policies and make sure that they are feasible in fact.

INNOVATION HERO

"ALWAYS OPEN TO NEW IDEAS"

RENAUD SCHOEMANS

LOVES TO LEARN AND EMBRACE CHALLENGES,

THAT MAKES HIM IDEALLY PLACED TO LEAD THE RESEARCH AT BELGIAN SME DIAGENODE INTO AN INNOVATIVE SCIENTIFIC AND BUSINESS AREA.

Interview by Ruth Ivory; illustration by Pablo Diartinez after a photo by Ann-Julie Delville.

Diagenode provides analysis kits, reagents, instruments and services for epigenetics research and for the infectious diseases diagnostics market. It supplies universities, hospitals, clinical biology labs and major molecular diagnostics and pharmaceutical companies.

"In our Epigenetics Business Unit, we look for changes in chemical markers related to how a gene will express," says Schoemans, a programme manager at the company. *"In the Diagnostics Business Unit we provide molecular reagent kits for infectious diseases diagnosis. All our products are designed here in Liège and carry the European CE quality mark for the in vitro diagnostics (IVD) market."*

Schoemans —a Doctor in Biomedical Sciences— joined Diagenode in 2015 as a programme manager. A large part of his work was to scout for epigenetics science that could be brought to market with partners and external funding. Although not every project became a product, he enjoyed the process. *"The path is sometimes more interesting than the results,"* he says. *"It produces ideas, contact with researchers, skills and insights into new technology."*

Now he is leading the R&D that aims to bridge the company's two activities with epigenetic diagnostics. Diagenode is developing kits that could monitor the epigenetic chemical signals from specific cancers to make diagnostics and treatment more effective. Schoemans is the R&D programme manager in charge of the two projects developing these products.

PERSISTENCE PAYS

One project, EPITHYDIA, has been set up through EUREKA to develop an epigenetics-based diagnostic kit for thyroid cancer. This could drastically decrease the use of diagnostic surgery, and its side effects, by monitoring chemical signals from often benign thyroid nodules. The second project focuses on breast cancer and is funded from another source, Schoemans says.

He is enjoying his switch to a more R&D role *"I am now making the final products from these two projects happen. It is very exciting,"* he says. *"We need tools to reduce surgery, when possible."*

The road to his new role was not always easy. At the start, Schoemans worked on EPITHYDIA and the breast cancer project by himself for a year. *"It was lonely, but you shouldn't be too afraid of a new situation. Epigenetic diagnostics was also new for the company,"* he says.

The work is already paying off, with a dedicated core team now in place.

REACH OUT TO OPPORTUNITY

Schoemans had always wanted to apply his scientific training to industry. *"Intellectually rich and diverse situations are very important to me. Working for industry is very rich in 'problematics' —although it is sometimes difficult to keep pace,"* he laughs.

To prepare for his career, Schoemans took evening classes to get a master's in management science while still completing his PhD. *"I am really glad I did it. It made me ready to make the shift to industry. I am readier to talk about business plans, IP potential, market opportunities and conditions for achieving these when looking at potentially useful science,"* he says.

The same flexible approach means that he is also enjoying the collaboration with two non-Belgian partners in EPITHYDIA. The Austrian Institute of Technology provides technical expertise for the whole process, while Platomics Gmbh, also Austrian and a spinoff of AIT, writes the software that turns the complex lab results from the diagnostic kits into understandable, error-free reports for doctors. *"This is important for the CE IVD mark,"* says Schoemans.

"We have a lot of good scientists close to the research, and a whole team to develop and manufacture products with high added value," he adds. *"With EUREKA, you can reach all of Europe to find science with applications. It is very beneficial for SMEs to get Eurostars help and reach out to other specialised partners."*

"I have learned a lot and am looking forward to learning a lot more," he concludes.

HIS ADVICE TO OTHER INNOVATORS

- Be flexible and open minded about what role could be fulfilling. Don't be afraid of a new situation
- An appetite for learning is important. You need a love for new information
- Keep looking ahead. See every opportunity as the next stage of your journey and not your ultimate goal

PARTNERS INVOLVED

Diagenode S.a.
Austrian Institute of Technology Gmbh
Platomics Gmbh

COUNTRY FOCUS

BELGIUM

UNITY CREATES INNOVATION ACROSS REGIONAL BORDERS

By Dominik Kirchdorfer

Belgium is an unusually complex member state of the EUREKA network. Not only does it have a federal level, three communities and three distinct cultural regions, those regions are also competent in applied industrial research related to the economy and have their own budgets, whereas in most other countries, innovation is a national level competence. This diversity is also a source of possibilities, since each region individually has the possibility to develop initiatives in the framework of EUREKA. In terms of innovation, regional support and subsidies cover the development of new products and processes in small and medium-sized enterprises (SMEs) and technology transfer.

The federal government is competent for the scientific research necessary for it to perform its own general competences; scientific research (such as space, climate and Antarctic research) within the framework of international or supra-national agreements and Belgian participation in activities of international research bodies.

EUREKA initiatives are funded by the regions; the federal government funds the housing of the EUREKA Secretariat by means of a convention. The convention started in 2013, for 6 years and for a maximum of 600.000 EUR/year. From 2019 on, a new term of 6 years will start, for a maximum amount of 485.000 EUR/year.

Because of its rich diversity, Belgium came up with a unique way of working within the EUREKA framework, as the federal level represents the country on the international level, but the regional funding agencies are the ones practically executing the various cooperative projects. The Belgian federal administration in charge of Science Policy, BELSPO, nominates the High-Level Representative to EUREKA (HLR), who then prepares the Belgian position, with the regions, in order to promote the interests of Belgian actors.

Each regional funding body, SPW Research (Wallonia), VLAIO (Flanders) and Innoviris (Brussels), nominates a Deputy National Project Coordinator to support the work of the EUREKA Network and every year, one of the deputies takes on the role of National Project Coordinator (NPC) on a rotating basis. The funding agencies have established a very informal routine of working together and generally use English as their working language.

SPW WALLONIA DG06 (AKA. SPW RESEARCH)

Wallonia's interest is to have Walloon companies involved in the European Market. As such, Wallonia is strongly involved in Eurostars calls, but is currently also considering a broader engagement in the rest of EUREKA's funding instruments. The reason why SPW has been reluctant to participate in more EUREKA instruments in the past, was because of the way how EUREKA instruments were managed was not always very clear for them on the one hand and because of a lack of staff resources on the other hand. Eurostars always provided a greater clarity on its processes. As the selection procedure became more transparent with time, SPW is now hiring additional staff and could increase their EUREKA portfolio in the near future.

For Wallonia there was little political support for internationalisation in the past and the rate of success and funding is similar on the regional level and on an international level. Nevertheless, new incentives (SWAN, Horizon Europe subsidies) are showing up and are likely to make more Walloon SMEs to seek international cooperation. They also legally have to oblige applicants to submit applications in French. However English texts are used in annexes of applications to allow for international collaboration. Technically, German language applications are also accepted in Wallonia. However, there is not much interest from German speaking innovative companies to do so.

Biotech is one of the most important sectors for Wallonia together with the Material sector which makes up for almost one third of all projects funded by SPW. ICT is also important, but is not as strongly represented as it is in the rest of Belgium.

INNOVIRIS BRUSSELS

On the European level Innoviris collaborates with other regional agencies and does its best to maintain a balance of powers through informal as well as formal collaboration with BELSPO and the other agencies. Given that it is a city-state region, Brussels has its focus on IT. A lot of financial institutes and headquarters are located in Brussels and as such R&D is mostly centred around IT and IT-start-ups. In its unique position, Innoviris has a natural focus on international and regional collaboration, as well as collaboration between industry and academia.

Funding applications can be submitted in French, Dutch and English, the latter of which is preferable in the case of international collaboration. As most international contracts are signed in English, e.g. the EUREKA Network agreement, English applications are the standard for international programmes. This is also the case when academic and industrial players are involved. All legally-binding documents, such as funding agreements, are however drafted in French or Dutch, the official languages of the Brussels Region.

VLAIO IS THE INNOVATION FUNDING AGENCY IN FLANDERS

Flanders Innovation and Entrepreneurship (VLAIO) is the contact point for companies and entrepreneurs in Flanders. They encourage and support innovation and entrepreneurship and contribute to a favourable business climate. VLAIO help companies with the start-up of their activities, the growth and continuity of their business.

The main research areas in Flanders are: Biotech, ICT, Materials, Manufacturing, Electronics and Construction.

VLAIO is active in all EUREKA Clusters, mostly in ITEA, in CELTIC+ and PENTA and most recently also in SMART.

Unlike other agencies, VLAIO has a high degree of operational autonomy in innovation, in which the authority to grant support to R&D to companies has been assigned to the Decision Committee of the Hermes Fund by the Flemish Government.

They do this with a true bottom-up approach. Any demand from companies from Flanders can be met. There are no restrictions for funding.

They keep an eye on the amount of requests and successful projects and use quarterly reviews in order to ensure there is enough budget for all the companies. In recent years the ministry has topped up the budget around the end of the year when needed. This has been a constant policy, independent of the party in government.

On top of basic R&D applications, the companies can get bonuses for international projects, e.g. via EUREKA. There are no ranking lists, everyone gets funding if the project is deemed good. International experts are used for evaluation of international projects. As with the other agencies, the language used is important. Dutch or English language applications are used for local funding and cooperation, and both languages are used in the evaluation process. International projects must be submitted in English. In Flanders the success rate for Eurostars applications is about 30%, other local programmes are 60-70%, but international collaboration encourages Flemish companies to apply for international funding.

VLAIO is very keen on increasing the proportion of international projects in its portfolio. That is why they are working on steadily increasing collaboration with neighbouring regions and other EUREKA members. International programs such as Eurostars are attracting new companies to VLAIO. VLAIO also benefits from greater collaboration with other neighbouring countries, like The Netherlands, Germany, but also France and the UK due to their membership in EUREKA. They intend to organize more common events with other National Funding Bodies from those countries. This is also in the interest of the Flemish ministry.

BELGIUM BENEFITS FROM EUREKA

In collaborative meetings around EUREKA, the agencies always speak English, because it is more convenient as a common language and because the relevant documents are also already in English.

Due to R&D funding being regional, for the longest time it was impossible for companies in one Belgian region to apply for funding in another region, or even to collaborate with another Belgian company from another region.

Recently, a new instrument, BEL-SME was established to overcome this issue: BEL-SME is a call between all the regions. For the first time it is possible to collaborate between Belgian regions with funding for industrial research.

In September 2018 the Memorandum of Understanding (MOU) on regional level was also signed by the three agencies to further strengthen Belgian cross-regional collaboration.

The main aim of this MOU is to assist enterprises that wish to collaborate with an enterprise in another region or with a cluster in another region to find its way to obtain support from their government.

The collaboration involves:

- the collaboration between individual enterprises in Brussels region, Flanders and Wallonia receiving support from the regional governments for R&D.
- the collaboration between clusters with individual enterprises located in another region.

Belgium is steadily developing its R&D&I infrastructure and is interested in taking on a stronger role in EUREKA's Eurostars and Globalstars programmes. EUREKA makes it easier to reach beyond European borders, because projects go through the EUREKA framework and there is no need to set up bilateral calls for international collaboration. This is very interesting for small regions that otherwise might not be able to extend their reach globally. The close collaboration with other National Funding Bodies (NFBs) through EUREKA also strengthens and deepens the collaboration between NFBs bilaterally after the fact, e.g. in promotional activities. One might say that EUREKA brings the nations closer together.

BELGIUM

R&D&I PERFORMANCE OVERVIEW

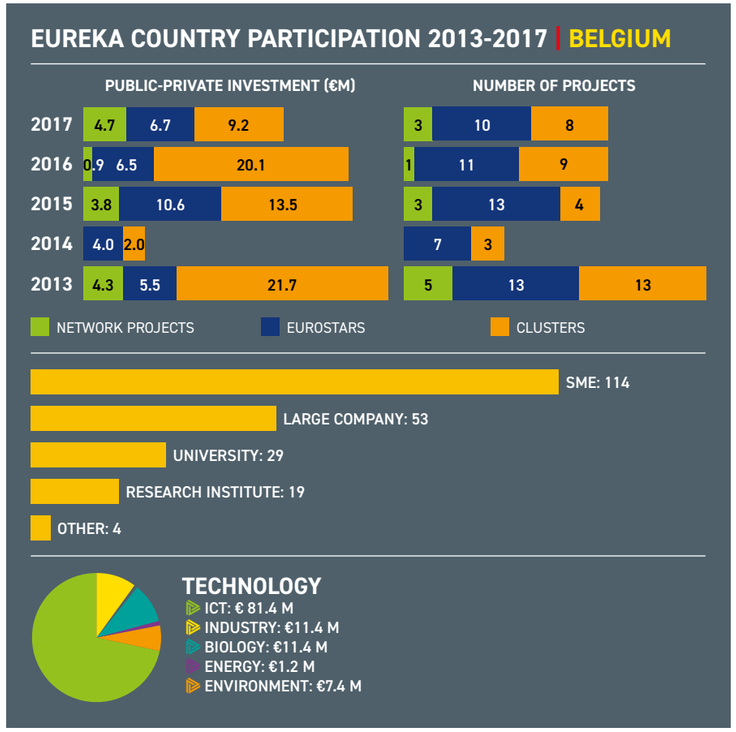
PARTICIPATION IN EUREKA

1 Investment and projects

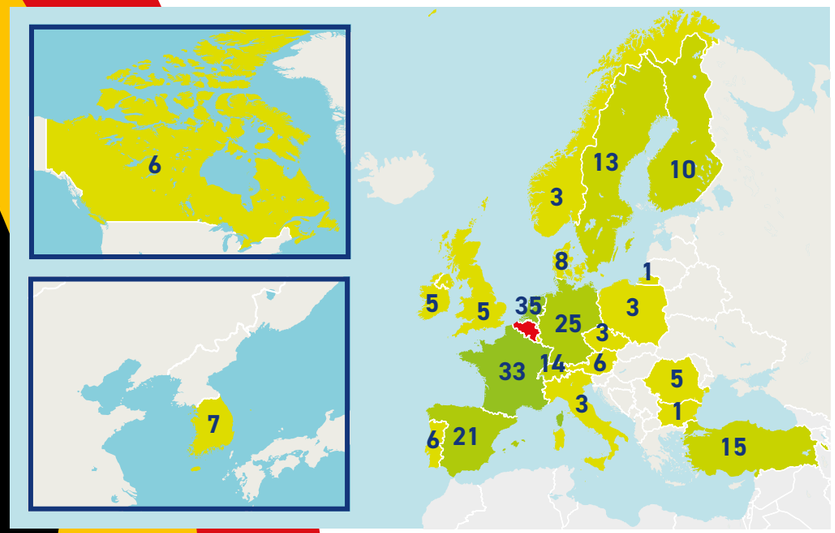
Belgium's participation in EUREKA is characterised by activity in all three main instruments, totalling 20.8m in public and private investment in 2018, and 21 projects.

In the 2013-2017 period, Belgian SMEs participated in EUREKA projects on 114 occasions.

On a regional basis, since 2008, Flanders has seen over 160 participations, Wallonia over 75 (mainly in Eurostars) and Brussels around 40.



Source: EUREKA/ESE Data



2 Collaborations

Belgium's most important partners in EUREKA have been the Netherlands and France from 2013-2017, followed by Germany and Spain.

Other important partners include Sweden, Finland and Turkey.

Source: EUREKA Database

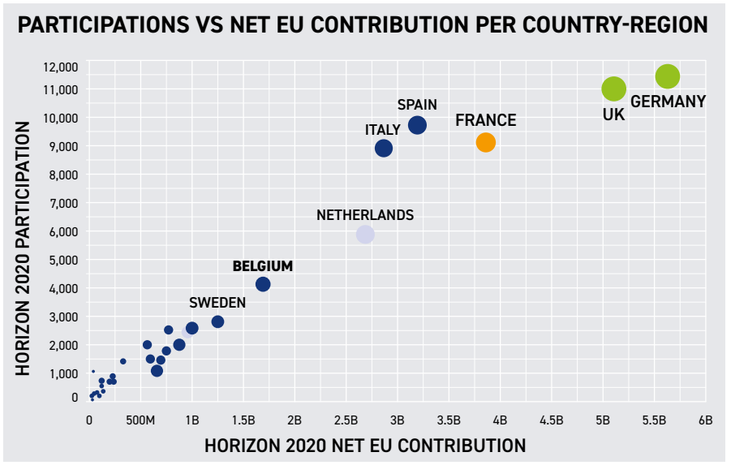
BELGIUM

AS A EUROPEAN AND GLOBAL PLAYER

EU PERFORMANCE

3 Participations vs net EU Contribution per Country-Region

Belgium is a big player in European R&D&I and is among the top performers in terms of progress towards achieving the European Research Area (ERA). In particular, Belgium scores far above the EU average for funding of transnational cooperation public-to-public partnerships and is a leader in the provision of R&D tax incentives. (source: ERA Progress Report 2016, Country Snapshot Belgium)

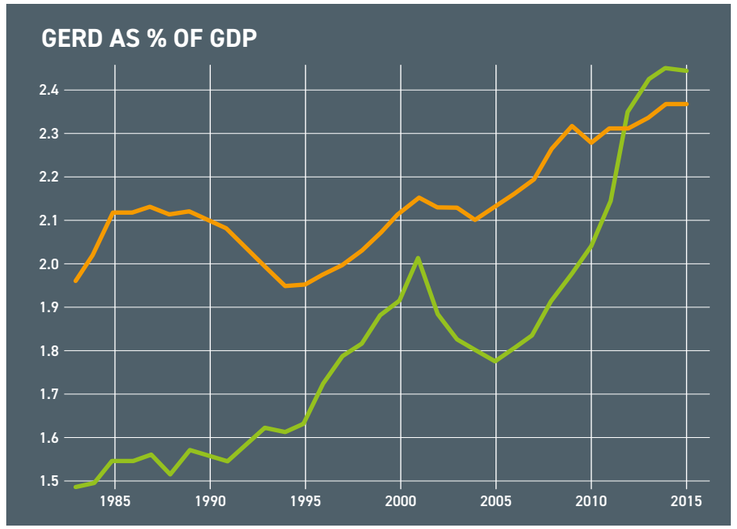


Source: H2020 Dashboard, EU

GLOBAL INDICATORS

4 GERD as % of GDP

Belgium recently surpassed the OECD average in terms of Gross domestic expenditure on R&D as a proportion of GDP. The country ranks 25th in the Global Innovation Index, and 16th in terms of R&D.



BELGIUM

GIL 2018 RANK: 25

OUTPUT RANK	23
INPUT RANK	21
INCOME	HIGH
REGION	EUROPE
EFFICIENCY RATIO	38
POPULATION (MN)	11.4
GDP, PPP$	526.4
GDP per capita, PPP$	46,553.1
GIL 2017 RANK	27

SENSING DIGITAL REVOLUTION IN MINING

What are the chances of two ambitious but very different businesses finding each other across the Atlantic? Rather slim, if it were not for EUREKA, which backed a project to test and roll out an innovative iron-ore 'sensing', sorting and communication system.

MineSense, a Canadian mining technology development and marketing company, teamed up with engineering and detection specialists, Ketek of Germany, to launch the High-Speed X-Ray Fluorescence (HSXRF) project.

MineSense reached out to Ketek in 2015 and, together, they field-tested and, in early 2017, delivered a next-generation iron-ore detector and integrated solution which boosts performance by up to 20% and saves on energy, water and chemical use.

"We both realised quickly that this is a challenge and an opportunity we should not miss. The twofold approach from the technology side and the application side was a perfect match right from the beginning," said Reinhard Fojt, Managing Director of Ketek, about the partnership.

The ground-breaking sensor technology and data analytics platform evolving from the project now provides mining operations with unprecedented real-time information about their ore deposits.

As an emerging global player in mineral telemetry and ore upgrading, MineSense's system not only makes mining low-grade ore feasible, it optimises the whole decision-support process. Penetrating deep into the ground, the sensitive XRF detector provides accurate real-time ore grade data, which means higher yields and, combined with connected machinery like scoops, belts, feeders and chutes, helps to separate unwanted waste from the valuable minerals at an early stage of the mining process.

ATTRACTING ATTENTION

Not surprisingly, MineSense's solutions have attracted the attention of investors and customers. Company CEO Jeff More announced early in 2017 that MineSense had sealed a $CAN19 million finance deal, led by Aurus Ventures alongside Caterpillar Venture Capital —the investment arm of the mining equipment giant— and existing investors, Chrysalix Venture Capital, Cycle Capital Management, Prelude Ventures and Export Development Canada.

"Having a major player like Caterpillar as a new strategic investor provides a strong partner with global reach. We are also thrilled to have the continued support of our existing investors," noted More in a statement.

"This is one of the most exciting new technologies to come into the mining sector with the potential of significantly improving the industry's profitability," remarked Victor Aguilera, Managing Director of Aurus Ventures, following the deal.

> *"[it] not only makes mining low-grade ore feasible, it optimises the whole decision-support process"*

CLEAN, LEAN SORTING MACHINE

The integrated sensing and communication platform, designed around the XRF detecting and sorting technology, has the ability to generate unparalleled 'whole mine' datasets which can also be used for better planning and modelling. It can monitor changes to the ore body on a daily basis, identify differences in mineralogy, and look for trends to optimise various operations within the mine.

Ketekis working on further refinements to the XRF technology and on expanding the portfolio of applications for semiconductor sensors in the optical area with its Silicon Photomultipliers.

"Having an industrial partner with a shared passion for digital innovation to test our prototypes and devices in demanding sectors can mean the difference between success and failure," concluded Fojt.

Σ!

EUREKA NETWORK

PROJECT ID 10382
HSXRF

COUNTRIES & NATIONAL FUNDING BODIES	CANADA National Research Council Canada GERMANY
TOTAL COST	€ 680 000
DURATION	01/2016 TO 03/2017
MAIN PARTNER	CANADA Minesense Technologies Ltd.
OTHER PARTNERS	GERMANY Ketek GmbH

INTEGRATING BLOCKCHAIN TECHNOLOGY

To integrate new digital currencies, such as Bitcoin, into global financial systems requires that checks and balances be put in place to ensure adherence to local laws and regulations and protect consumers from fraud while maintaining privacy. This is where the Blockchain PISC project comes in.

EUREKA NETWORK
PROJECT ID 10349
BLOCKCHAIN PISC

COUNTRIES & NATIONAL FUNDING BODIES	CANADA CNRC-NRC SWITZERLAND SERI
TOTAL COST	€ 610 000
DURATION	10/2015 TO 10/2016
MAIN PARTNER	CANADA Bitaccess Inc
OTHER PARTNERS	SWITZERLAND SBEX SA

Ensuring privacy, identity, security and compliance (PISC) issues in digital currency networks, such as Bitcoin, are fully compatible with global financial systems is key to the integration and expansion of these new forms of financial assets.

The goal of the Blockchain PISC project was to enable collaboration between Swiss firm SBEX and Canadian company Bitaccess to coordinate their research efforts, exchange development experience and to open access to their respective products and services in new global markets.

The project, that took place in 2015 and 2016, was very successful in developing technologies that have since seen commercial success as the market for virtual currencies has boomed from 2017.

DIGITAL CURRENCY

Digital currencies using blockchain technologies started to emerge around 2008 as an attempt to construct a trust-based transaction asset outside conventional financial systems.

Estimating the number of virtual currency users globally is difficult due to their pseudo anonymous nature. There were approximately 1.3 million individual Bitcoin users at the start of 2014, up from a population of around 100 000 in 2011. Best estimates at the beginning of 2018 suggest a global bitcoin user base of between 13 and 28 million.

Originally the blockchain currencies were used only by niche industries, but started to gain significant interest from larger markets for use in payments, international transfers, asset management and banking applications.

> *"the EUREKA project allowed the two companies to partner in a non-competitive way"*

"The key to integration of virtual currencies has been to develop technologies that allow companies to engage with customers in a compliant manner," says Moe Adham, co-founder and Chief Technology officer of Bitaccess.

"This needs a multi-faceted approach that builds trust while preserving the essential privacy and security characteristics of virtual currencies." The project developed intelligent software that is able to analyse big data on blockchain markets to ensure the correct identification of customers and end-users but enables the private nature of transactions themselves to be preserved.

In addition, the security of the digital currency networks needed to be validated and demonstrated as appropriate for normal business use. Bitaccess and SBEX were able to design their technologies to allow companies to engage securely on a large-scale with virtual currencies through approaches such as multi-signatures.

TECHNOLOGY FOUNDATION

The technology developed through this short project acted as a foundation to products and services that were able to take on the huge rise in demand for virtual currencies that has been seen since 2017. *"The technology acts as a backbone for many global systems,"* comments Adham.

As virtual currencies have grown, regulation has also changed and the technology has been able to adapt, and in some ways enable, changing market governance.

Both Bitaccess and SBEX have commercialised products in their respective markets following the project. Bitaccess markets the industry-leading digital currency kiosk in 15 countries. SBEX SA has launched a digital currency brokerage service in Europe through the bity.com brand that is serving customers in over 35 countries.

"The EUREKA project allowed the two companies to partner in a non-competitive way and to understand and address issues in different markets that allowed both to design products and services with a more global reach," says Adham.

Adham sees a great future for blockchain technologies not only for financial transaction but for all applications where transparency and validation are essential such as smart supply chain contracts, selective disclosure of sensitive information or auditing. *"For example, the Canadian government is currently exploring the use of our blockchain software to enable the transparent administration of government grants,"* he concludes.

SMART CONTENT DELIVERY FOR THE DIGITAL AGE

A scalable and robust video streaming solution has been developed to deliver adapted media content to smart devices, with the level of quality that customers increasingly expect and demand. THE CELTIC PLUS-FUNDED NOTTS PROJECT 2018 INNOVATION AWARD WINNER IN THE "COMPETITIVENESS AND GROWTH" category has made it easier for content providers to deliver Over the Top (OTT) services, a means of selling and streaming audio, video and other media content over the internet directly to consumers.

A total of 27 technical innovations were delivered through the project and are now on the market, enabling media service providers to guarantee quality of service and thus attract more customers. NOTTS technologies have also been recognised by global standardisation bodies.

"There are no available solutions that gather all our innovative components"

Industrial and SME project partners that have implemented the technologies have been hugely positive about the results, reporting returns of investment of up to 1.000%, translating into substantial turnover growth. "A *good example of the project's success is the significant increase in sales of 'TV Tu i Tam', the OTT commercial service of Orange Poland, and Watson Elisa's OTT TV service in Finland,*" says project coordinator Dr. Antonio Cuadra Sánchez from Indra Sistemas in Spain. "NOTTS also provided valuable insights for the launch of the Swedish OTT TV service Sappa Play in Sweden."

TRANSFORMING MEDIA DELIVERY

OTT media distribution is transforming the telecommunication landscape by enabling content providers to bypass cable or broadcast television service providers that would traditionally have distributed such content. New business opportunities are being created, both for OTT providers and suppliers of Smart TVs, tablets and smartphones, through which this content is consumed.

Change is happening so fast however that current internet architectures and business models are struggling to cope with the massive deployment of OTT services. In a globalised market, it is vital that businesses maintain a competitive edge, and that Europe has the infrastructure in place to ensure the rapid deployment of new OTT technologies.

The NOTTS project therefore sought to identify common technical problems, evaluate potential solutions and develop next generation OTT prototype technologies. "*Our goal was to deliver an integrated solution to achieve a context-aware and media-aware delivery platform,*" says Cuadra Sánchez. "*There are currently no commercially available solutions that gather all the innovative components developed in NOTTS.*"

Prototype solutions include advanced methods for smoother content distribution as well as technologies for monitoring and controlling OTT quality of experience. A scalable video-streaming solution based on different components to deliver adaptive content has also been developed.

The project has proven successful in other ways as well. A total of 23 new permanent employees have been hired by partner organisations to meet growing demand and spin-off companies were created due to the activities generated by project results. "*We were also able to provide support to five PhD students and 12 Master students, who contributed to and used our project results to write their theses,*" says Dr. Cuadra Sánchez.

Looking ahead, Dr. Cuadra Sánchez notes that Indra is currently developing new technologies for monitoring the quality of service of OTT multimedia content. Close collaboration within the consortium has also strengthened links between companies and partners and resulted in further cross-border collaborations in CELTIC-Plus projects such as MONALIS and 5G-PERFECTA.

CELTIC CLUSTER

PROJECT ID C2012_2-4 NOTTS

COUNTRIES & NATIONAL FUNDING BODIES	**SPAIN** CDTI - Spanish Centre for Industrial Technological Development
TOTAL COST	**€ 8.45 MILLION**
DURATION	**MAY/2013 TO MARCH/2016**

CLUSTER PROJECTS

FIND OUT MORE AT eurekanetwork.org/clusters

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- Focus on particular industrial sectors in different countries: hardware, software, telecommunications, renewable energy, new materials and more.

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EURIPIDES²
Smart electronic systems

EUROGIA2020
Low carbon energy technologies

ITEA 3
Software intensive systems and services

PENTA
Micro and Nano electronic technologies and applications

METALLURGY EUROPE
Breakthrough metal products

SMART
Advanced manufacturing

ARTIFICIAL INTELLIGENCE HELPS EARLY DETECTION OF DEMENTIA

Through pioneering algorithmic analysis, the Eurostars project BRAINIQ has developed software that uses artificial intelligence to detect the signs and progression of dementia in a patient's MRI scans.

The innovation was developed through successful collaboration between Quantib and the Erasmus University Medical Centre in the Netherlands, and Biomediq in Denmark.

"Our technical challenge was to get as much information as possible out of non-invasive imaging methods such as MRI scans," explains project coordinator Professor Wiro Niessen, Scientific Director of Quantib.

"And it's not just the information that you can get from a single scan but how the brain changes over time is also important."

One of the hallmarks of Alzheimer's disease is shrinkage of brain tissue, especially around the hippocampus, an area of the brain associated with the consolidation of short and long-term memory. *"If we can understand how the volume of the hippocampus and also how the total volume and texture of brain tissue changes as the disease advances, it can help with detection and prognosis,"* explains Niessen.

TAKING RESEARCH OUT OF THE LABORATORY INTO THE REAL WORLD

The potential of this approach has been known for quite some time, but the challenge was to develop robust software that can be used in hospitals and clinics. *"It's one thing to test this approach in a laboratory, but each hospital will have different MRI scanners, different imaging processes and different software. We have to make sure our software works in all these different settings and still produces accurate results,"* says Niessen.

> *"most estimates suggest we are looking at a billion euro market in the long-term"*

The success of the project was down to the collaboration between the different partners. *"We have a lot of expertise at Quantib,"* says Niessen, *"but we are primarily interested in volume and shape of the hippocampus while Biomediq has expertise on the texture of brain matter. In the end, it is a combination of features that provide the most information."* Using case studies from the Erasmus University Medical Centre, the artificial intelligence system was trained to ensure an accuracy that was comparable to human beings.

A BILLION EURO MARKET IN THE MAKING

"We already see enormous interest in using artificial intelligence to improve the diagnosis and prognosis of dementia. It is difficult to predict how large this market will be, but most estimates suggest we may be looking at a market as large as a billion euro in the long-term," Niessen suggests.

The software has been certified by the American FDA, received a European CE mark and is already installed on MRI scanners made by GE Healthcare. *"Eurostars funding has been instrumental in helping us develop the software," says Niessen, "without it we wouldn't be in a position to transform how dementia is diagnosed and treated in the future."*

EUREKA EUROSTARS
PROJECT ID 8234
BRAINIQ

COUNTRIES & NATIONAL FUNDING BODIES	DENMARK Innovation Fund Denmark	THE NETHERLANDS RVO
TOTAL COST	€ 500 000	
DURATION	JANUARY/2014 TO DECEMBER/2016	
MAIN PARTNER	THE NETHERLANDS Quantib BV	
OTHER PARTNERS	THE NETHERLANDS Erasmus University Medical Centre	
	DENMARK Biomediq A/S	

10TH ANNIVERSARY OF EUROSTARS

CELEBRATING SUCCESSFULLY FUNDING SME-LED RESEARCH FOR A WHOLE DECADE

By Dominik Kirchdorfer. Photos: Chris Marchal; Dorothee De Keyzer

In 2008, Eurostars launched as a small niche EUREKA programme, co-financed by the European Commission. Since then, Eurostars has developed into a success story, perhaps even to the point where its visibility and reputation is greater than that of EUREKA itself. Eurostars seems to have established itself as EUREKA's flagship programme.

In celebration of its 10th anniversary, a private event of the EUREKA network and the European Commission was held in Brussels, Belgium to commemorate the Eurostars programme's achievements and look to its future.

Member of the European Parliament **DR. PAUL RÜBIG** was rapporteur for the Eurostars co-decision process in the European Parliament in 2008. I asked him for a few words on this momentous occasion:

"Research and innovation are the foundations of prosperity in Europe. Research-performing small- and medium-sized enterprises play a particularly large part in this. At the European Parliament, we are particularly devoted to this issue and have launched Horizon 2020, the world's largest multi-annual framework programme for research and development; Eurostars, which supports research-based SMEs, is also part of this programme. In 2008, I negotiated the Eurostars budget. At that time, we were able to reach €400 million, with the programme being financed by 25 member states, 7 associated countries and the European Commission. Under the current Horizon 2020, €1.4 billion have been mobilised to support R&D-performing SMEs in their efforts to establish Europe as a world-class location for innovation.

I would like to congratulate those responsible at EUREKA on this 10th anniversary. In politics there is often talk of European lighthouse projects —Eurostars is certainly one of them".

> *"in politics there is often talk of European lighthouse projects —Eurostars is certainly one of them"*
>
> Dr. Paul Rübig

At the event, I also caught up with **PETER CHISNALL**, the man in the chair, heading the Eurostars team at the EUREKA Secretariat to discuss the ups and downs of Eurostars over 10 long years, as well as getting a little sneak-peak for the future of the programme.

E! Peter, you have been with the programme from the get-go. I'd like to talk to you about the beginnings of Eurostars and where you see it heading. Would you like to share with me how you got involved in Eurostars?

PC I wasn't here when EUREKA decided in 2005 to branch out with this new programme. Maybe they realised that SMEs were the way to go, or that EUREKA hadn't focused on SMEs up until that point and this was an interesting niche with huge potential. Either way they had this great idea and set it in motion, but I think the size of demand and success took them a bit by surprise.

It's one thing to talk about what you want to do from a strategic or political level, but operationally it is often a very different story.

There were half-finished guidelines and an application form that was a copy-paste of the existing EUREKA form. All the administration was done by hand, there was a very basic website where you could upload project information and share it across the network. And that would have been fine, if the modest hopes EUREKA had for Eurostars had been true.

If we look back to the original estimates, they were talking about 50 applications a year and that the evaluation panel would actually meet people for pitching; the thing that has become so fashionable at that time. A very humble idea and then —BOOM! Hundreds of applications in Round One and hundreds more in Round Two. Within 18 months, EUREKA had received more applications than they thought they would receive in seven years. I think that's when reality dawned and they said: *"Wow, we struck gold! There is something out there, but how do we manage this? How can we keep up with this kind of demand?"*

That was the start of the real capacity building within the EUREKA Secretariat [the central administration offices of the network], changing it into a truly professional part of EUREKA by making it able to cope with the management of a joint EU programme and the processing of hundreds of millions of euro of transactions.

It was a very exciting time when I came on board. I had just left my traineeship at the European Commission; I had been at the ERC [European Research Council] where they'd had problems of their own —they launched the (what we know now to be the wildly successful) Starting Grant scheme. They expected maybe a thousand applications but received nearly 12,000. There were around 20 people in the unit at the time; nowhere near enough! There were great leaders, and dedicated staff, and I was given a rare opportunity [for a trainee] to become fully integrated in the programme operations. This grounding in how to run funding programmes benefited me greatly when the opportunity at EUREKA presented itself. And I am really enjoying my time here. It was a hands-on experience —*"Here is a problem. We need it fixed. Do whatever you need to do to get it fixed. Off you go!"* »

> *The fact that our portfolio now has massive potential value and that there is a clear link back to Eurostars is a very good sign*
>
> Peter Chisnall

It was an amazing opportunity to build something from the ground up, to adapt it and change and improve it. Usually you only get to tweak things a little bit, but here we were given creative freedom to make it the best that we could make it.

E! How many people did you have at the start in the Eurostars team?

PC Four in Eurostars and three in IT. That changed; it changed quickly. But still we were always pressured with the amount of work against resources available, resulting in quite a high turnover of colleagues. If I try to think of all the people, there are probably 20 people that have touched and impacted Eurostars. Of course, when you add the EUREKA network too, we are talking of well over 100 people who have made it what it is today.

E! Well, now Eurostars has become very well established and entrenched in the innovation landscape...

PC Yes. I don't know if I am doing it a disservice, but it has gone from a bit of a pilot project for EUREKA, a "let's-see-what-happens" to what some people now refer to as the flagship of EUREKA.

E! The great thing we have started to see recently with new platforms like Dealroom, is that Eurostars companies have done well for themselves after they received the grant.

PC Absolutely. Dealroom is an interesting example —and I don't want to get too much into it, but the fact that someone has discovered a way to track investments independently from any funding agency is very revealing. Long-term follow-up and impact studies (using internal and external data) give us the ability to see and track the development of companies after the initial grant they received from us; we see that some of these Eurostars companies are doing really well. One of them seems very close to breaking the 1 billion EUR value mark. This is just one company of course, but the fact that our portfolio now has massive potential value and that there is a clear link back to Eurostars is a very good sign.

And it's not just about financial growth. Eurostars has created tens of thousands of jobs and given its participating companies a certain kudos that enables them to go on to other things, be they follow-up grants at national or EU level, or even, as I saw recently, getting the backing of the Bill & Melinda Gates Foundation!

Can we say that success is ours? Take the athlete Usain Bolt as an example. He won 8 Olympic gold medals; he is obviously amazing. But somebody trained him. The trainer did not win the gold medal though; he can't claim that success. But without him, it would never have happened. That's the kind of relationship we have with our companies. The question is, how do we highlight this, how do we demonstrate that we are integral to their success?

E! But we are looking for broad success rather than the single victor?

PC Yes, that's very important, we are not doing this for the one amazing company —the unicorn, to use the jargon. We support those individuals or those groups of companies that have great ideas and put them on a path to success. But we won't be successful every time. When you've got a group of athletes, only one of them can win gold, but an Olympic silver is still worth the effort! I am sure the same thing is happening with Eurostars, but the fact that it seems we have some tangible individual successes and —to continue the analogy— we are getting lots of top 10 finishes, suggests that we are actually doing something really meaningful and impactful. That's a very good indication that we are not just wasting our time.

E! So, you've been involved in Eurostars for 10 years? Should we be celebrating your anniversary alongside that of Eurostars?

PC *laughs* In March, I'll have been involved for 10 years. On 21st March 2019 to be precise.

E! So, the question is: Since Eurostars has evolved into something well established, why are you still here? What makes you want to stay after you have essentially 'rescued' EUREKA from its own success?

»



PC *laughs* I think, as great as it is, Eurostars is not yet as good as it could be. The world moves on and the needs of our customers change. Eurostars-1 [under the 7th Framework Programme] was planned and designed prior to the financial crisis of 2008. Eurostars-2 emerged from that crisis. Eurostars-3 will be the first 'post-crisis' opportunity for programme development. New technology means that we can do things faster and better, simplifying the system and if not removing the administration, reducing it for the customer. There are a lot of new things I would still like to push for. We have a team of talented and enthusiastic people to drive things forward over the coming years. And I think the exciting thing for Eurostars in 2018 is that we have another excellent opportunity —Horizon Europe will be the biggest European R&D framework yet. Showing that Eurostars continues to have an important role to play after 2020 is foremost in our minds.

So, in a way it is still new. It is a new thing for me. It is the opportunity to go and play, to design Eurostars for the next 10 years. It is still an interesting challenge. Take some lessons from the past and put them into practice for the future.

E! I guess that leads us to the final question, which is: What does the future hold for Eurostars? What is Eurostars-3 going to be about? Are there any big ideas floating around that you would like to see happen?

PC Yes. We are pushing along several ideas. One is the idea of simplicity and removing barriers or administration. We did quite well in Eurostars-1 and we did even better in Eurostars-2 compared with other international programmes. Innovators should spend more time innovating, not filling out endless forms.

Applying is relatively easy; it's a one-stop shop so you can concentrate on doing your project. But we are still working with governments, and governments often need to formalise things as regulations, and as soon as something is written down it becomes hard to take away. So, we do need to simplify some things. I think that will make Eurostars more straightforward for businesses. EUREKA is all about the bottom-up philosophy —an open system where almost anything is possible, as opposed to one where amazing ideas are lost because they fall on the outside of some artificial barriers.

On the other side, there is the accessibility aspect; for instance, opening-up to more types of organisations. What I would like to see is the possibility of support to companies who literally have just had a EUREKA moment, with less emphasis on their track record and past performance —to really support the innovation that is ahead of us.

EUREKA has over 40 member countries, so there is clear potential for Eurostars to grow across the wider EUREKA family. That means better balance, more active participation, more active monetary engagement, and a higher likelihood of success.

That is the challenge for us, saying: *"Hey, look at these great ideas! How can we support them?"* and being open enough to make it happen.

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Either fill it out here and send it back by post to:
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1200 Brussels

or fill out the survey online to instantly give us feedback using this link:
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☐ Skim it
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☐ Read the complete magazine

4. For how long do you keep your copies of the Magazine?

☐ Less than a Month
☐ 1-2 Months
☐ 2-4 Months
☐ Over 5 Months

5. How would you rate the Magazine overall?

☐ Excellent ☐ Good ☐ Fair ☐ Poor

EUREKA MAGAZINE SURVEY

6. How would you rate the relevance of articles presented in the Magazine ?

☐ Excellent ☐ Good ☐ Fair ☐ Poor

7. What type of articles do you like reading most? Select all that apply

☐ Editorial
☐ Interviews
☐ Country focus
☐ Feature article
☐ Project Success Stories
☐ Innovation Hero
☐ Opinion Editorial (OpEd)

8. What kind of articles would you like to see more of in the Magazine?

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☐ Scientific topics
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☐ EU Institutional topics
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☐ Global topics
☐ Societal challenges
☐ Data topics
☐ Influencer interviews
☐ Stories about EUREKA Network
☐ Stories about the EUREKA office

9. How would you rate the cover of the Magazine?

☐ Excellent ☐ Good ☐ Fair ☐ Poor

10. What do you, as a reader, think we are doing well?

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11. What do you, as a reader, think we could improve on?

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14. Do you have any other comments, questions, or concerns?

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EUREKA's strength lies in its well-established network of national project coordinators (NPCs) representing more than 40 countries and the European Commission.

NPCs act at operational level, running the National EUREKA Offices. They are the direct contact for project participants. NPCs facilitate the setting-up and running of a project and are responsible for project generation, national and international support and follow-up.

WHAT IS EUREKA?

www.eurekanetwork.org

EUREKA is a publicly-funded, intergovernmental network, involving over 40 countries.

EUREKA's aim is to enhance European competitiveness by fostering innovation-driven entrepreneurship in Europe, between small and large industry, research institutes and universities.

Today, in this network, there is more than ever a strong belief that international collaboration is crucial for European industry to compete effectively on world markets in advanced technologies.

While innovation is increasingly becoming an international activity, 90% of the public funding available to researchers and innovators in Europe is to be found in national programmes and most of it is dedicated to national activities. This is why the EUREKA network ensures that a steady flow of national public funds is directed towards transnational collaboration in research, also leveraging a high level of private investment.

For innovative companies, institutes and universities wishing to expand their activities internationally, EUREKA is a catalyst for the finance and support they need to launch and run their transnational R&D&I projects. Those projects are based on two criteria: cooperation between at least two different EUREKA countries, and the final result being a commercially viable new product, process or service.

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