Investing in European success

Empowering European SMEs to Innovate and Grow
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To compete in the global economy of the 21st century the European Union is investing in research and innovation to boost jobs and growth. Research and innovation contributes to making Europe a better place to live and work, improving Europe’s competitiveness, future growth and ultimately job creation while tackling the main current and future societal challenges. Horizon 2020 is the financial instrument implementing the Innovation Union and directly contributing to the aims of the Europe 2020 strategy for growth and jobs.

Why is research and innovation important for Small and Medium-sized Enterprises (SMEs) and the European economy?
• SMEs are important for growth and jobs because 99% of all European businesses are SMEs.
• 85% of net new jobs in the EU between 2002-2010 were created by SMEs.1
• Research & Development expenditure by SMEs is lower in the EU than in the U.S. and less than a third of EU SMEs have innovative activities.

Horizon 2020 will help to bridge the gap between research and the market by helping innovative enterprises – including SMEs – develop their scientific and technological breakthroughs into viable products and services with real commercial potential. SMEs will be encouraged to participate throughout Horizon 2020, and those selected for Horizon 2020 support will be able to count on financial and business innovation support.

A new dedicated SME instrument will fill gaps in funding for close-to-market innovation aspects. It will target highly innovative SMEs showing a strong ambition to develop, grow and internationalise, regardless of whether they are high-tech and research-driven or non-research conducting, social or service companies.

Innovation in SMEs will be further supported through a specific action for research intensive SMEs building on the Eurostars joint programme, the development of new and experimental types of support infrastructure and market-driven innovation initiatives, for instance through procurement networks. Greater use of financial instruments will help leverage yet further private research and innovation investments, including venture capital investments for innovative, high-tech companies, and in particular SMEs.

Building on the success of previous research framework programmes, this brochure presents a selection of twelve examples showing how R&I by SMEs make a real difference to EU citizens’ everyday lives from health to construction, eco-tourism or agriculture. They illustrate that R&I holds business opportunities for SMEs, that innovation is easier to achieve in well-balanced partnerships, where organizations can complement each other with a view to “go-to-market” solutions and remain competitive in a global economy.

With Horizon 2020, we can achieve even more at European level, bringing our brightest and best together to really tackle society’s big challenges, while contributing to European economic recovery and growth. Let us – EU policy-makers, entrepreneurs, Member States, regions, stakeholders in the research and innovation community and citizens – join forces and build tomorrow together today.

More information
EU R&I support for SMEs: http://ec.europa.eu/research/sme-techweb/index_en.cfm
Financial instruments: http://www.eif.org/

HORIZON 2020
There is something for you in every European innovation
Change Tomorrow Today
Our ultimate aim was to develop an innovative form of treatment that stops the growth of tumours through the inhibition of angiogenesis, the process by which new blood vessels are produced in the body,' says Dr Titti Martinsson-Niskanen of BioInvent, the Swedish research-based pharmaceutical SME responsible for coordinating the three-year project.

Angiogenesis is vital for tumours to grow, and an important factor in supporting this process is placental growth factor (PIGF). The antibody that has been developed targets PIGF. By limiting PIGF levels in patients, tumour growth can be stopped. Dr Martinsson-Niskanen explains that the successful treatment of tumours with angiogenesis inhibitors has been proven by agents such as Avastin, a cancer medicine targeting vascular endothelial growth factor, another important angiogenic factor. ‘However, despite the success of Avastin, it’s clear that such drugs alone will not be sufficient to halt tumour angiogenesis,’ she emphasises. The efficacy is limited and many patients develop resistance over time.

ANGIOSTOP was initiated on the strength of the initial findings of the consortium partners. The project plan was then designed to support the development of the anti-PIGF therapy through translational research, toxicology studies, manufacturing of clinical material and studies to identify appropriate patient populations.

BioInvent began to study the antibody together with ThromboGenics, the other biopharmaceutical SME participating in the project, in what was the beginning of a fruitful cooperation. The two produced a detailed programme describing how they would develop the antibody for clinical use. ‘In fact, the collaboration had been initiated shortly before the start of the project,’ says Dr Martinsson-Niskanen.

According to Dr Martinsson-Niskanen, the EU funding was the foundation for an aggressive project timeline where activities could be performed in parallel rather than in sequence. ‘It also gave us the opportunity to carry out
Seeking out pioneering cancer treatment studies of lower priority but still of great value for the design of the clinical programme.

The EU support also had collateral positive effects, says Dr Martinsson-Niskanen. The two SMEs could build a critical mass of projects, which was a precondition for continued financing in terms of new risk capital investments and money from project licensing deals. ‘I think it is fair to say that the funding contributed to the companies’ maturation. With the fairly long development times we are faced with – from target identification to phase I data which is what most big pharmaceuticals want to see before any licensing deals – it is difficult, if not impossible, for small companies with limited funds to run a sufficient number of projects in parallel considering the high attrition rate of projects in this early stage.’ She adds that the EU funding is critical for continued therapeutic development today when big pharmaceuticals are cutting down on their own research capabilities as it seems impossible to get a sufficient return on investment.

BioInvent, a relatively small biotech company with around 50 employees, managed to grab the spotlight in the global biotech sector. Dr Martinsson-Niskanen believes this was because of a very clear project plan where all activities were essential for the development of the project’s anti-PIGF antibody in the clinical phase, facilitated by the consortium. Also, the project’s novelty ‘created much interest from the big pharmaceuticals in need of new ideas and treatment concepts.’

The results showed that the antibody had a considerable effect on mice. Pronounced safe for humans, it entered into clinical studies. In 2009, BioInvent and ThromboGenics secured a EUR 50 million investment from pharmaceutical giant Roche by selling its findings.

The ANGIOSTOP outcomes have served as an important stepping stone. ‘Recent data shows that it’s likely other mechanisms, rather than the inhibition of angiogenesis, that are important for the anti-PIGF antibody to be effective,’ stresses Dr Martinsson-Niskanen. ‘The potential of this new mode-of-action – the process through which the drug effects a condition – is being explored and, if successful, it may trigger the start of a new clinical study.’ As such, the true potential of an anti-PIGF antibody has yet to be determined.
To achieve this, the industry is moving away from traditional farming methods such as ponds and lakes, and instead focusing its effort on Recirculating Aquaculture Systems (RAS). RAS are typically located indoors and allow farmers to control environmental conditions year round. Despite the advantages of RAS, the problem of bacterial loading still remains a serious issue.

A potential solution comes from the CleanHatch consortium which began its work in September 2010. This two-year EUR 791,117 EU-funded project is developing a new fish-farming cleaning technology aimed at controlling bacteria proliferation in larval tanks.

‘Cleaning the tanks’ sides and base requires high levels of human effort. It also increases costs and poses a constant risk of infections, resulting in reduced larvae health and survival rates. These outcomes can have a negative impact on the bottom line,’ says CleanHatch project coordinator, Maria-Liza Scicluna. ‘A high degree of disinfection is also crucial to avoid diseases,’ she maintains.

The above problems are further compounded by the fact that current methods used to clean aquaculture tanks are labour intensive and often ineffective, and can unsettle the fish larvae and thus reduce their survival rates if not performed correctly. CleanHatch offers two important solutions. First, cleaning the tanks’ sides and base by using an automatic arm, which saves considerable man hours. Second, the technology disinfects the surfaces through the focused injection of ozonated water, which is water free of bacteria, viruses, spores, parasites and chemicals.
The CleanHatch arm is currently being tested in purpose built RAS facilities. In addition, data is being collected to determine the effect of the arm on larval survival, occurrence of deformity, growth performance, and bacterial counts. Additional data on the effects of injected ozonated water will also be collected. Results will establish the technology’s cost effectiveness and ease of use.

By using the technology, the consortium predicts an increase in larvae survival of 10%, resulting in lower unit costs and increased production.

According to Scicluna, the goal is to have a marketable product ‘by the end of 2013’, which could potentially offer new business opportunities for the European fish-farming technology providers and SMEs across the EU.
HIV is not curable but it is treatable, states Dr Francesca Incardona, CEO of EuResist Network GEIE and research area manager at Informa s.r.l, the SME responsible for coordinating the EuResist project. The thirty-month initiative was devoted to providing better treatment by implementing an intelligent system that uses patients’ clinical information together with viral genetic data.

‘Choosing the best treatment for a specific person can be very challenging. The antiviral drugs designed to help deal with HIV are numerous, and furthermore the HIV virus evolves very rapidly so that each person hosts slightly different mutants of the wild virus, with a different response to the various drugs,’ says Dr Incardona. ‘Some viruses become resistant to several drugs and doctors may encounter many difficult situations.’

Drug resistance is the main source of treatment failure today in western countries. There are numerous antiviral drugs that can be used, and in most cases, it is relatively simple to treat a patient at the onset by prescribing a cocktail of antiviral drugs. Such treatment success is usually short-lived. The virus evolves and becomes resistant to the medicine. When doctors choose new medicines to combat the disease, they may find that the viral population (the mutated viruses hosted by the specific patient), is already resistant to the treatment. EuResist was launched with the objective to collect as much data as possible in order to understand how patients fare under this particular virus.

The vision behind the EuResist project was to create a system with the ability to learn from real data through smart modelling techniques in order to help doctors choose the best treatment for a particular patient with a given viral population and resistance profile more accurately than before.

The achievement of the project was based on two key outcomes. First, an integrated database was created, which is among the largest HIV resistance databases available today with over 62,000 patients. It is used by hundreds of countries and contains such data as patient information, drug therapies and AIDS defining events.

Second, a prediction engine was developed based on the database, which examines data that is given online and foresees how treatment will
work best. The engine boasts a high accuracy percentage (77-78%) in predicting the right treatment. Increasing this percentage remains challenging, as it cannot be done simply by populating the database. ‘What we believe will drastically change the accuracy is to consider the profile of the human immune system,’ underlines Dr Incardona.

This system enables more effective patient care and considerably reduces the prohibitive international therapy management costs. Designed to offer more treatment options to patients, the EuResist system can contribute towards saving lives. Furthermore, reducing the possibility of choosing wrong treatment leads to a better quality of life and to the decrease of expenses.

Dr Incardona puts the system’s added value into perspective. A 10% yearly increase in the number of effective treatments in an area where 10,000 patients are being treated with a success rate of 80% would result in the reduction of the final treatment failure rate from 20 to 12%. Based on this, an additional 800 patients would benefit from effective therapy every year. ‘Using a system with this modest rate of increase in successful treatment on a large scale can make a considerable difference when we consider that around eight million patients are under treatment in low- and middle-income countries and more will be put on treatment every year,’ she adds.

The EU’s funding instrument was vital in getting the project off the ground. When it ended, the EuResist Network was set up, an entity which involves most of the initial project partners. The large amount of data collected is highly valued by pharmaceutical companies, and paid studies are carried out if approved.

Dr Incardona stresses that additional public financing at this stage is necessary to continue to build on achievements. The broader research aims of the project, such as further efforts to make it applicable to third world countries, require funding which private companies and organisations cannot allocate.

Dr Incardona aspires ‘to increase accuracy by considering the patient’s genetics, particularly that of the immune system.’ Furthermore, the EuResist Network plans to use similar models in other domains like hepatitis, and to adapt the system for users in third world countries who are most in need.
SMEs – supported by researchers at the Fraunhofer Institute for Building Physics in Stuttgart, Germany – spent three years on the development of IT tools for the design of top-quality wooden and metal organ pipes. In December 2011 the InnoSound team unveiled a first prototype that reduced total organ production costs by more than 15%, while considerably improving sound quality. The research and development was backed by EUR 625,000 in EU funds.

The team experimented with changing the materials used in organ components to find an optimum arrangement. The idea was to develop a software programme that could help SME organ builders achieve their particular sound ideals. The sound quality is the signature of the organ builders and one on which they earn their reputation. The team also investigated different factors related to the character of the sound, such as room dimensions, accompanying acoustics or dimensioning and voicing of the pipes. The SME partners involved designed new organ pipes, and provided pipes and voicers for lab experiments and for evaluation in their own workshops.

“We have been able to develop software to help organ builders construct the pipes according to the sound character that they would like to get at the end,’ says Dr Judit Angster, leader of the InnoSound research group. ‘Organ builders generally work by hand, and learn how to build the organ pipes from their fathers and grandfathers so it’s a very traditional art, clarifies Dr Angster.

The developed software programme can determine the ideal depth and width of wooden organ pipes for specific sound characters, believe the researchers. It helps organ builders optimise the size of the wind chest of the large pedal pipes, saving time and money.

The organ has played a central role in Western society since Roman times. Along with the clock, the organ was considered one of the
most complex man-made creations before the Industrial Revolution. Building organs is a traditional craft that originated in Europe and spread globally, with each country adopting unique technical and cultural traditions. Organs are expensive. A small, used pipe organ costs a few thousand Euros but a custom built church organ starts at EUR 100,000 and increases relative to size.

Organs produce sound by air moving through their pipes. They are essentially a very large box of whistles. Each pipe sits on top of a hollow wind chest that is filled with compressed air which comes from an electric pump. The longer the pipe the lower the sound it makes and the shorter the pipe the higher the sound. To play an organ the musician must open and close the air that flows to the pipes from the wind chest. This produces the distinctive organ sound. With so many different parts working in unison, minimising cost without cutting corners required an in-depth knowledge of the building physics.

Far from standardising the organ sound, the aim of the three year project was to provide indisputable scientific knowledge that experienced organ builders can use to achieve their tonal ideals.

SME representatives from the project consortium assert not to have any competitor in the EUR 740 million European organ market.
‘Once cheap bearing counterfeits from Asia started to penetrate the market, we came to the conclusion that European manufacturers can only survive by offering a new state-of-the-art product,’ says Dr Helmut Wenzel, president of VCE Vienna Consulting Engineers ZT GmbH. VCE, the Austrian-based high-tech consulting firm that coordinated the two-year project, took a rather unconventional route when building its SME consortium. ‘We brought together the four competing bridge equipment manufacturers in Europe, and this created the critical mass necessary for the development of a new generation of sliding bearings.’

All the ingredients were in place for a successful joint effort: diversified experience, balance of required know-how and a shared research approach. Mr Wenzel stresses, however, that this seamless cooperation was only made possible thanks to EU funding: ‘Without it, this harmonised development would not have been possible in a competitive market such as this one.’

Bearings are designed to transmit the weight and traffic load of a bridge to the ground. In order to avoid over-stressing and damage by vehicle and loading movement to the piers (a bridge’s upright supports), bearings are used to accommodate such movements so as to reduce the reaction forces and bending moments to be within the safety limits of the structure.

It proved easy to produce the new bearing after successfully developing and testing it, says Mr Wenzel: ‘The development work tried to remain as faithful as possible to the production process, so it was no issue to proceed to the commercialisation phase after the end of the project.’

Mr Wenzel was optimistic of going to market because of the demand shown. ‘We identified several critical cases where bearing failures caused considerable problems for prominent bridges. In fact, two of the four manufacturers implemented the new concept immediately with success.’
Marketing of the MOBILE product then took off. ‘The new bearings started to sell immediately, and marketing was carried out on a global scale,’ states Mr Wenzel. ‘A collaboration agreement between VCE and the producers was signed and joint offers were successfully made to international clients. Since then, joint projects have been implemented worldwide.’

Along with MOBILE project success came tremendous growth. According to Mr Wenzel, VCE grew by more than 100%. The business volume in the bridge bearing sector quadrupled compared to previous years and continues to experience rapid growth, which now comprises 40% of the business. More than 30 new jobs were created in 2012, a third of which are related to the MOBILE technology. Products and services are almost entirely European, which contributes to keeping jobs in Europe.

Most of the exceptional bridge projects have been equipped with the MOBILE technology. Prominent superstructures include the Haliç Metro Bridge (Istanbul), the Taizhou Suspension Bridge (China), the Halifax Harbour Bridges (Canada) and the Wazirabad Signature Bridge (New Delhi). The majority of projects are managed online via a web interface.

Mr Wenzel explains the added value and competitive advantage of the MOBILE product: ‘The lifespan of the new bearings is more than double and they provide information on their real-time condition through a monitoring system. They are superior to the low-cost fakes, and are considered a necessity for many large-scale projects today.’

‘The new bearing should continue to be successful for the foreseeable future,’ emphasises Mr Wenzel. ‘We see an innovation cycle of about a decade. In the next few years, we will start to carry out more research and development work for an improved product.’

Mr Wenzel believes that the achievements of the MOBILE project offer lessons learnt for SMEs: ‘It is important to enable SMEs to take big steps in development and to collaborate with other like-minded businesses when going alone is not an option. Well-balanced European research and development projects can bring considerable added value to the European industrial process.’
The ActoBiotics approach could potentially be the first intervention for newly diagnosed patients, resulting in a complete reversal of the disease,” says Dr Bernard Coulie, CEO of ActoGeniX. He explains that ActoBiotics are a novel class of orally available biopharmaceuticals for the targeted treatment of diseases such as T1D, and are designed to be safer and more effective than their injectable equivalents. ‘The role of ActoGeniX in this project is to introduce ActoBiotics as a novel concept for the oral administration of the natural immune modulators, which are key to maintaining a strong and properly functioning immune system.’

T1D is a lifelong condition usually diagnosed in children and young adults. The body does not produce insulin, a hormone that enables a person to get energy from food. Left untreated, T1D can seriously damage the body’s organs.

‘The ActoBiotic product for the treatment and prevention of T1D is unique in many ways,’ boasts Dr Coulie. ‘Its features ensure that it’s safe, efficacious, easy to use – oral administration of a capsule – and cheap to produce.’ He adds: ‘Within the remit of T1D treatment, it may potentially lead to a radical change.’ Currently the only option for T1D patients is insulin replacement therapy which requires multiple injections or the use of an insulin pump.

‘If we can indeed stop the progression of T1D or even prevent it, a significant number of people will be able to live a normal life,’ says Dr Coulie. The extent of the economic benefits of this possibility is uncertain in terms of figures, but should be huge nonetheless. ‘NAIMIT will obviously have a tremendous impact on overall economic growth most notably by treating a debilitating disease which is chronic and starts at a very young age.’
Safe and disease-modifying treatment and even prevention will inevitably lead to significantly less use of health care resources, less sick leave, as well as maintain a very young population economically active.

ActoGeniX was introduced to the project by noted researcher Chantal Mathieu, a professor at the Clinical and Experimental Endocrinology Unit at University Hospital of Leuven, Belgium. The two continued what was an ongoing collaboration on this specific type of T1D research. ‘For us, the collaboration has been particularly successful precisely because of the very close cooperation – both scientific and logistic – made possible by NAIMIT with academic research institutions, notably the coordinator, the University of Leuven,’ says Dr Coulie. The contribution of ActoGeniX has proven extensive: ‘We were able to generate a wide range of test products within weeks, to train scientists in our labs who then continued their work in Dr Mathieu’s lab, as well as to deploy our extended network of immunology experts in academia as well as in industry.’

Dr Coulie considers the EU funding as the cornerstone of NAIMIT: ‘Although the scientists in academia as well as in our company have a clear idea of the necessary steps and experiments to test the hypothesis of immune tolerance in T1D, turning these scientific ideas into concrete actions was only possible thanks to the allotted budget.’

The five-year project which is set to end in late 2014 is in the preclinical phase. The consortium is seeking partners in industry and government in order to advance to the clinical testing stage and ultimately to commercialise the product. Despite the current economic climate, ActoGeniX recently managed to raise EUR 10.7 million in equity capital. This substantial funding will enable the company to uniquely position itself in the marketplace to successfully exploit the commercial potential of its ActoBiotics products.

‘The ActoGeniX team and myself are being driven by the fact that we may make the difference in patient care and health care in proving that our unique platform is applicable in the clinic,’ says Dr Coulie. ‘It seems that – but we need further validation – it will constitute a true paradigm shift in the advancement of novel biological therapeutics.’
Back in 1993, the Phidias project brought together the then SME Materialise, which coordinated the project, an interdisciplinary university research group and two of Europe’s largest companies. The aim was to adapt the latest rapid prototyping (RP) technologies from manufacturing industry to surgery.

Through rapid prototyping, surgeons were provided with highly accurate models of their patients’ internal organs just a few hours after performing CT or MR scans. The models have improved both diagnosis and surgical planning considerably. They have also been used as masters for surgical implants or prosthesis. By mid-1996, Materialise had sold 20 licenses worldwide and opened a sales office in the USA. It saw its workforce expand from five before the project to 40 after, the EU as such playing a decisive role in the company’s rise and sustained success thereafter.

Today, thanks to advances in computing power and industrial innovations, companies are increasingly using cutting-edge laser and digital technologies – traditionally reserved for creating three-dimensional (3D) prototypes – to leapfrog from design to new products in a wide range of fields. Materialise has become a leader in 3D printing or so-called ‘additive manufacturing’ (AM) which effectively makes objects from 3D computer models by joining materials layer by layer.

Mr Vancraen gives credit where it is due: ‘Materialise would never have become what it is without European backing. It gave a small company the chance to do longer-term development by providing not just money but a framework of support – legal, project management, networking – for multi-country, multi-disciplinary research.’
Industrial tools, medical instruments, historical replicas, even luggage and furniture can be rendered simply and quickly thanks to a little bit of computer-assisted or ‘virtual’ magic. This has huge advantages for industry, and the applications are only limited by the imagination. If a firm needs to customise a surgical instrument for a complex brain tumour removal, or a new product line shows potential but only in low volumes, traditional RP processes would be too costly. From the very beginning, Materialise focused on using AM in the creation of a better and healthier world. Making innovation count has become something of a mantra for the company. ‘With our assistance, anyone and any company – large or small – can create world-class products or offer excellent service. When people have passion, we are there to help them materialise it…make their vision real,’ explains Mr Vancraen.

Back in the 1980s, a rapid prototype was a cumbersome instrument. While useful to show a manufacturer what their product might eventually look like, they were far from production-ready. Of course, the technology – its accuracy and scope – has improved since Mr Vancraen witnessed its use in the metal industry and first dreamed of applying it to medicine. Since the company’s involvement in Phidias, an EU project which adapted industrial RP technologies for use in surgery, AM based on medical images has remained a core business. Materialise has come a long way fast, developing and improving AM-related tools including its original Magics software, Streamics, AutoFab and 3-Matic. The company has also created the first-ever collection of 3D-printed design objects (.MGX) in addition to an on-line shop and platform (i-materialise), allowing anyone to contribute to the design process. Today, designs coming out of its MGX product line, such as the Cadence MGX pendant lamp by One & Co, are winning Good Design Awards for outstanding product development.

‘It’s not the end of the story,’ says Mr Vancraen. Like many technologies, these tools are constantly evolving and developing. ‘Yet, the biggest changes we’re seeing are not in the objects we slice up and glue back together “virtually” but in the different approaches to the rich set of problems presented to us.’

Materialise’s specialist teams are making a difference in everything from smart textiles appearing at Paris Fashion Week, to surgical face reconstructions and life-sized models of King Tut’s remains, to the first race-car designed in great part thanks to 3D printing.
The RAPIDCOOL project set out to develop a method of cooling prepacked beverages at the point of sale in order to avoid the need for constantly cooling them in readiness for purchase,” says Iztok Vodicar, executive manager at Vending Marketing DOO, the SME which coordinated the one-year project. ‘Commercial refrigerators use a lot of energy, so we thought that by storing the drinks at ambient temperature – 20 degrees Celsius – and then quickly cooling them at the point of purchase, we would save a great deal of energy and reduce retailers’ electricity bills.’

Energy savings was the original driving force behind the idea, a concept originating with Enviro-Cool UK Ltd, one of the three SME partners. The company conducted research before the project began. It was then that Mr Vodicar’s company, Slovenia’s sole vending manufacturer, joined forces with the UK SME and Spain’s DYMTEC to develop this innovative technology.

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‘SMEs do not have large R&D budgets and carrying out effective research is very expensive,’ emphasises Mr Vodicar about the funding’s importance. Developing the product was not without its challenges. The main obstacle was achieving a product delivery time acceptable to consumers. ‘We overcame this by developing a product that had six drinks in it at the same time, and this effectively reduced the waiting time from 42 seconds to around 10.’

Mr Vodicar boasts that the RAPIDCOOL technology, under the V-Tex trademark, has gained a number of competitive advantages over its competitors. Commercial drinks refrigerators take a long time to cool drinks. ‘In busy, warm environments you often have to search in the fridge for a cold drink, but with our product you get a cold drink every time, and the temperature of the drink can be programmed into the unit.’
Large beverage companies give away tens of thousands of commercial refrigerators every year to retailers so they can sell their drinks. ‘Often retailers put the competitors’ drinks in the refrigerators, but our product can be programmed to chill only the drinks provided by the donating drinks company.’

‘Retailers benefit from our technology because it saves around 90% of the energy consumed by open front chiller cabinets and around 50% of the energy used by glass fronted refrigerators,’ says Mr Vodicar. He adds that retailers also benefit ‘because consumers place the ambient drink in the V-Tex unit and then receive a cold one out, so the retailer does not have to stock the unit.’ What is more, V-Tex takes up a lot less retail space than conventional refrigerators. ‘Consumers get a cold drink every time and one that is bacteria free, thanks to our newly designed hygiene feature.’

Mr Vodicar estimates the yearly savings for retailers to be about EUR 800 for each open chiller cabinet that is replaced with RAPIDCOOL technology and about EUR 200 for each glass fronted commercial refrigerator. The real savings are anticipated to be more because one V-Tex unit could replace more than one standard drinks refrigerator/chiller. Patents have already been granted in Europe and the UK, while Enviro-Cool has filed patents worldwide. Following the project’s end in December 2013, Mr Vodicar now has his sights set on commercialisation. ‘We have been working closely with one of the world’s largest beer producers to develop the commercial unit. We have had meetings with the world’s largest manufacturer of household appliances in an effort to get them to invest in a manufacturing line for us.’

The SME partners are planning to set up manufacturing and distribution channels around the world. ‘There is a truly global application for this technology, and there are other applications still to be developed,’ stresses Mr Vodicar. The technology has the potential to be included in a standard domestic refrigerator, as well as to be built in to kitchen or bar worktops. An application in the marine and automotive industries is also envisaged.

‘We expect, in time, to make a significant change in the drinks refrigeration industry,’ concludes Mr Vodicar.
Harmful bacteria can be removed from water sources through the addition of copper and silver ions. The SILCO project has developed an innovative monitoring device that senses the elimination process of complex bacterial communities known as biofilm and unsafe bacteria from drinking water systems.

‘We set out to develop a sensor which quickly and cheaply measures the content of copper and silver, and other metals in water,’ says Peter van der Linde, managing director of Holland Watertechnology (HWT), the SME responsible for developing the sensor during the SILCO project’s lifetime and its current supplier.

‘Soil contamination was a serious issue in The Netherlands during the 1980s, and that’s when we started developing innovative techniques,’ he explains. ‘It’s the knowledge that we accumulated over the years which eventually led us to the research and development of our BIFIPRO® technology that uses copper and silver ionisation to eradicate biofilm and legionella from water systems.’

‘We started this project in 2009 together with our SME partners in The Netherlands, Greece and Slovakia, and with universities from Italy and Germany, to develop the Silco-sensor,’ states Mr van der Linde. ‘After a period of extensive testing in our labs, the first prototype sensor was eventually installed in a Slovakian spa in July 2011.’

The BIFIPRO® system releases copper and silver ions into the water to eliminate biofilm, a breeding ground for harmful bacteria like legionella. It is equipped with a sensor that accurately monitors the concentration levels of copper and silver ions in water sources and facilities, which is a determining factor in the removal of biofilm and legionella.

Mr van der Linde explains that the copper and silver amounts are monitored in real time in The Netherlands. The quantities released into the water are immediately known, while the dosage can be adjusted remotely if need be. Before the development of the SILCO® sensor, water samples needed to be taken and analysed over a number of days, thus making the entire process considerably more complex and expensive.
Mr van der Linde stresses the environmental benefits of the BIFIPRO® system: ‘There’s a strong case to be made for terminating the use of chemicals to control the growth of bacteria and switching to a more environmentally-friendly technology with copper-silver ionisation.’

HWT boasts more than 180 customers ranging from the healthcare and elderly care domains, to hotels, penal institutes, swimming pools, spas and cooling towers. Mr van der Linde adds that the project has received numerous enquiries from interested parties worldwide, in spite of the current economic climate. HWT projects the market value for the system to be between EUR 10-15 million for the period 2013-2017. ‘We’re hopeful that the creation of the limited company and the recent allocation of new manpower will fuel the commercialisation of our product.’

‘The ongoing development of the BIFIPRO® system has strengthened our market leadership in The Netherlands, as well as opening up new opportunities,’ emphasises Mr van der Linde. The EU-funded project may have finished over a year ago, but HWT is busy bundling related technologies with the SILCO product in an effort to advance the sensor and validate its performance in harsh working environments. ‘New partnerships are being established and a separate limited company is being set up which includes SME partners. This company will be responsible for new developments and the commercial exploitation of the sensor technology,’ claims Mr van der Linde. Placing the sensor into a handheld device is in HWT’s future plans, and he sees numerous application possibilities in the process industry.

‘For us, the SILCO project has been a great success,’ says Mr van der Linde. ‘It’s been our experience that most of the practical input has come from the SMEs.’ He continues: ‘As Holland Watertechnology, we do see a lot of potential in our own applications and industries, but we also see abundant interest from other industries.’

In early 2013, the Dutch government, after a successful two-year testing period, purchased the BIFIPRO® system for use in two cooling towers at the Forensic Institute in The Hague. The management of the Mirabilandia aqua-fun park close to Ravenna, Italy also decided to install the system on the basis of its proven effectiveness in excluding any risks of legionella for visitors and staff.
‘The SteelProst coating represents the state of the art of high performance intumescent formulations tailored to meet the unique challenges of the steel construction market,’ explains Véronique Dehan, Secretary General of European Convention for Constructional Steelwork (ECCS), the project coordinator. ‘It combines a series of nano-additives carefully selected with tin chemistry to improve performance and sustainability, and it is more environmentally friendly compared to most of the commercially available solutions.’

Over the last ten years, issues regarding the cost and protection quality of existing intumescent paints has resulted in steel structures losing 40% of the market to concrete structures. Because of their low resistance to scratching, the paint is typically applied on-site after erection, to avoid damage during transportation and installation. However, because at least three or four layers are required to achieve the protection required by European legislation, it takes at least three to four days to apply the paint. As a result, the application disrupts the construction process and adds significantly to its cost.

To improve the coating’s resistance to scratching, the SteelProst solution incorporates nanomaterials as an inorganic filler. This makes it significantly more durable than other intumescent paints, and correspondingly less likely to be damaged during transportation and installation, without reducing its fire-resistant properties. Its greater durability enables it to be often applied off-site. The result is that the coating reduces costs by 25% for on-site applications and 50% for off-site applications.

The SteelProst coating also has enhanced fire-resistant properties. It provides 2.4 times the
amount of fire resistance compared to other existing intumescent paints, in part because it begins to form a protective layer at much lower temperature. In addition, it has far lower smoke emission than other solutions.

The consortium will launch a demo project soon in order to put the coating on the market within the forthcoming months. The patent has been written and will be filed before the demo project starts. The coating will be commercialised first in Europe, then in the USA, Japan and elsewhere, and Ms Dehan expects it to have a significant impact in the market. ‘It is expected to gradually recover the 40% market share lost by the steel construction market during the last 10 years. Around 10% should be recovered in the first five years of commercialisation.’

In addition to Belgium, the consortium comprises members from Germany (Bersch & Fratscher GmbH), Italy (Alcea s.r.l.), Slovenia (Construction Cluster of Slovenia; Razpon D.O.O.), Spain (Asociacion de la Industria Navarra; Talleres Ruiz; Tecnologias Avanzadas Inspiralia; Acciona S.A.) and the UK (ITRI Ltd). None of the members had the capability to develop the solution alone, and a high level of cooperation was required. Ms Dehan is also quick to acknowledge the contribution of EU funding. ‘EU funding was of paramount importance in order to achieve all the ambitious objectives initially planned in SteelProst. It supports trans-national research collaborations in this industrially relevant area (fire protection of steel structures), support for researcher mobility, and trans-national access to research infrastructures from other partners involved in the project.’

Ms Dehan is very proud of the project’s achievements. ‘Many people told us that our project was too ambitious, that we would never achieve the results we had committed to. But the strong coherence of the partners, the excellent team spirit, and the seriousness and genius of our RTD partners have been influential in the success of this project. It is extremely important to choose the right partners from the beginning of the project; for a coordinator, to feel a total confidence and reliability in the project partners is a major factor. Communicating often and multiplying the occasions to speak to each other is a priority. Any obstacle to the total cohesion of the team must be tackled immediately.’

Participants

Belgium (Coordinator), Germany, Italy, Slovenia, Spain, the UK

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‘Our overall goal is to maximise the safety of people and to minimise the adverse impacts on the environment,’ says Josep Maria López Orriols, director of EDMA Innova R&I, which is the main software developer for the UnderSafe system. ‘We’re creating an innovative and tailored system solution that provides continuous and automatic monitoring of safety and environmental conditions at underground sites open for recreational and touristic purposes.’

Monika Bandura of INNOWA, a leading R&D company in Poland, is coordinating the two-year project. Its extensive experience in providing cutting-edge technology solutions has proven invaluable in developing the system’s hardware. About 27 million people visit underground destinations every year in Europe, and with this specialised industry poised for steady growth, its economic and social impact is becoming evident. By 2014, it is estimated that there will be more than 1,800 underground tourist attractions in Europe, primarily in Germany, Austria, Italy, Spain and France. Several specialist tourist companies came together with the SMEs to recognise the need for state-of-the-art technology, in addition to a uniform regulation scheme, that would lead to better security, biodiversity preservation and environmental conservation. The reputation of underground attractions as being safe and environmentally friendly was at stake.

The project was launched in late 2011 thanks in large part to EU funding: ‘The project simply would have been impossible to carry out without the EU contribution – it made all the difference,’ stresses Mr López Orriols. ‘What is more, the SMEs didn’t have the product development capacities or the qualified personnel.’ He also explains that the ‘AP Module’, the system’s basic unit, will provide round-the-clock detection and early warning about situations that could potentially pose threats to tourists, guides as well as professionals working underground. This remote software
device in the form of a necklace or bracelet enables users to access a central monitoring system via all popular mobile devices. Alerts are issued in cases where people enter non-visitor areas or unstable zones, when a visitor remains immobile for an extended period of time, or when someone falls behind a group. It is easy to install, use and maintain, and can continue to run for up to one hour during a power failure.

The system will offer complete environmental control of the underground facility in terms of physical parameters (e.g. humidity, temperature) and gas sensing (e.g. carbon dioxide, oxygen, carbon monoxide). For instance, it calculates the maximum number of visitors a site can accommodate without destroying flora and fauna or ancient drawings. It will also include structural sensors to detect rock falls and landslide movement.

The SME partners acknowledge the tremendous market potential since it is the only such product that focuses on underground tourist attractions. The SMEs will gain a competitive and timing advantage with a novel product and with access to advanced technologies. The commercialisation phase will inevitably lead to the establishment of a new company and the creation of jobs.

The UnderSafe system will be commercialised by Arthaus (the former Yugoslav Republic of Macedonia), Electronics Design (Estonia) and EC Electronics (Poland). Spain’s Polytechnic University of Catalonia lends its expertise in mining engineering and underground environments. Poland’s Wieliczka Salt Mine provided know-how during system definition and design, and offered its facilities for installation and testing. ‘It’s the consortium’s combined expertise and diverse core competencies that have made the development possible,’ says Ms Bandura.

Following successful testing and validation of the project results at such famous attractions as the Wieliczka Salt Mine, one of the world’s oldest salt mines still in operation, Mr López Orriols is optimistic of going to market in 2015. ‘There’s interest right now, and not only in the EU, but globally as well,’ he says. ‘We expect to commercialise the product beyond the EU, and by maximising its export capacity, the EU stands to benefit. In fact, the SME consortium has initiated contacts with sites in Australia, and the US is next.’
Due in large part to inefficient water irrigation systems, the agriculture industry wastes 60% of the water it uses each year, or 70% of the world’s freshwater. WaterBee has developed a smart irrigation system to reduce this wastage, thereby saving money and increasing both crop quality and yield.

‘The widespread take-up of this intelligent irrigation system could have a profound impact on water usage and its efficient management, which is a global environmental need with major implications for Europe,’ says Dr John O’Flaherty, the technical director of Ireland’s National Microelectronics Applications Centre, the SME coordinating the two-year project.

Dr O’Flaherty says that funding has been essential in allowing the consortium to work together, scale-up, validate and demonstrate this innovative system, as well as to bridge the gap from WaterBee’s previous research project prototype. ‘This would have taken much longer, if it would be possible at all, with the SMEs working alone.’

‘The WaterBee system goes well beyond the state-of-art, with its unique Soil-Moisture Model for optimal water use, continuously self-adapting to each user’s situation and business objectives,’ indicates Dr O’Flaherty. ‘Growers optimise their use of water by irrigating only where and when it is needed, as well as enhancing plant growth and quality.’

The system consists of a series of sensors planted across a field to measure soil water presence, environmental parameters and indicators of crop development for different areas of the field or fields that have diverse water requirements. These sensors then send readings through a wireless network and the Internet to an intelligent software application which selectively activates irrigation nodes to deliver the necessary amount of water only when it is required. Real-time data is presented to growers on easy-to-use smartphones and web apps. The WaterBee plug-and-play units are easy to install, and the user interface is very intuitive.

Dr O’Flaherty stresses that growers will benefit by getting greater control over the irrigation of their crops, thus earning more profit per hectare through the efficient use of water and
other inputs. The system provides accurate and complete real-time information on crop and field conditions, assuring greater yields and higher quality crops. Specifically, about 40% of irrigation water used today will be saved and irrigation events will be reduced by 50%. Time spent planning irrigations will be reduced by 50%. Plant health will be improved by 5%, while growers can expect to experience 10% higher profitability. ‘Water management has to evolve from today’s model to a new smart one that includes water consumption reduction in accordance with scarce natural resources,’ emphasises Dr O’Flaherty.

The main beneficiaries will include commercial growers of salad, fruit and vegetable crops, vineyards, golf courses and landscape managers. The SME partners, who are set to commercialise all or parts of the WaterBee system, will also benefit because the solution meets the markets’ current needs.

‘Unlike existing systems, WaterBee is the first irrigation system to have a unique soil moisture model that optimises the use of water for individual crops in specific locations,’ says Dr O’Flaherty. ‘Regardless of such technological improvement, it’s affordable and the ownership cost is very low, with communications costs being no more than a few euro each month.’ He claims that ‘WaterBee systems will offer much greater functionality and value-added benefits for the beneficiaries.’ He adds: ‘Existing water management and irrigation systems can be expensive, difficult to use and not very effective, while WaterBee provides accurate and complete real-time information on crop and field conditions.’

WaterBee has tremendous commercial potential due to a growing demand for food. Today, 40% of the world’s food is produced by irrigated agriculture. Of the 255 million hectares irrigated worldwide, 16 million are irrigated in 12 million holdings in Europe alone. The 255 million hectares are real market opportunities for implementing the WaterBee system, as exploitation rights cover all global markets. Europe potentially accounts for EUR 500 million in smart irrigation systems. Overall, smart irrigation is estimated to be a EUR 1.7 billion global market by 2020.

The consortium has disseminated the WaterBee service to potential customers and business partners through various media and key events, such as the highly influential EIMA (International Agricultural and Gardening Machinery Exhibition) in 2012 and the UN World Water Day in March 2013.
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Project information