

# Horizon 2020

**BIGGER  
SIMPLER  
BOLDER**

Fourth edition of the **guide** to Europe's multi-billion innovation strategy, and its journey through the EU legislature



## SCIENCE | BUSINESS

### Horizon 2020: Bigger, Simpler, Bolder

Fourth edition of the Science | Business guide

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# Preface

**A**fter two years of political preparation, Horizon 2020 is finally on the launch pad. This Autumn, the world's second-largest civilian research programme (after the US National Institutes of Health) goes through the final formalities in the European Parliament and Council. In early December the European Commission will announce the first call for funding proposals under the programme. And so what had been political plan will become financial reality.

But will it make a difference? Will Horizon 2020 succeed in its grand ambitions – helping solve society's greatest challenges, reinvigorating Europe's competitiveness in emerging technologies, and inspiring a new generation of innovation, entrepreneurship and social cohesion? It depends.

It depends on the details in the work programmes being finalised now inside the European Commission's main R&D bureaucracy, the Directorate General for Research and Innovation. It depends on the quality of the individuals chosen to run the various parts of Horizon 2020 (indeed, the latest dinner-party amusement here is gossiping about who will get whose job in a coming reorganisation at DG Research.)

It depends on whether big companies, to date unimpressed by Brussels' skill at managing cost-effective research, decide to sign up for the innovation flagships, partnerships and undertakings that are the policy showcase of Horizon 2020. And it depends on whether the Commission can deliver on its promise to cut the red tape, encourage small companies, and stimulate frontier research.



These are the issues that we at Science|Business will follow – in our publications, events and policy research - in coming years. This report, the fourth edition of our periodic guide, is supplemented by regular updates online at [www.sciencebusiness.net](http://www.sciencebusiness.net). Join us – as readers, members or sponsors – as we try to broaden and inform the debate over Europe's future.

**Richard L. Hudson, CEO, Science|Business**

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# Horizon 2020

## Europe's new research & innovation plan



The European Union's new omnibus R&D programme promises more money, less red tape, broader benefits, more jobs and economic growth – but will it deliver? Science|Business follows the final steps of the Horizon 2020 negotiations, as legislation is drawn up in Brussels and more details emerge.

**A**fter two years of preparation and six months of negotiation between the European Parliament, Commission and Council, a political agreement on the programme for Horizon 2020 was reached on 25 June 2013. National governments, acting at EU-level through the Council, held on tightly to the hard-fought budget deal reached at a summit in February 2013. In exchange, many of the items on the Parliament's wish-list were incorporated into the programme.

The EU's long term budget, the Multi-Annual Financial Framework, also awaits rubber-stamping, but Horizon 2020 looks set to receive €70.2 billion – up from about €55 billion in the current Framework Programme Seven, but short of the €80 billion the Commission initially proposed and the €100 billion that many in the Parliament wanted.

With the Parliament set to officially sign off on the text in early autumn, the first calls under Horizon 2020 are expected to be announced on 11 December 2013.

It is now possible to see the contours of what research and innovation funding from the EU will look like through the remainder of this decade.

- It will be fairly large – increasing the financial and political weighting of European Union funding in European research overall.
- It will add more of an emphasis on market-facing innovation rather than basic research.
- It will, within basic research, magnify efforts to fund the best science through open competition – chiefly through the European Research Council.
- Within the innovation portion, it will offer more support to small companies, push to deal with challenges such as climate change and an ageing population, and expand experimentation in new forms of public-private collaboration – such as public procurement of innovative products and services, and the knowledge triangle (industry, research and education) consortia of the European Institute of Innovation and Technology.
- It will strive to be simpler, to stop driving away companies horrified by the old bureaucratic mill that EU funding had become, with a single set of rules, a flat-rate reimbursement model and a reduced time to grant. How these measures will be implemented and whether

simplification will be the outcome will be the biggest question when the programme begins.

- It will involve new measures designed to bridge the innovation divide in Europe and to better co-ordinate research programmes with EU structural fund investments.
- It marks the beginning of the EU's move towards open access publication of publicly-funded research. As of 2014, all journal articles reporting research funded from Horizon 2020 will have to be freely available – in an attempt to secure a greater return on public R&D investment.

Certainly, the ambitions are big. “We now have within reach what the European Parliament, EU Member States and European Commission all envisaged from the start: a research and innovation programme that will make a real difference for jobs and growth in Europe,” said Máire Geoghegan-Quinn, Commissioner for Research, Innovation and Science, when the deal was reached by institutions in June.

The programme will benefit researchers, universities, and SMEs, she said, while “Many more stand



From page 4, left: EU Commissioners Tajani, Geoghegan-Quinn and Vassiliou unveil Horizon 2020 to the press in 2011

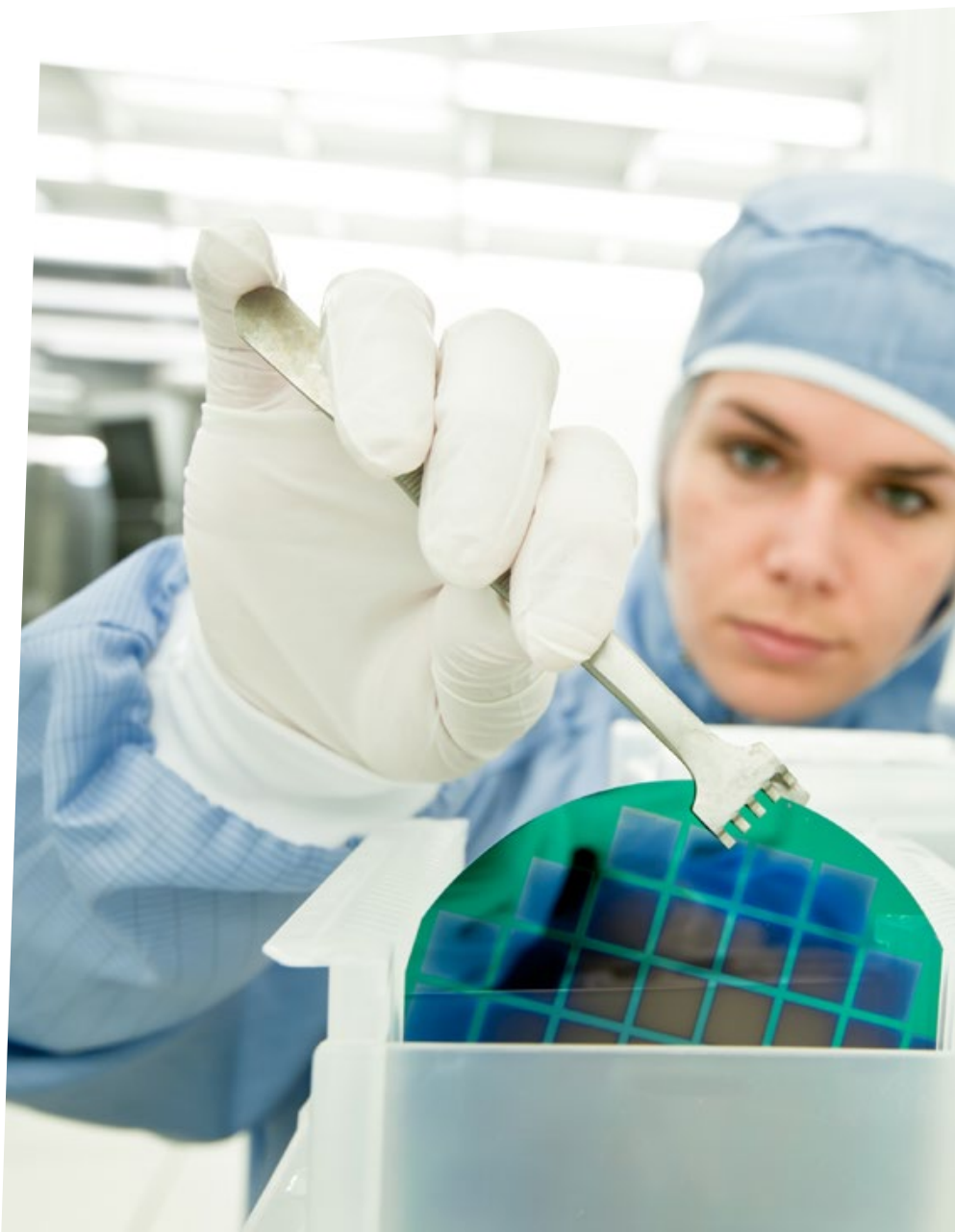
to benefit from the breakthroughs and innovations the programme will bring, providing solutions for societal challenges and strengthening industrial competitiveness.”

## Negotiation time

Horizon 2020 was unveiled by EU Commissioners Máire Geoghegan-Quinn, Antonio Tajani and Androulla Vassiliou on 30 November 2011. But despite the fanfare, this was merely the beginning of a new negotiating and lobbying chapter in Brussels.

Six reports from MEPs in the Industry, Research and Energy Committee (ITRE) served as the Parliament’s mandate for negotiation, proposing significant changes to the Commission’s plan. Keen to assert their powers as part of the EU legislature, lead MEPs refused to deviate far from their demands. Industry groups also remained vocal to the end, with the reimbursement model proving to be a major bone of contention.

This Science|Business guide provides insight into the highlights of the political debate, the resulting agreement, how it differs from the Commission’s original plan, and how it affects R&D in Europe. ■



# Big and bold What's new?

A look at some of the most striking features of the revised programme



**M**EPs have been quick to praise the changes made by the Parliament to the Commission's proposal. "We have managed to use the budget in a more efficient way," said Teresa Riera Madurell, MEP, speaking at the conclusion of negotiations in June. Another rapporteur, Christian Ehler, MEP, said, "The Parliament managed to achieve a number of great improvements," strengthening the programme "with some crucial measures". But the changes came amidst budget cuts for the programme – raising questions on how effective it will be.

Since the Commission unveiled its proposals for Horizon 2020 on 30 November 2011, the biggest change has been to the proposed budget of €80 billion. Government leaders, meeting in Brussels in February 2013, agreed to an EU long-term budget of €960 billion, under which Horizon 2020 was set to receive €70.96 billion, according to Michael Jennings, spokesman for Máire Geoghegan-Quinn, EU Commissioner for Research, Innovation and Science. Following negotiations with the Parliament, which saw wins for MEPs in their demands for a more flexible and reviewable budget, Horizon 2020 now has an indicative budget of €70.2 billion – almost €10 billion less than the Commission had bid for, and a further reduction on the February figure.

Having rejected the original budget in March 2013, the Parliament has yet to vote on the revamped version and is expected to do so in autumn. Each budget line of Horizon 2020 has been given a percentage figure, which will be applied to the overall budget figure. The numbers presented here are calculated on the basis of a Horizon 2020 budget of €68.1 billion, with the remaining €2.1 billion reserved for the nuclear energy programme EURATOM.

## The programme at a glance:

- A significant boost for the basic science funded by the European Research Council, which will receive 17 per cent of the overall Horizon 2020 budget, approximately €11.6 billion, for its elite research grants, up from 15 per cent (€7.5 billion) in FP7. The agency, has won wide praise for funding excellence in science since it began in 2007. However, there has been some political backlash in eastern and southern Europe because most of the ERC grants to date have gone to science-rich northwestern Europe. The Commission's responses include several measures to reverse the brain
- drain from new member states, including the creation of 'ERA Chairs', funding special professorships to recruit "outstanding academics to institutions with a clear potential for research excellence".
- Eight per cent of the budget, or €5.4 billion, for the Marie Skłodowska Curie Actions that provide opportunities to excellent researchers, such as fellowships and the possibility to gain experience abroad and in the private sector. Return Grants have been introduced to attract researchers currently working outside of Europe to return, and to support researchers already working in Europe who wish to move to a region with a less well-developed science infrastructure.
- A dedicated SME instrument will be introduced to fill gaps in funding for early-stage, high-risk research and innovation activities. The instrument will cover all fields of science, technology and innovation in a bottom-up approach. SMEs will benefit from at least twenty per cent of the combined budget from the Leadership in Enabling and Industrial Technologies banner in Pillar Two and Societal Challenges in Pillar Three, with the Parliament insisting on a dedicated budget of seven per cent of this combined budget for the SME instrument. Innovation Vouchers, introduced by Maria da Graça Carvalho MEP, will fund research and innovation activities to promote the creation of start-ups and enhance the research and innovation activities in existing SMEs.
- A bottom-up "Fast Track to Innovation" pilot scheme will be implemented in order to speed up the time from idea to market with open calls and a reduced time to grant of six months, and to increase the participation of industry, SMEs and first time applicants in Horizon 2020.
- Reduced administrative burdens, a shortened time to grant of eight months (in Framework Programme Seven the average was a year), and the abandonment of the full-cost reimbursement model (despite a determined fight from Christian Ehler MEP and large-scale research organisations), represent an attempt to cut red-tape in the programme. A flat-rate reimbursement model will apply, with universities and research and technology organisations receiving 100 per cent of eligible costs, as well as a flat rate of 25 per cent to cover indirect costs.
- An eye-popping rise, from €309 million to €2.4 billion for the European Institute of Innovation and Technology, which will be integrated into Horizon 2020. This Budapest-based organisation is a new EU model for getting industrialists, researchers and educators working together via Knowledge and Innovation Communities (KICs) in specific sectors – so

far, energy, climate change and ICT. The plan, though less than the €2.8 billion originally proposed by the Commission, will allow for five new KICs. The themes for the first two KICs to be launched in 2014 will be 'Healthy living and active ageing' and 'Raw materials'. The themes for the second two KICs in 2016 will be 'Food4future' and 'Added value manufacturing' and the final theme for 2018 will be 'Urban mobility'.

- The biggest chunk of the budget - 38.53 per cent or €26.24 billion - will go to 'Societal Challenges' – a set of hot-button social and environmental issues that have risen high on the political agenda across Europe over the past five years. These are health, demographic changes and wellbeing; food quality and marine research; clean and secure energy; smart and green transport; climate action, resources and raw materials; inclusive, innovative societies; and secure societies. A greater focus on marine and maritime research as well as European cultural heritage was incorporated into this pillar. The sixth challenge was divided from the proposed "Inclusive, innovative and secure societies" into "Inclusive, innovative societies" and "secure societies", reflecting the EU's enlarged security powers under the Lisbon Treaty.
- In an attempt to secure greater access to and return from publicly-funded research, all articles produced with funding from Horizon 2020 will have to be made accessible - either immediately online by the publisher ('Gold' open access) or through an open access repository no later than six months (12 months for social sciences and humanities) after publication ('Green' open access).
- A new budget line, Widening Participation, has been introduced to address the innovation divide in Europe and will receive 1.06 per cent of the overall budget. This includes new activities such as teaming and twinning of research institutions in less-developed regions with well-established counterparts, and the establishment of European Research Area chairs to attract leading academics to less-developed institutions. The programme will also see closer co-ordination with structural funds – a type of regional development funding that most member states jealously guard as their own prerogative to control, not the Commission's.
- In total, 10.5 per cent of the €70.2 billion budget will be spent on energy. EURATOM, the nuclear energy programme, will get €2.1 billion. EURATOM 2014-2018 will have a stronger focus on nuclear safety and nuclear training, as well as funding work in the fields of fusion energy research, nuclear fission and radiation protection. For the first time, it will have the same rules for participation as Horizon 2020 – as part of the move towards simplification. A further €5.2 billion will be reserved for other types of energy in Horizon 2020. Of this, 85 per cent will be reserved for non-fossil fuel activities: renewables, end-use energy efficiency improvements, energy storage and smart grids and the remaining 15 per cent is to be spent on efficiency improvements and on projects to support fossil fuels. ■

## Budget Breakdown Horizon 2020

	%	Approx. figure
<b>I. Excellent science, of which:</b>	<b>31.73</b>	<b>€21.6B</b>
1. The European Research Council	17	€11.58B
2. Future and Emerging Science and Technologies	3.5	€2.38B
3. Marie Curie Actions	8	€5.45B
4. European research infrastructures	3.23	€2.2B
<b>II. Industrial leadership, of which:</b>	<b>22.09</b>	<b>€15.04B</b>
1. Leadership in enabling and industrial technologies	17.6	€11.99B
2. Access to risk finance	3.69	€2.51B
3. Innovation in SMEs	0.8	€545M
<b>III. Societal challenges, of which:</b>	<b>38.53</b>	<b>€26.24B</b>
1. Health, demographic change and wellbeing	9.7	€6.61B
2. Food quality and marine research	5	€3.41B
3. Secure, clean and efficient energy	7.7	€5.24B
4. Smart, green and integrated transport	8.23	€5.60B
5. Climate action, resources and raw materials	4	€2.72B
6. Inclusive, innovative societies	1.7	€1.16B
7. Secure societies	2.2	€1.5B
<b>Science for and with society</b>	<b>0.6</b>	<b>€409M</b>
<b>European Institute of Innovation and Technology</b>	<b>3.52</b>	<b>€2.4B</b>
<b>Non-nuclear direct actions of the JRC</b>	<b>2.47</b>	<b>€1.68B</b>
<b>Spreading Excellence and Widening Participation</b>	<b>1.06</b>	<b>€722M</b>
<b>HORIZON 2020 (excl. EURATOM) TOTAL</b>	<b>100</b>	<b>€68.1B</b>
<b>EURATOM</b>		<b>€2.1B</b>
<b>HORIZON 2020 PACKAGE</b>		<b>€70.2B</b>

# Who shaped Horizon 2020?

Some of the most influential figures from the two-year long debate

## Máire Geoghegan-Quinn

[EU Commissioner for Research, Innovation and Science](#)

Máire Geoghegan-Quinn became the European Commissioner for Research, Innovation and Science in February 2010. Her responsibilities include the European Research Area and the policy framework for European research policy, especially Horizon 2020. Geoghegan-Quinn previously served as a member of the European Court of Auditors from March 2000 to February 2010. Following election to the Irish Parliament in 1975, Geoghegan-Quinn became the country's first female cabinet Minister in 1979, serving as Minister for the Gaeltacht (Ireland's Gaelic speaking regions), and later as Minister for European Union affairs; for Tourism, Transport and Telecommunications; and for Justice. Prior to entering politics, she qualified and worked as a primary school teacher. ■



Commissioner Máire Geoghegan-Quinn



Director-General Smits

## Robert-Jan Smits

[Director-General, Directorate-General for Research and Innovation, European Commission](#)

Robert-Jan Smits was appointed Director-General of DG Research and Innovation in July 2010 after a stint as Deputy Director-General at the Joint Research Centre, where he was responsible for programmes and stakeholder relations; resource management; and the institutes for Energy, for Environment and Sustainability and for Prospective Technological Studies. Before joining the European Commission, Smits was Deputy Head of International Technology Policy at the Dutch Ministry of Economic Affairs. ■

## Maria da Graça Carvalho MEP

[Rapporteur for the Specific Programme implementing Horizon 2020](#)

Maria da Graça Carvalho has been an MEP since 2009, as part of the European People's Party. She is a member of the Industry, Research and Energy Committee, and a substitute member of the Budgets Committee. Carvalho is a former Minister of Science and Higher Education and former Minister of Science, Innovation and Higher Education in Portugal. She is a full professor at the Technical University of Lisbon and has 30 years' experience as a researcher in energy, environment and climate change. ■



Maria da Graça Carvalho MEP



Christian Ehler MEP

## Christian Ehler MEP

[Rapporteur on the rules for the participation in, and dissemination of, Horizon 2020](#)

Christian Ehler has been an MEP since 2004 and is a member of the Bureau of the German Christian Democratic Union in the European Parliament. He is a member of the Industry, Research and Energy, Committee, as well as the Subcommittee on Security and Defence. He is also a substitute member of the Committee on Foreign Affairs. Since 2012, he has acted as Chairman of the delegation for relations with the United States. In addition, Ehler is the managing director of Biotech GmbH – a biotechnology centre in Hennigsdorf, Germany. Before joining the European Parliament, he was a member of the Brandenburg regional parliament. Ehler holds a doctorate in political science. ■



## Marisa Matias MEP

Rapporteur on the Strategic Innovation Agenda of the European Institute of Innovation and Technology: the contribution of the EIT to a more innovative Europe

Marisa Matias was elected to the European Parliament in 2009. She is a member of the Industry, Research and Energy Committee and a substitute on the Economic and Financial Affairs Committee. In addition, Matias acts as Vice-Chair of the delegation for the relations with the Mashreq countries (Egypt, Jordan, Lybia and Syria). She is a researcher at the Centre for Social Studies at the University of Coimbra, Portugal, where she obtained a doctorate in sociology. Her areas of interest include environmental health, sociology of science, sociology of health, and political sociology. ■



Marisa Matias MEP

## Peter Skinner MEP

Rapporteur for the Research and Training Programme of the European Atomic Energy Community, complementing Horizon 2020

Peter Skinner was elected as a member of the European Parliament in 1994 and has been a member of the Economic and Finance Committee for 16 years, as well as a member of the Industry, Research and Energy Committee. As the Parliament's longest serving member on the Transatlantic Economic Council, he is also closely involved in the European Parliament relations with the US. Skinner is a fellow of Sunderland University in the UK and a qualified human resources professional. He graduated from Bradford University in economics and politics, and completed post-graduate studies at Warwick Business School. ■



Minister Sean Sherlock



Peter Skinner MEP

## Sean Sherlock

Irish Minister of State, Research & Innovation; Chair of the Competitiveness Council January-June 2013

During the Irish Presidency of the Council of the European Union, Sean Sherlock chaired Competitiveness Council meetings and took part in inter-institutional negotiations as a representative of the national governments. He was appointed Irish Minister of State for Research & Innovation in March 2011. Sherlock was first elected to the Irish Parliament in May 2007, where he acted as the Labour Party spokesperson on agriculture and food. He was first co-opted onto Mallow Town Council and Cork County Council in 2003 and was then elected to both institutions in 2004. He graduated from the National University of Ireland, Galway with a degree in economics and politics. ■

## Philippe Lamberts MEP

Rapporteur for the regulation establishing the European Institute of Innovation and Technology

Philippe Lamberts has been a member of the European Parliament since 2009. He focuses on economic and financial matters, and has become a specialist in fiscal, banking and macroeconomic issues. He also deals with industrial, research and innovation matters, and has an interest in relations with China. His political career began in 1991 with the Belgian green party (Ecolo), where he served both at local and federal level. From 1999 onwards, he became involved in European politics and more specifically with the European Green Party (formerly the European Federation of Green Parties). He has served as co-president of the party since 2006. ■



Philippe Lamberts MEP



Teresa Riera Madurell MEP

# Building a programme around simplicity

Will Horizon 2020 be able to avoid the bureaucratic madness that is often associated with its predecessors?

**O**f all the new initiatives being introduced under Horizon 2020, the drive for simplification has become its centrepiece. Couple this with the fact that one of the main focuses of this new framework programme is the targeting of SMEs, and it is easy to see why the hours and hours of paperwork that plagued previous framework programmes needed to be cut drastically if this one is to be considered a success from the perspective of its applicants.

A set of measures will aim to encourage a broader and larger range of organisations to participate in open calls, with the promise that they will be met by a simpler and more efficient process. The entire structure of the programme has also been simplified and shaped towards three main goals: promoting excellent science, increasing industrial competitiveness, and finding answers to society's biggest challenges.

## A brief history of red tape

The EU research programmes have gradually evolved and grown – first, from the 1957 Euratom Treaty that began funding nuclear power research, and then from the early 1980s when the Commission began funding computer and telecommunications research. That gradually grew into FP7, the economy-wide Framework Programme which, already at an aggregated cost of €55 billion from 2007-2013, is the world's second largest civilian research programme, after the US National Institutes of Health.

Pressure for change began rising a

few years ago – in part because of a confrontation between the Commission and the main French research agency, the Centre national de la recherche scientifique (CNRS). The Commission tried to claw back about €20 million in research grants – not because of any alleged fraud, but because the CNRS had not been doing its paperwork in the way the Commission's auditors wanted. At the same time, universities in north-western Europe – the scientific core of the EU – began agitating against all the money they had to spend on staff

of funding rules. The goals are: promotion of excellent science, industrial competitiveness, and finding answers to society's biggest challenges.

- Simpler and standardised rules for reimbursement – based on full reimbursement of costs that can be directly attributed to the project (or 70 per cent for close-to-market, “innovation actions”) and a flat rate of 25 per cent to cover indirect costs.

- Timesheets will be eliminated –

Grantees with full-time staff will only need to certify that the researchers on a project actually worked the time they claimed, rather than keep a timesheet for each one. However, part-time and occasional workers on a project still have to keep timesheets.

- A single IT platform for all interactions with participants, based on the FP7 Participant Portal.
- A shorter time to grant of eight months, with the Commission committing to inform participants of the outcome of their application after five months and signing the common grant agreement within three months.

- An increase in bottom-up

procedures, including the Fast Track to Innovation for small, innovative, close-to-market projects relating to any technology field under the specific objective “Leadership in enabling and industrial technologies” or to any societal challenge. This will operate under a permanently open call for proposals with a reduced time to grant of six months.



to understand and comply with the EU grant rules. The European Parliament joined the no-red tape bandwagon around 2010.

Heading into Horizon 2020, a number of key changes have been designed to counteract these complaints:

- A simpler overall structure – three main goals with one common set

## Validation

What does the application process today look like for a typical SME? First, you have to prove to the Commission that your company really is small. That is not as simple as it may sound. Its lawyers have written a precise definition for that, and created a series of forms you have to fill out to prove you meet the criteria. Time for each small company to fill out the form: Easily, hours and hours. Time for the Commission to read and process the forms: Easily hours and hours. In fact, handling these forms is the job of about 100 Commission staffers. And all this paperwork is just to prove you are legally eligible to apply for the grant; whether you get it is an entirely different review.

To ease this burden on both parties, and to expedite the process, the Parliament successfully amended the Commission's proposal so that previous records can now be used for the validation process. Commission sources say that participants from FP7 will not need to go through the validation procedure again, unless the entity's legal status has changed or, in the case of SMEs, a company no longer falls within the SME definition. Participants will need to sign a declaration to this effect.

## Funding rates

The most politically sensitive aspect of the simplification process is the Commission's proposal to replace FP7's many reimbursement rates with two flat-rates, one for research activities and one for innovative, close to market activities, "innovation actions", as they are now called.

## Step 1: The Commission's Proposal

Under the Commission's proposal, eligible costs directly attributable to the Horizon 2020 project ("direct costs") would be reimbursed at a rate of 100 per cent for all R&D activities and at a rate of 70 per cent for all innovation activities, regardless of the type of participant. A flat-rate of 20 per cent of the direct costs would then be assigned to cover indirect costs, such as infrastructure overheads. Many large research organisations with extensive overheads and expensive infrastructures said this proposal would leave them out of pocket.

## Step 2: The Council

Despite many countries endorsing full-cost reimbursement models in their national research systems, the national ministers at EU level approved the main elements of the Commission's proposal with some changes:

- The single flat-rate for indirect costs was maintained but increased to 25 per cent of direct costs for all participants in all activities.
- It introduced the possibility of a funding rate of 100 per cent of direct costs for non-profit legal entities in all activities, even those close to the market.
- A "bonus +" scheme was introduced whereby supplementary payments can be made to personnel of up to € 8,000 per person per year.

## Step 3: European Parliament

According to Christian Ehler, the MEP in charge of guiding the Rules of Participation through the Parliament, the Council's model would be, "11.5 per cent more expensive and less cost-efficient than in the last Framework Programme." This would equal an additional cut of €8 billion and mean roughly 4,000 fewer projects, he said.

Ehler was adamant that the proposed flat-rate system represented more of a simplification for the Commission than for the participants. Instead, he proposed the reintroduction of an option for reimbursement based on a flat rate for all costs. He sets these rates at 70 per cent for universities, research and technology organisations (RTOs) and SMEs and at 50 per cent for industry. He wants to see reimbursement rates that not only apply to the type of activity, but also by method of cost calculation (direct costs + flat-rate/ full costs) and type of participant (universities, research centres, others/ SMEs/industry). The tables illustrate the differences in approach.

## Step 4: Negotiation

With a variety of opinions expressed, and a dogged determination on all sides to see their models accepted, this was a debate that threatened to delay the entire Horizon 2020 programme. As late as June 2013, Ehler threatened to take the legislation to a second reading, while the Council described its funding model as a "red line".

## The Commission's Proposal

Type of Activity	Method of Cost Calculation	Type of Participant	Rates
Research and Development	Direct eligible costs + flat rate	All	100% + 20%
Innovation Actions	Direct eligible costs + flat rate	All	70% + 20%

## Proposal by Christian Ehler MEP

Type of Activity	Method of Cost Calculation	Type of Participant	Rates
Research and Development Experimental Development	Direct eligible costs + flat rate	Universities/RTOs/SMEs	100% + 20%
		Industry	70% + 20%
	Full Costs	Universities/RTOs/SMEs	100% + 20%
		Industry	70% + 20%

## The final agreement - Conclusion

Type of Activity	Method of Cost Calculation	Type of Participant	Rates
Research and Development	Direct eligible costs + flat rate	All	100% + 25%
Innovation Actions or co-funded	Direct eligible costs + flat rate	University/RTO	100% + 25%
		SME/Industry	70% + 25%

The budgetary strength of the national states prevailed, however, and the Council ultimately succeeded in passing the flat-rate system, with 25 per cent of direct costs assigned to cover indirect costs, as well as the €8,000 “bonus +” option.

“The twenty five per cent figure will not be enough for research institutes with large infrastructures”, said Ehler. Universities with expensive facilities, for example ocean-going research vessels, as well as organisations such as Fraunhofer, would not see their costs covered under this system. In a move to address this problem, the Commission has issued guidelines on how to transfer some indirect costs to direct costs for large infrastructures.

These guidelines will take the form of an official Commission declaration and will be embedded into the Horizon 2020 beneficiary guidance.

“However, these guidelines are no substitute for the missing full cost option,” said Ehler. “The full-cost option will be the prevailing model for the future, because there is no other alternative”.

At a meeting on 17 June 2013 between the interest group representing many of these large research organisations, EARTO, and representatives from the

Commission, it was agreed that when a cost cannot be directly attributed to a Horizon 2020 project because of proven technical constraints, then an acceptable alternative would be the measurement of these costs by means of units of actual usage relevant for the project, supported by accurate technical specifications and actual data.

With the Rules of Participation explicitly foreseeing an interim evaluation of the funding levels, it remains to be seen whether research institutes with sophisticated infrastructures will really be left out of pocket from participating in EU programmes. ■



Christian Ehler MEP

# Parallel lines

Confronting Europe's problems whilst bridging the wealth and development gap



**A**t the heart of the Horizon 2020 strategy lies the recognition that the continent is facing serious problems – including climate change, food security, ensuring energy supplies, a decline in competitiveness, making health systems sustainable, environmental degradation and caring for an increasingly elderly and frail population – that need to be tackled at a European level. Alongside developing Europe's innovation capabilities, Horizon 2020 is intended to confront these so-called grand challenges.

The budget for Horizon 2020 has been divided between three main areas, or pillars: Societal challenges, industrial leadership and excellent science. Each was selected on the premise that it is too big an issue for any one country to handle alone and to improve the distribution of funding.

Teresa Madurell, member of the European Parliament and rapporteur for the ITRE Committee, wrote in her final report, "Horizon 2020 contributes directly to tackling the major societal challenges identified in Europe 2020 and its flagship initiatives. It will contribute equally to creating industrial leadership in Europe. It will also increase excellence in the science base, essential for the sustainability and long-term prosperity and well-being of Europe."

While there has been general approval of the themes selected, the Parliament was successful in passing a number of changes, including:

- Establishment of 'Scientific Panels' to help define research and innovation priorities and to encourage EU-wide scientific participation. The first such panels will be implemented in the health sector;
- Increasing the energy budget from 7.2 to 7.7 per cent of the Horizon 2020 budget and earmarking 70 per cent of this to renewable energy, energy efficiency, smart grid and storage research. A further 15 per cent will be spent on promoting the market uptake of existing renewable energy and energy efficiency technologies.
- Creating a new and separate security programme called

"Secure Societies", which will receive 2.2 per cent of the budget, approximately €1.5 billion.

- Including a Fast Track to Innovation Scheme, which will run permanently open calls with a maximum time to grant of six months. It aims to speed up the time to market and to increase the participation of industry and SMEs.
- Earmarking part of the excellent science budget for a new bottom-up instrument dedicated to SMEs with innovation potential.

## Closing the gap in research and innovation performance

Throughout the negotiations, the Commission and the Parliament acknowledged the need to address the significant regional disparities across Europe in research and innovation performance.

Currently, a large portion of EU R&D funding ends up in wealthier member states, such as the UK, France and Germany. This is often a source of contention between less-developed, newer, member states and the richer countries in the north and west of Europe, which have so far resisted calls to create geographic quotas. "It is not only the well-established institutes that [produce] excellent research," Maria da Graça Carvalho pointed out to Science|Business.

As the Parliamentary rapporteur for the Specific Programme Implementing Horizon 2020, she was responsible for formulating the Parliament's amendments to the Commission's legislative proposal and led the formal discussion of the Parliament's position with research ministers in the Council, and with the European Commission.

In their review of the Commission report, Carvalho and Madurell argued that while the two programmes have different objectives, "Horizon 2020 and the Cohesion Policy are extremely important to reach the objectives of Europe 2020, and as such, synergies and complementary agendas between them are essential."

The need for better co-ordination has also led to changes in regional policy, and structural fund investment in research and innovation from 2014-2020 will be based on Smart Specialisation Strategies, drawn up by national and regional authorities, based on the unique characteristics and competitive advantages of their regions. It is hoped that this targeted approach to spending will result in more effective investments and greater co-ordination with research programmes at national and EU level.

## Taking the next steps in Horizon 2020

The Parliament was successful in creating a new funding line on “spreading excellence and widening participation” with 1.06 per cent of the budget – approximately €722 million. Earmarking yet another section of the budget was a significant political achievement, as the Council and Commission were wary of limiting their future spending flexibility.

Concrete measures designed to promote excellence across Europe and widen participation include:

- Establishing European Research Area Chairs to attract outstanding academics to institutions in regions with less-well developed scientific infrastructures;
- Providing a seal of excellence for project proposals that are positively evaluated at a European level but do not get funding because of limited budgets;
- Awarding Return Grants to excellent researchers currently working outside Europe who wish to return, or to researchers already in Europe who wish to move to a less-developed region;
- Twinning an emerging institution with at least two international leading counterparts in a particular field of research, through staff exchanges, joint summer schools and conferences;
- Teaming excellent research institutions with regions where R&D is less advanced, to create or upgrade Centres of Excellence, using Cohesion Policy funds and money from Horizon 2020;
- Explicitly linking Horizon 2020 with Smart Specialisation Strategies under Cohesion Policy, and earmarking certain regional funds for R&D.

## ERA Chairs and a twinning scheme

To start building bridges between the Horizon 2020 and Cohesion Programmes, a pilot call for the ERA Chairs programme was launched in December 2012. This was open to all universities and research organisations located in one of the convergence regions identified in the FP7 Research Potential Work Programme for 2012-2013. The Commission is now evaluating proposals and it is expected that the first grant agreements will be signed in December 2013.

This programme will continue under Horizon 2020. It is anticipated that this will permit institutions to develop the level of excellence required to successfully compete internationally in particular fields and thus widen participation.

Collaboration between institutions across the innovation divide will be supported by the twinning and teaming schemes. While twinning involves linking an emerging institution with at least two leading international counterparts in a particular field of research through staff exchanges, expert visits, workshops, and so on, the teaming scheme is more elaborate.

Teaming will allow institutes in richer countries and those in less-developed member states to jointly apply for Horizon 2020 funding, to create or significantly upgrade a Centre of Excellence in the less R&D-intensive region. Following open calls for proposals, the best teams will be selected and given assistance to develop a business plan for the centre. A financial commitment from the recipient region or country is expected, for example via Cohesion Policy funds.

This would be a “win-win situation,” Carvalho said, allowing a less-developed institution to benefit from the expertise and good name of its more-renowned counterpart, which would in turn have the benefit of attracting excellent students from its partner, and an increase in scientific publications. Carvalho has first-hand experience of such partnerships from when she was a researcher from the Technical University of Lisbon working at Imperial College London. The collaboration was beneficial for both institutions, she said. After Imperial College, Carvalho went on to become a professor in Lisbon and later held the post of Science, Innovation and Higher Education Minister in the Portuguese government under then Prime Minister, José Manuel Barroso. ■

## Contribution Vs. Participation

Country	EU contribution in millions of euros by country 2007-2011	Country	# of participants in FP7 by country 2007-2011
PT, IE, EE, LV, LT, PL, CZ, BG, CY, LU, MT, RO, HU, SI, SK,	< €300M	EE, LV, LT, MT, CY, BG, SI, SK, LU	< 500
FI, DK, EL	€300M-€500M	IE, CZ, HU, RO	0.5-1K
SE, BE, AT	€500M-€1B	FI, PL, AT, EL, PT, DK	1-2K
ES, NL, IT	€1B-€2B	ES, SE, BE, NL	2-5K
UK, DE, FR	> €2B	DE, UK, FR, IT	> 5K

# Doing more to support the backbone of the European economy

Small and medium-sized enterprises are the new darlings of European politicians, and they are set to receive a major boost under Horizon 2020

It is hoped that a single set of rules for Horizon 2020 and a lifting of administrative burdens through simplified and shortened procedures, should see a rise in participation from small and medium-sized enterprises (SMEs) in Horizon 2020. Those who join the party are set to be rewarded - with 20 per cent of the combined budget of Leadership in Enabling and Industrial Technologies (part of Pillar Two) and Societal Challenges (Pillar Three) earmarked for this sector.

According to Máire Geoghegan-Quinn, Commissioner for Research, Innovation and Science, "SMEs are the backbone of the European economy". The Commission estimates that SMEs provide around 67 per cent of jobs and generate 58 per cent of total company turnover in the European Union.

Aside from the prominent role they play in the European economy, they are also politically popular. In contrast to the early days of EU research programmes, when mammoth 'national champions' like Philips, Siemens and Alcatel were viewed as the most important beneficiaries, today most European politicians would rather be photographed visiting a scrappy garage start-up that hopes to be the next Apple. Horizon 2020 brings the promise of creating opportunities to SMEs of all stripes, from those that are high-tech, research driven, to ones that are social and service oriented.

## An SME instrument

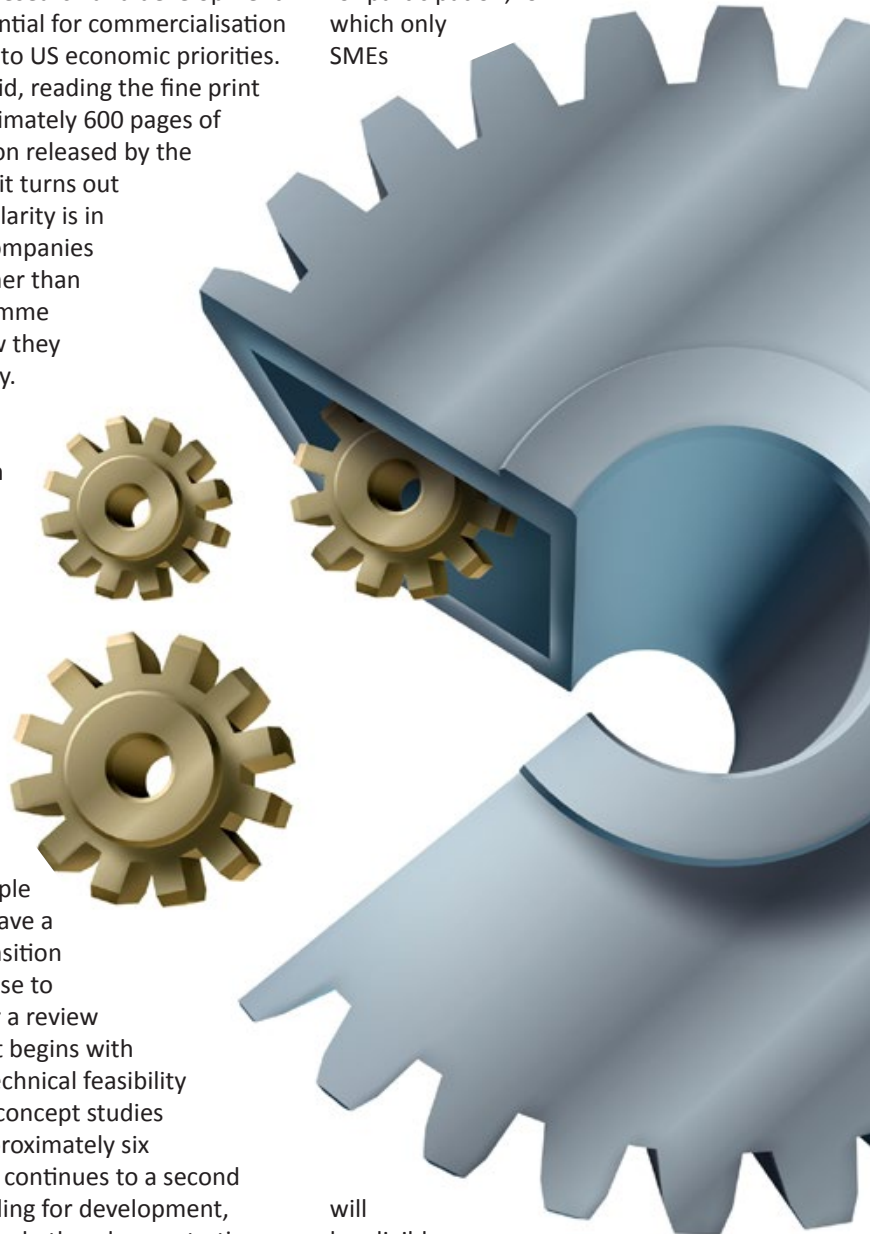
To help simplify the process, a dedicated SME Instrument is to be created to finance innovative companies. The idea is to let SMEs in all fields of science, technology and innovation apply for funding singly, or in groups. With a dedicated budget of seven per cent of the combined budget of Leadership in Enabling and Industrial Technologies in Pillar Two and Social challenges in Pillar Three, this instrument is designed to cover the entire innovation cycle from research to market.

The SME scheme is modelled on the US Small Business Innovation Research Programme (SBIR), which uses Federal funds to fill gaps in funding and encourages small domestic businesses to engage in research and development that has potential for commercialisation and is critical to US economic priorities. That being said, reading the fine print in the approximately 600 pages of documentation released by the Commission, it turns out the main similarity is in the kind of companies targeted, rather than in the programme details of how they get the money.

However, in common with SBIR, the dedicated SME instrument will cater to SMEs over the three main phases of the innovation cycle, while making it simple for them to have a seamless transition from one phase to the next after a review of progress. It begins with funding for technical feasibility and proof of concept studies (duration approximately six months), and continues to a second phase of funding for development, prototyping and other demonstration work (duration 12-24 months). In the final phase of commercialisation, the Commission will not directly fund work, but will connect SMEs to other programmes that could possibly provide the funding. This includes simplified access to debt and equity financial instruments as well as various other measures, for example on intellectual property protection.

On the Parliament's insistence, the instrument will have its own budget and a single management structure. The scheme will take a bottom-up approach and run open calls for participation, for which only SMEs

will be eligible to apply. Successful SMEs will decide how best to organise the project and with whom to collaborate, including subcontracting tasks where they lack in-house capabilities. Closer to the market activities under the rules of participation have a reimbursement rate of 70 per cent of eligible direct costs plus a 25 per cent flat-rate to cover indirect costs.



SMEs may still take part in collaborative R&D projects where the rules of participation state the reimbursement rate is 100 per cent.

Innovation Vouchers will be available to fund research and innovation activities within Phase Two, to promote the creation of start-ups and enhance research and innovation activities within existing SMEs.

Pillar Two – Industrial Leadership will also support all forms of innovation in SMEs outside of the instrument, through access to equity and debt finance, mentoring and coaching services, and access to R&D networks and clusters. Much of this work will be done in conjunction with the new Programme for the Competitiveness of Enterprises and SMEs (COSME), which has a planned budget of €2.03 billion (2011 figures, which will be adjusted for inflation).

## The leveraging effect

Compared with existing EU programmes for SMEs, COSME will take a more targeted approach, putting more emphasis on access to finance, including two financial instruments operated by the European Investment Fund (EIF), in cooperation with financial intermediaries in the different member states.

The Equity Facility for Growth will provide venture capital to support the growth phase of enterprises, and the Loan Guarantee Facility will cover loans to SME loans of up to €150,000. The aim of COSME is to help small companies grow. “Whenever they are ready to take the steps to grow, there are funding instruments,” said Antti Peltomäki, deputy director-general for Enterprise and Industry at the European Commission, adding that his directorate

conducted a public consultation asking SMEs to identify ten of the most burdensome laws or regulations when it comes to European research programmes. “We want to do a ‘fitness check’ on legislation to see whether it really is serving its original purpose or creating a totally undesired situation for business.”

These instruments represent a cross-over between COSME and Horizon 2020, where Horizon will



Antti Peltomäki, deputy director-general for Enterprise and Industry, European Commission

co-finance the Loan Guarantee Facility in order to cover all loans above €150,000 for innovative projects. A similar arrangement will be in place for the Equity Facility, where Horizon 2020 spending will be targeted at early stage funding. Multi-stage risk capital funds investing in early and growth-stage SMEs may receive funding from both programmes on a pro-rata basis. It is hoped that for every euro provided through the financial instrument, additional finance of up to €5 will be generated.

## Eurostars

Another significant programme for SMEs in the next seven years will be Eurostars, a joint programme between the EUREKA network of funding agencies and the European Commission.

Eurostars is the only Europe-wide funding programme to be specifically designed for innovative SMEs, with each project bringing together at least two different partners from two different countries under the leadership of an

SME. While projects can address any technological area, Eurostars is a market-driven venture, and every project funded must result in the launch of a commercial product onto the market within two years of completion.

Under Framework Programme Seven (FP7), the lead SME for each project needed to have ten per cent of its labour force or of turnover dedicated to R&D activities. Under Horizon 2020, this will be adapted to help medium-sized companies involved in research processes linked to industrial manufacturing. This will be welcome news for Mittelstand companies, the German middle-sized companies with anything from a couple of dozen to several hundred workers and responsible for more than half of the country's economic

output. While Eurostars was originally a very Internet start-up heavy programme, it is hoped that this fine-tuning of the programme will enable it to better support the European manufacturing sector and job creation.

Eurostars 2 is expected to total around €1.14 billion over seven years, with €287 million coming from Horizon 2020 and €861 million from participating member states. This represents an increase of more than 200 per cent over FP7. ■



# Partnerships in industrial research

A look at the Commission's plans for €8 billion of Horizon 2020's budget



In advance of final agreement on the Horizon 2020 budget and programme, the Commission announced five public/private partnerships will get €6.5 billion, pulling in a further €9.9 billion from industry. Total investment in these and five other projects unveiled on 10 July 2013 will be €22 billion.

Most of the money in the €22 billion headline figure will go to five Joint Technology Initiatives (JTIs) funded by the EU and industry and covering innovative medicines, aeronautics, bio-based industries, fuel cells and hydrogen, and electronics. "These initiatives not only strengthen our economy, they are an investment in a better quality of life," said R&D Commissioner Máire Geoghegan-Quinn, when she announced the JTIs.

"Many competitors are investing faster than us," she said, "and they are thinking big." For example while the EU has the world's first commercial-scale advanced bio-refinery for cellulosic biomass, there are reports that China plans to have nine such facilities by 2015. "So no-one can rest on their laurels. We need to bolster both public and private spending if we are to stay in - never mind ahead of - the game."

€8 billion will be taken from the Horizon 2020 budget for these collaborative projects. This will be matched with approximately €10 billion from industry and close to €4 billion from national governments. "That represents a major increase in our level of ambition compared to the current public-private partnerships," said Geoghegan-Quinn. Under FP7, a total EU contribution of €3.1 billion has been matched by an industry investment of €4.7 billion.

## How JTIs work

Each JTI is managed by a dedicated legal entity, a Joint Undertaking, and not by an EU institution, as is the case for other Framework Research programmes. The governing board of each JTI establishes its own strategic research agenda and projects are selected through open and competitive calls. While most of the partnerships were started under the current Seventh Research Framework Programme (FP7), stakeholders



EU Commissioners Kroes and Geoghegan-Quinn in the European Parliament

say more time and money is needed to consolidate the objectives and scale up the technologies. There will also be an entirely new €3.8 billion investment in a bio-based industries JTI.

The guiding principle is that these five areas represent large-scale, long-term projects which, "No one company or country can deal with alone," said Geoghegan-Quinn. It is thought this type of collaboration makes for a more efficient use of funds by pooling financial, human and infrastructure resources, and also aids in removing any block on innovation to get technologies to market faster.

The five JTIs, which represent sectors already providing more than four million jobs, are:

- Innovative Medicines 2: to develop vaccines and new drugs including treatments for antibiotic resistant infections.
- Fuel Cells and Hydrogen 2: to expand the use of clean and efficient technologies in transport, industry and energy.
- Clean Sky 2: to develop cleaner, quieter aircraft which emit significantly less CO<sub>2</sub>.
- Bio-based Industries: to use renewable natural resources and develop technologies for manufacturing greener products.
- Electronic Components and Systems: to boost Europe's electronics manufacturing capabilities.

While the legislative framework for these initiatives has not yet been endorsed, Geoghegan-Quinn said the Parliament and Council have told the Commission to, "Get on with the work so that you are ready to roll on January 1st [2014]."

## Partnership with industry

The industrial partners will commit fifty per cent or more of the total costs of the JTIs, although the payment can consist of both in-kind contributions and hard cash.

JTIs proved popular with industry under FP7, and succeeded in attracting a high level of industrial participation, including many SMEs.

Geoghegan-Quinn said industry is committed to the JTIs. “Vice President Kallas, Vice President Kroes and I had an opportunity to eyeball eight CEOs involved in JTIs this morning,” she said at the July launch. Geoghegan-Quinn is pleased with their commitment to the projects, their willingness to work with their competitors for the best of Europe and to provide the budget as promised. “They have realised that in this tough global environment, it is sometimes better to work together with a competitor than not to work at all.”

## What’s new?

The new JTIs aim to step up activities from FP7. For example, while the first Fuel Cells and Hydrogen JTI has delivered units suitable for use in forklift trucks and small back-up power units, it now aims to scale-this up for more widespread use in road and air transport.

Industry commitments to the JTIs are significantly higher than in FP7 and include additional activities that will be solely financed by the industry partners, in particular to help ensure the effective deployment of the new technologies.

Geoghegan-Quinn claimed that the second round of JTIs

will address criticisms that the current initiatives are overly complex and difficult to take part in. “We needed to bring industry back into the programme,” said Geoghegan-Quinn. “When we asked industrial partners what was wrong, they all said ‘It’s all wrapped up in red tape. We have an enormous administrative burden’.” JTIs under FP7 all had their own funding rates and rules of participation, but the new initiatives will in general follow the rules of participation for Horizon 2020.

## Public/public partnerships

The Commission also launched a sixth public-private partnership SESAR, which will invest €1.6 billion in creating an integrated air traffic control system for the whole of Europe. The Commission is putting in €600 million, with the balance coming from Eurocontrol, the body that supervises European airspace.

Alongside this, the Commission announced four joint public/public partnerships with EU national governments, focussing on new treatments for poverty-related diseases, measurement technologies for industry, support for high tech SMEs, and assisted living products and services to help the elderly and disabled to live safely in their homes.

Geoghegan Quinn said these are areas where there is not sufficient incentive for industry to invest, but which would deliver significant benefits. For example, assisted living can improve quality of life for elderly and disabled people, while reducing the burden on statutory services and carers and – eventually – developing important new markets. ■

## Joint Technology Initiatives

JTI	EU (Horizon 2020) + EU Member States (for Electronics only)	Industry	Total
Innovative Medicines Initiative 2	€1725	€1725	€3450
Fuel Cells and Hydrogen 2	€700	€700	€1400
Clean Sky 2	€1800	€2250	€4050
Bio-based Industries	€1000	€2800	€3800
Electronic Components and Systems	€1215 (+ €1200 from EU Member States)	€2400	€4815
Total JTIs	€7640 (€6440 from Horizon 2020 + €1200 from EU Member States)	€9 875	€17 515
Joint Programmes with Member States			
Public–public Partnership	EU (Horizon 2020)	Member States	total
European and Developing Countries Clinical Trials Partnership 2 (EDCTP 2)	€683	€683	€1366
European Metrology Research Programme (EMPIR)	€300	€300	€600
Eurostars 2 (for SMEs)	€287	€861	€1148
Active and Assisted Living Research and Development Programme	€175	€175	€350
Total joint programmes	€1445	€2019	€3464
SESAR Joint Undertaking			
JU	EU (Horizon 2020)	Eurocontrol and other members	total
European Air Traffic Management System (SESAR)	€600	€1000	€1600
TOTAL			€22579

# Right treatment to the right patient at the right time – the EU unveils €3.4B drug discovery collaboration

Personalised medicine, unmet medical need and faster translation of basic research will be the focus of the second stage of the Innovative Medicines Initiative



Ruxandra Dragia-Akli, director of the Health Directorate, DG Research, European Commission

**P**re-empting the final legal agreement on Horizon 2020, in July the Commission launched five Joint Technology Initiatives that will be funded in the R&D programme.

One of these is the Innovative Medicines Initiative 2 (IMI 2), a public-private partnership bringing together pharma and biotech companies, universities, SMEs, patient organisations and regulators, with a brief to both collaborate on the discovery of new drugs and to revitalise Europe's flagging pharmaceutical research sector.

The programme will build on the €2 billion IMI programme which was set up with the backing of the European Federation of Pharmaceutical Industries and Associations (EFPIA) and the Commission in 2008 to speed up drug discovery.

To date, 4,000 researchers have participated in forty different IMI projects that have included deriving the first-ever human pancreatic beta-cell line; developing new in vitro models to better predict drug toxicity and building the world's largest database of clinical trials in schizophrenia. This has given Europe international recognition, "as a pioneer in open collaboration for health research," said Michael Goldman, Executive Director at IMI, outlining the plans for IMI 2.

The EU will contribute up to €1.725 billion from the Horizon 2020 budget, which will be matched with a commitment from EPFIA members of up to €1.5 billion.

## The challenge for IMI2

"Until now we have worked in compartments", said Ruxandra Dragia-Akli, Director of the Health Directorate at DG Research, "and each compartment has incurred high costs." It is hoped that collaboration in IMI2 will reduce the expense and risk of drug discovery, ending the "innovation blockage" Europe is suffering from, said Dragia-Akli. "We need to bring all the innovation we have to patients."

Unlocking innovation in healthcare is particularly important in the context of an ageing population and the corresponding prevalence of chronic diseases. This challenge will shape the agenda for IMI2, said Dragia-Akli, "IMI 1 has been a big success, but we are moving to a different strategic research agenda - to address public health needs."

The aims for the updated initiative include:

- A thirty per cent better success rate in clinical trials of priority medicines identified by the World Health

Organisation, including diabetes, cancer, autoimmune disease and respiratory diseases

- Obtaining clinical proof of concept for new drugs for treating immunological, respiratory, neurological and neurodegenerative diseases in just five years
- New and improved diagnostic markers for four of these diseases and at least two new drugs, which could either be new antibiotics, or treatments for Alzheimer's disease

Personalised medicine will be a key theme, said Dragia-Akli. This will be driven by a shift from diagnosing disease by symptoms, to molecular-based medicine, in which the underlying molecular and genetic characteristics of diseases are identified by objective diagnostics, rather than relying on subjective and erratic reporting of symptoms.

Peter Anderson, Senior Vice President of the pharma company Lundbeck and Chair of EFPIA Research Director Group, said Parkinson's disease is a prime example where such an approach could improve diagnosis and treatment. Multiple genes have now been implicated in the initiation and progression of this disease. "It is not Parkinson's disease, it is a genetic disease and we need to treat each

patient differently based on their genetic make-up,” he said.

IMI 2 aims to stratify at least four diseases based on genetic analysis. Anderson said this would be revolutionary, noting schizophrenia alone has been linked to one hundred genes. If Parkinson’s disease and schizophrenia were broken down and reclassified based on the genes that have been implicated in their aetiology the market would be split many ways. “Each new treatment will need a new business model and regulatory approach,” said Anderson. “This is why IMI 2 has a much broader perspective.”

On the other hand, the use of genetic profiling to select likely responders to a

new drug, based on an understanding of the precise mechanism of action, will result in a better success rate for clinical trials, reducing costs and improving treatments, said Dragia-Akli.

The focus will not just be on drug discovery, but on successful marketing and business models. This will be particularly challenging for antibiotics, where to avoid the development of antibiotic resistance it is necessary to limit their use, said Richard Bergstrom, EFPIA Director General. “Unlike most products, you want there to be as many variations as possible of the drug with as many tweaks as possible. We are currently working on a business model,” he said.

## Learning from IMI 1

IMI 2 will bring together the members of EFPIA, but will also be open to other industries and sectors. “One criticism of IMI 1 was the idea that it was a closed club,” said Dragia-Akli. The impression was that it was an exclusive project for big pharmaceutical companies only, and small biotechs or companies from other industrial sectors could not participate, she said. “We are now creating a very flexible framework for others joining.” ■



# Electronics industry to get €4.8B boost

Electronics will be the biggest winner in European Commission's R&D plans for 2014 – 2020, landing a €4.8 billion package of investment in research and innovation to boost components, system design and manufacturing capabilities



The Horizon 2020 joint technology initiative for Europe's electronics sector - Electronic Components and Systems for European Leadership (ECSEL) - will bring in almost €5 billion of funding from the EU, member states and the industry, to boost manufacturing capacity in the sector.

ECSEL will have an EU contribution of up to €1.2 billion, matched by funding from Member States, with the industrial partners putting in around €2.4 billion.

This underlines the strategic importance of electronics, not only as an important sector in its own right, but also as one that underpins many other industries. "It's not just about one sector, it's about all the sectors that are enabled by electronics," said Neelie Kroes, EU Commission vice president, launching ECSEL in July.

Cars, planes, trains, medical and health equipment, home appliances, energy networks and security systems, will all benefit from advanced European capabilities and capacity to design and manufacture state of the art electronic components and systems, Kroes said. "The fact is, electronics supports and enables a huge value chain, reaching across the economy."

Electronics is, "a strong and strategic sector that has grown around five per cent per year since 2000. In Europe today it directly employs 200,000 people. And there is huge demand for more skills and more workers," Kroes added.

The ECSEL programme will reinforce Europe's existing world-class electronics clusters, such as that in Dresden, and prevent Europe's market share from declining further. The plan that is in place would see a doubling of chip production by 2020, which would mean Europe outpaced the US in semiconductor manufacture, Kroes claimed.

ECSEL is the largest of the five JTIs announced by the European Commission as a key part of the €70.2 billion Horizon 2020

research programme. This JTI is a merger of two existing JTIs funded under the current Framework Programme 7: the ARTEMIS initiative on embedded systems and the ENIAC project on nano-electronics, both of which were set up in 2008. It also incorporates research and innovation on smart systems.

Amongst ECSEL's aims are to reverse the decline of the EU's global share in the electronic components and systems area; to maintain Europe's leadership in areas such as embedded systems, semiconductor equipment and materials supply, and the design of complex electronic systems; and also to increase energy efficiency and improve security.

Kroes said she had received a lot of support when she presented the ECSEL programme to the Council. "Electronics is a source of future growth: information and communications technology is becoming more and more important. But it's not just electronics [as a sector], it is emerging across the board. We are investing in our digital future." ■



Neelie Kroes, EU Commission vice president

# Commission to strengthen fuel cell research with €1.4B R&D programme

New programme will bid to develop long-term clean energy supplies and reduce greenhouse gas emissions from Europe's energy and transport sectors.

The New Energy World Industry Grouping (NEW-IG), the industrial association representing Europe's hydrogen and fuel cell industry welcomed the European Commission's proposal to renew and strengthen the Fuel Cells and Hydrogen joint technology initiative set up under Framework Programme 7, boosting investment to €1.4 billion in the Horizon 2020 R&D programme.

Fuels and Hydrogen 2 will continue to develop clean, efficient and affordable fuel cell and hydrogen technologies up to the point of market introduction, helping to secure the future international competitiveness of this strategically important sector in Europe.

When the extension of the programme was announced in July, Pierre-Etienne Franc, Chairman of the board of NEW-IG, noted that the JTI for fuel cells and hydrogen provides the framework to coordinate objectives, pool resources and advance the technology for the benefit of the European economy. "This renewed political and financial support is a sign that Europe will strive to establish this technology as a key enabler for its future energy and transport roadmap," he said.

The current Fuel Cells and Hydrogen JTI, set up in 2008, has made substantial progress in both energy and transport applications. Successes include the Clean Hydrogen In European Cities (CHIC) project which has advanced towards full market commercialisation of hydrogen fuel cell-powered buses. The project is integrating 26 hydrogen fuel cell-powered buses into the daily public transport operations and bus routes in five locations across Europe – Aargau in Switzerland, Bolzano in Italy, London, Milan, and Oslo.

CHIC has demonstrated a significant

reduction in fuel consumption of over 50 per cent compared to previous types of "clean bus".

## Demonstrating large-scale hydrogen production

Of the €1.4 billion to be invested in Horizon 2020, €700 million will come from the Commission and €700 million from industry in the form of hard cash and in kind contributions.

Amongst the specific objectives for the second programme are reducing the cost of fuel cell systems for transport

and Science, said that as a result of the research and implementation carried out in the first Fuel Cells and Hydrogen JTI, "You can take a ride on hydrogen-powered pollution-free buses in five cities across Europe. However she added, "Much research and development is still needed to make this application of FCH technology widespread, and those for clean energy production and storage to become attractive." ■



applications by a factor of ten; increasing electrical efficiency of fuel cells for power production by ten per cent, and demonstrating the viability of large scale hydrogen production from electricity generated from renewable energy sources.

When she launched the second fuel cell research programme in July, Maire Geoghegan-Quinn, European Commissioner for Research, Innovation

# Clean Sky 2 cleared for take-off with €4.05 billion budget

The Commission is following up €1.6 billion spending on cutting noise and emissions from aircraft in Framework Programme 7 with a €4 billion package of research in Horizon 2020



**T**here's a significant boost for the Clean Sky Joint Technology Initiative (JTI), with plans to more than double the budget in the Horizon 2020 R&D Programme.

The current Clean Sky initiative, funded by Framework Programme 7, is the largest European aeronautics research programme ever, with a €1.6 billion budget over seven years.

Clean Sky 2 will dwarf that figure, with total funding of €4.05 billion. Of this total, the Commission is putting in €1.8 billion, whilst €2.25 billion in cash and in kind resources will come from the industrial partners. However, €1 billion of this will be in the form of "additional activities" that are not included in the work plan of the JTI but that contribute to its objectives.

Speaking at the launch of Clean Sky 2 in June, Jean Paul Herteman, chairman and CEO of Safran, the French aircraft engine manufacturer said, "Today is an important day for Europe because it is a big day for the aerospace industry" – an industry that is "one of Europe's jewels".

Clean Sky 2 will bring together companies, universities, public laboratories and SMEs to develop and demonstrate new technologies for the civil aircraft market that cut emissions and noise. Air traffic currently contributes about three per cent to global greenhouse gas emissions, a figure that is expected to triple by 2050. Although other sectors are more polluting – electricity generation and heating produce 32 per cent of greenhouse gases - pollution from air traffic is released high in the atmosphere where the impact is much greater.

In addition to improved environmental credentials, it is hoped the Clean Sky 2 JTI will secure the future international competitiveness of the European aviation industry. Europe currently has a 40 per cent share of the world market.

Amongst specific objectives, Clean Sky 2 aims to increase aircraft fuel efficiency, cutting CO<sub>2</sub> emissions by 20-30 per cent, and reducing nitrogen oxide and noise emissions by 20-

30 per cent compared to state-of-the-art aircraft entering into service as from 2014.

Other countries, and in particular the US, strongly support their aeronautics industry, meaning private investment alone is not enough to maintain the competitiveness of the sector in Europe. This highlights the importance of the synergy between private and government investment on show in Clean Sky 2.

In addition to developing technologies that can be applied within aeronautics, Clean Sky 2 may also lead to new technologies, for example, light-weight materials, that can be used in other sectors.

Eric Dautriat, Executive Director of the Clean Sky Joint Undertaking which is responsible for managing the JTI said, "Based on the successful Clean Sky experience to date, Clean Sky 2 is well positioned to become a force in shaping innovation for aviation in the decades to come. The entire aeronautics supply chain will benefit: SMEs, research organisations, universities and industry."

## Clean Sky achievements to date

Those involved in Clean Sky claim that technology developments to date or in progress could reduce aviation CO<sub>2</sub> emissions by more than 20 per cent compared to 2000 baseline levels. This is equivalent to a reduction of 2 to 3 billion tonnes of CO<sub>2</sub> over the next 35 years.

Technologies and demonstrators developed in the Clean Sky programme are said to represent major steps forward, with examples to date including innovative rotor blades and a high compression engine for light helicopters, new ice detector sensors and advanced avionics systems.

Since the Clean Sky JTI was set up in 2008 it has brought together over 560 participants of which around 40 per cent are SMEs. ■

# €3.8 billion plan to boost Europe's bio-based industries

Forty eight companies have signed up for a Joint Technology Initiative (JTI) to research and bring products made from renewable natural resources to market. This will provide new markets for farmers and reduce dependency on fossil fuels



The new kid on the JTI block is a €3.8 billion public/private partnership to develop bio-based industries, bringing together 48 large and small companies from across different sectors to develop and commercialise food, animal feed, chemicals and fuel products made from sustainable biomass and waste.

BRIDGE – Biobased and Renewable Industries for Development and Growth in Europe – will be managed by the 48 corporate partners through the Biobased Industries Consortium (BIC), with the aim of enabling European companies to bridge the innovation gap between technology development and commercialisation of high-value bio-based products.

These companies have committed to put in €2.8 billion cash and in kind resources, with €1 billion coming from the Commission. Of this, €1.8 billion will be pumped into investments and infrastructure, whilst the rest will fund activities, deployment and research across the innovation chain. Companies signing up to take part in BRIDGE said the €2.8 billion investment from industry highlights both their

strong commitment to the partnership and their confidence it can achieve its objectives. Coming together to make this investment under the umbrella of BIC reflects the collaboration which is at the core of BRIDGE, with its ambition of laying down the foundations of a post-petroleum society. This will require sectors including agriculture, biotech, forestry, pulp and paper, chemicals and energy to combine strengths and resources, and build bridges between different industries.

This requirement to work across sectors was stressed by Guy Talbourdet, CEO of Roquette Freres, a company specialising in making products based on starch extracted from plants. In order to develop new technologies, collaboration and joint development and support is absolutely vital, he said when the BRIDGE project was launched in July. New biomass resources In the face of evidence that European Union policies for the promotion of biofuels have led food crops to be diverted to biorefineries, BRIDGE will continue research to replace petrol-based products with ones based on biomass. One aim is to develop a biorefinery able to handle different types of biomass that cannot be used as

food, for example, non-food crop grasses and agricultural and forestry waste, and which can produce multiple products including biopolymers and biofuels. Beyond the potential of the project to create jobs in a broad range of sectors in Europe, in particular in rural areas, the Commission says it will also help the EU meet climate change targets. It will also aim to bridge the 'valley of death' that prevents research from Europe's universities being translated through to commercial bio-based products.

The BRIDGE project is a major milestone on the journey towards a smarter, more sustainable, more innovative EU economy, believes Stephan Tanda, Director of Royal DSM. "It underscores the commitment of both the Commission and of industry to work together with a broad community of European stakeholders, from farmers to foresters, to scientists and citizens, in the development of a world leading EU bio-based economy," Tanda said. ■



# The time is right: renewed push to make the European Research Area a reality

It's been baking for 13 years but now there is a fresh effort to complete Europe's single market for research

The European Research Area (ERA) launched in 2000 with the goal of creating a single market in knowledge, to ensure the free circulation of researchers, ideas and technology across the EU.

But while some projects have met with success and continue to develop, for example the Marie Skłodowska-Curie actions and joint programming, progress in many other areas is patchy.

"We have identified the science infrastructures we need for the coming decades," said EU Commissioner for Research, Innovation and Science, Máire Geoghegan-Quinn, in July 2012, "But have not necessarily put in place the funding to build them. Less than one per cent of national research funding is currently co-ordinated across borders."

"It is an idea whose time has now come," she said. "We must act quickly to turn it into a reality."

Creating the ERA was pinpointed as the main priority for Geoghegan-Quinn by Commission President José Manuel Barroso when she received her mandate in 2009. In February 2011 and again in March 2012, the European Council called for the completion of the ERA by 2014. It remains to be seen what progress can be made in this last year of the Commissioner's term.

## Plan of Action for 2014

On 17 July 2012, the Commission set out five main goals:

1. More effective national research systems – including increased competition within national borders and sustained or greater investment in research
2. Optimal transnational co-operation and competition – removing the technical barriers which prevent joint actions from getting off the ground, raising quality



EU Commissioner for Research, Innovation and Science, Máire Geoghegan-Quinn

through Europe-wide open competition, and constructing and effectively running key research infrastructures on a pan-European basis;

3. An open labour market for researchers – removing barriers to researcher mobility, training and careers by making research grants and pensions portable across borders and ensuring that recruitment to academic positions is fair, transparent and merit-based;

4. Gender equality and gender mainstreaming in research – to put an end to the scandalous waste of female talent, to diversify views and approaches in research and to foster excellence;

5. Broader and faster access to scientific papers and data, including realising the digital ERA to guarantee access to and uptake of knowledge by all.

Five key organisations signed a memorandum of understanding with the Commission on the same day, agreeing to work in partnership towards the 2014 deadline. These organisations: the European University Association, the European Association of Research and Technology Organisations, the League of European Research Universities, Nordforsk, and Science Europe, committed to improving coordination between EU research institutions and working towards harmonising Europe's research policy.

A new monitoring system will also make it much easier for the Commission to track progress in the five action areas, with Geoghegan-Quinn saying "I will not hesitate to 'name and shame' Member States which fall behind."

Regional policy will also play its part, with the introduction of Smart Specialisation Strategies (SSS). In order to secure structural fund investment in research and innovation from 2014-2020, national and regional authorities will need to

draw up an SSS, identifying the unique characteristics and competitive advantages of their region. It is hoped that this targeted approach will result in more effective investments in developing regions and in greater co-ordination between structural funds and research programmes at national and EU level.

## Horizon 2020 and the ERA

Commission estimates suggest that the ERA and Horizon 2020 will together give rise to an extra one per cent of growth and almost one million more jobs per year by 2030.

When it called for the ERA to be completed by 2014 the Council placed a particular emphasis on increasing researcher collaboration and mobility within Europe, and the attractiveness of Europe for foreign researchers.

Several obstacles stand in the way of a genuine European research labour market, including inequalities in salaries, pensions and benefits across the EU; non-transparent recruitment processes; and the lack of recognition of academic diplomas.

Under Horizon 2020, the Marie Skłodowska-Curie actions will get a significant increase to €5.4 billion (eight per cent of the budget), and will see the introduction of grants to attract researchers currently working outside of Europe to return, and to support researchers already working in Europe who want to move to a region with a less-developed science infrastructure.

In order to attract world-class researchers, world-class facilities and research infrastructures and facilities are necessary. Under Pillar One – Excellent Science – Horizon 2020 will dedicate €2.2 billion to plans to ensure that all researchers in Europe have access to high quality research infrastructures, including e-infrastructures; to foster the innovation potential of research infrastructures; and to promote greater cooperation within Europe and internationally.

The crux of the ERA is to strengthen the scientific and technological base of Europe and to increase its competitiveness and ability to tackle society's major challenges. In order to do this, synergies between national and international programmes need to be exploited, to make the best use of national and EU funds. While progress has been made, the level of alignment is presently too low to make a serious impression on big and complex challenges. This is due in part to differences between national funding rules and selection processes, but it is also a question of political will.

Horizon 2020 will build on the work done so far through a number of public-public partnerships with national governments, focusing on new treatments for poverty-related diseases, measurement technologies for industry, support for high-tech SMEs and assisted living products and services to help the elderly and disabled to live safely in their homes. The underlying logic is that these are areas where there is not sufficient incentive for industry to invest, but which would deliver significant benefits.

In spite of national and EU-level strategies on gender equality, European research still suffers from a considerable loss and inefficient use of highly skilled women. As far back as 2005,

the Council set a modest goal for women to be in 25 per cent of leading public sector research positions, but according to the European Union's latest analysis, 'She Figures: Gender in Research and Innovation 2012', women comprise only 20 per cent of senior academics in Europe's universities. For the first time in a European research programme, the aim to promote gender equality is explicitly set out in Horizon 2020. "Gender experts will be involved in the programming of research," said Geoghegan Quinn, and, "We will highlight projects that involve a gender dimension, monitor gender-balance within research teams and run pilots in relevant areas."

## Open access to publicly-funded research

In an attempt to secure greater access to, and return from, publicly-funded research, and to break down barriers in the exchange of information across the ERA, all articles produced with funding from Horizon 2020 will have to be made accessible to the public. This can be in the form of "Gold access", where the publication is made available immediately online, or "Green access" where papers are made available through an open access repository, no longer than six months (12 months for social sciences and humanities) after first publication. The Commission has also recommended that EU member states adopt a similar approach in their nationally-funded research.

The new rules for Horizon 2020 comes amidst increasing clamour for open access to research papers from public R&D funding organisations worldwide. In February 2013, US President Barack Obama directed federal agencies with more than \$100 million in R&D funding to develop plans to make the results of federally funded research freely available to the public within one year of publication – and at the same time to require researchers to better account for and manage their data.

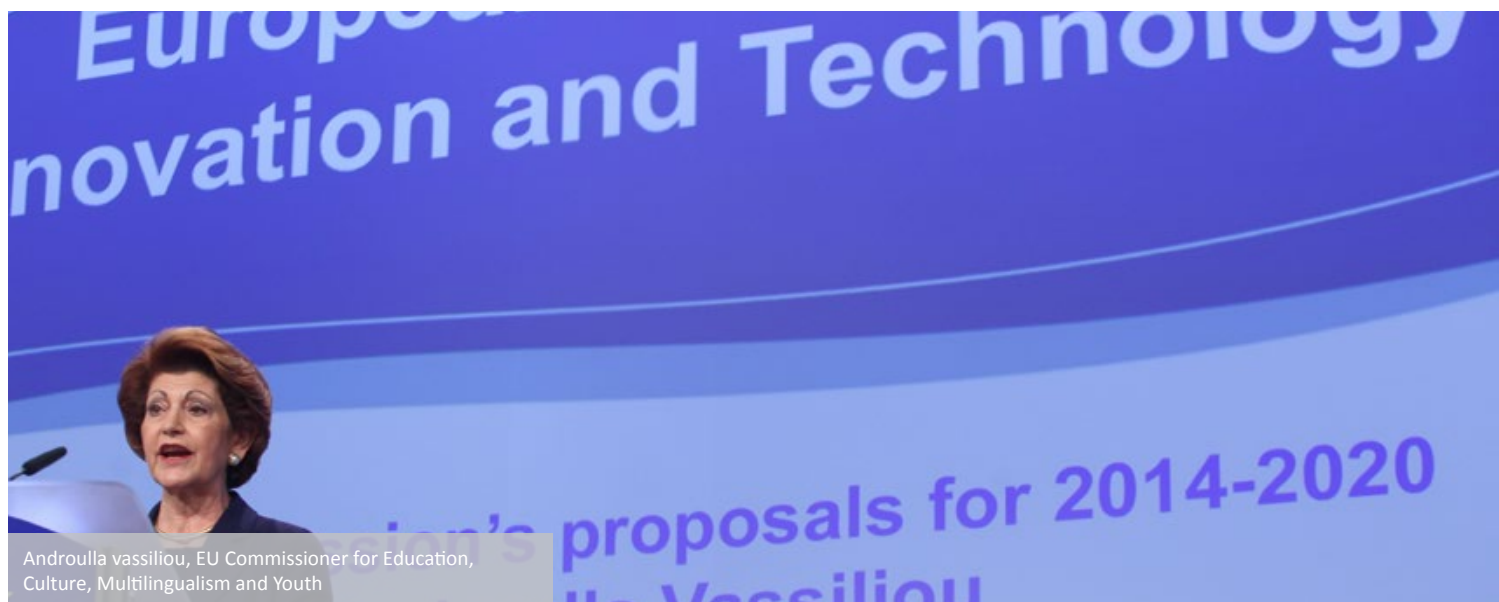
The UK government has led the way here, and from 1st April 2013 all research funded through the country's research councils must be made freely and openly available, to anyone around the world.

A recent study funded by the Commission suggests that open access is reaching the tipping point, with around 50 per cent of scientific papers published in 2011 now available for free. This is about twice the level estimated in previous studies, explained by a refined methodology and a wider definition of open access. The study, which looked at publications in the ERA as well as Brazil, Canada, Japan and the US, also estimates that more than 40 per cent of scientific peer-reviewed articles published worldwide between 2004 and 2011 are now available online in open access form.

Access to underlying data is also opening up. Under Horizon 2020, the Commission will also start a pilot on open access to data collected in the course of completing publicly-funded research, taking into account legitimate concerns related to the grantee's commercial interests, privacy and security. ■

# Greater Expectations: EIT gets a bigger budget and a wider mandate

Europe is betting big on the European Institute for Innovation and Technology (EIT) with a massive increase in the budget and in the number of Knowledge and Innovation Communities (KICs).



One of the biggest percentage increases in funding under Horizon 2020 will go to the European Institute of Innovation and Technology (EIT), the body that got off the ground in 2008 as an experiment in getting universities and companies working together to find technological fixes for some of Europe's biggest problems. After receiving €309 million under the existing Framework Programme 7, it is now in line to receive approximately €2.4 billion under Horizon 2020.

## Moving forward

Today, a small staff at the headquarters in Budapest supports three scattered clusters of partners referred to as Knowledge and Innovation Communities (KICs), specialising in climate change, energy and information and communications technology (ICT). The three KICs operate in 12 EU countries with 206 partners: 66 universities, 53 research institutes, 76 business and 11 local or regional agencies. A quarter of the funding comes from the EIT, with the balance coming from industry and local or national government.

The difficulties of establishing the first three KICs was, "underestimated by all parties," according to a Commission report to the European Parliament and Council last year, in which there was a call for "clearer guidance" for future KICs; more coordination and cross-fertilisation among the KICs; regular evaluation of the KICs' progress; a true EIT 'corporate identity' around a set of shared values.

In addition, there was a call to cut the EIT's 22-member governing board to ten. Most of these recommendations have been since been adopted.

## The weight of expectation

By 2020, the Commission expects the EIT to have provided the impetus for the creation of up to 600 start-up companies and to have built links between science and entrepreneurship for 10,000 master's students and 10,000 PhDs.

This is to be done through long-term strategic planning and multi-disciplinary collaboration that alongside fostering technological innovation, supports systems and public sector innovation.

## The EIT under Horizon 2020

While the €2.4 billion budget the EIT will receive under Horizon 2020 is a significant increase over Framework Programme 7 (and approximately 3.52 per cent of the overall Horizon 2020 budget) it is less than the Commission's proposal of €2.8 billion and far removed from the European Parliament's demand for €3.1 billion.

Over the course of Horizon 2020, five new KICs will be launched, with the first two KICs due to be launched in 2014 focussing on 'Healthy living and active ageing' and 'Raw materials'. The focus of two more KICs getting off the ground in 2016 will be 'Food4future' and 'Added value manufacturing' with the final KIC launching in 2018 specialising in 'Urban mobility'.

*(Note to Readers: Science|Business is a contractor to the EIT). ■*

# How the negotiations played out

Budget versus details: A look at how the political agreement was achieved



The Commission's best-laid plans for Horizon 2020 were dealt a serious blow at a summit in February 2013, when European government leaders in the Council decided for the first time to make cuts to the EU's long-term budget, the Multiannual Financial Framework (MFF). This covers everything the Commission will do over the next seven years: subsidising agriculture, funding development projects, paying its own staff – and funding research and innovation programmes. The agreed budget of €960 billion from 2014 to 2020 represented a cut of 3.4 per cent from the current spending period.

For Horizon 2020, the outcome was a budget of €70.96 billion, according to Michael Jennings, spokesman for Máire Geoghegan-Quinn, EU Commissioner for Research, Innovation and Science. This represented a net increase on the €55 billion of its predecessor, the Seventh Framework Programme (FP7), but was a reduction of almost €10 billion from the Commission's proposal, and a far cry from the ambitions of some MEPs, who had called for €100 billion.

## Parliament weighs in on the debate

Since the Lisbon Treaty came into force on 1 December 2009, however, the budget also needs the endorsement of the European Parliament – a responsibility MEPs take very seriously.

The four biggest political groupings immediately issued a statement rejecting the Council's proposal, "The real negotiations will start now with the European Parliament," said the group leaders.

The Parliament said the proposed cutbacks would weaken Europe's competitiveness, "We want a modern EU budget that is oriented towards growth and employment," said Göran Färm, vice-president of the Socialists & Democrats group. "We need sufficient spending in areas such as research, youth

unemployment, infrastructure and climate change policies, to achieve the EU 2020 strategy."

This vehement opposition, however, seemed to stem less from concerns over future spending and more from the Parliament's urge to assert its role in the budgetary process. "The Parliament wants to be taken as a serious partner," said President Martin Schulz. "We want to come to a compromise and improve the MFF."

## Parliament's budget demands:

In a defiant move, MEPs voted 506 to 161 against the Council's proposal in March 2013. As well as seeking an increase to the "austerity era" figures, MEPs sought a number of changes to the structure of the budget, including:

- The fulfillment of all unpaid payment claims for 2012, in order to begin the 2014 - 2020 funding programme with a clean slate. Payment shortfalls last year meant programmes, including Erasmus and Framework Programme Seven, were left with insufficient funds.
- Greater flexibility between years and budgetary lines, allowing unspent funds to be redirected to areas that need it.
- The introduction of a review procedure, whereby the allocation of funds within the Horizon 2020 budget could be reconsidered over the seven year programme.

The R&D community had reason to hope the original €80 billion for Horizon 2020 might be restored after this vote, with a prominent clause in the text reading, "The MFF for 2014-2020 should ensure the successful implementation of the Europe 2020 strategy and endow the EU with the necessary means to recover from the crisis and come out stronger; [The Parliament] stresses, therefore, the importance of substantially increasing its investments in innovation, research and development."

## A very public negotiation

The big question, however, was how much flexibility really existed at Council level to unpick its figures. Lengthy talks were needed for governments to secure a deal in February, amidst a growing divide between countries looking to reduce EU spending (led by the UK) and those seeking to maintain current spending levels (including France and Italy).

If an agreement was to be reached in time to finance the next round of EU projects, however, national ministers needed to move to meet MEPs. In the months following the Parliament's vote, lead MEPs met with negotiators from the Commission and Council in tripartite meetings, or "trilogues", with the Irish government at the helm of the rotating Presidency of the Council.

On 19 June, Ireland's Deputy Prime Minister, Eamon Gilmore, announced that a deal had been reached with Alain Lamassoure, MEP and Chairman of the Parliament's Budgets Committee. "We have agreed a package that we are both going to recommend to our respective institutions," said Gilmore. "This is a balanced package that addresses all four of the issues identified by the European Parliament as important for the EU budget."

Janusz Lewandowski, EU Commissioner for Financial Programming and Budget, also welcomed the agreement, but MEPs were not happy and several denied that any agreement had been reached. "The statement by the Irish Council Presidency of an alleged agreement on the financial framework is nothing more than a manipulation," said Reimer Böge, MEP and Rapporteur for the Parliament's response to the MFF. "The European Parliament's negotiating team last night decided not to continue the negotiations, if they can be called such at all, and submit the texts to the European Parliament," he said. Böge was so unhappy with the move that he resigned from his position as rapporteur.

His outrage appeared to be at odds, however, with the response from Lamassoure, who issued a statement defending both Gilmore's handling of the negotiations and the deal reached. Lamassoure clarified that while Parliament negotiators were unable to agree to the final text unanimously, he as chief negotiator was happy with it. "As lead negotiator, I will present the agreed text to the parliament and I will personally defend it," he said.

## An outcome, finally

The inter-institutional spat was resolved on 27 June, eight days after Gilmore's announcement, when the negotiations were concluded at the highest level between Schulz and Ireland's Prime Minister, Enda Kenny. "This is a good deal for Europe. This is a good deal for Europe's citizens. This is a good deal for the European economy," said José Manuel Barroso, President of the European Commission.

The big question for all was how much the Parliament's dramatic rejection of the February deal managed to change. While it did lead to increased flexibility of the budget, the

Council stuck to its guns in spending and the overall limits remain unchanged – €960 billion in spending commitments and €908bn in actual payments.

Parliament's gains:

- Flexibility to move unused appropriations between budget headings and fiscal years, rather than returning it to national budgets as at present;
- A review of the programme in 2016 with implementation in 2017, allowing the new Parliament and Commission coming into office in 2014 to put their stamp on the budget, and to facilitate changes in spending should the economic climate improve;
- "Front-loading" of up to €2,543 million to tackle youth unemployment and strengthen



Heads of state and government arrive at the Council building

research, including

- An additional €200 million for Horizon 2020 in 2014-2015
- An additional €150 million for Erasmus in 2014-2015
- An additional €50 million for COSME to improve the competitiveness of SMEs in 2014-2015
- €2143 million for Youth Employment in 2014-2015

These amounts will be fully offset against appropriations within and/or between headings in order to leave unchanged the total budget for each programme from 2014-2020.

While the deal has been approved in principle by the institutions, the legal texts are expected to be approved in autumn. The final legally binding vote in Parliament will only take place when the €11.2 billion needed to balance the 2013 budget is confirmed by the Council.

## Horizon 2020 negotiations

Running parallel to the MFF debate were negotiations on the programme for Horizon 2020 – deciding what activities would be funded and where emphases would be placed. The six reports produced by MEPs from the Industry, Research and Energy Committee (ITRE) framed the Parliament’s response to the Commission’s proposal and their authors – the “rapporteurs”- were the Parliament’s main negotiators.

While the trilogues took place behind closed doors, one part of the Horizon 2020 debate became very public. As late as June 2013, agreement had not been reached on a reimbursement model for the programme - with national governments favouring a flat-rate system and lead MEP Christian Ehler defending the existing full-cost model.

The Council proposed a flat-rate reimbursement model -

paying 100 per cent of direct research costs plus an additional 25 per cent of this amount to cover indirect expenses—in order to simplify the programme. It was suggested that this could be paired with a ‘Bonus+’ scheme, allowing supplementary payments of up to €8,000 per researcher per year.

Ehler said such a model would be more expensive than under Framework Programme Seven, and instead proposed the reintroduction of a full-cost reimbursement option. Along with lobby groups including the European Association of Research and Technology Organisations (EARTO), Ehler argued that participants with large, expensive research facilities would need reimbursement of actual infrastructure costs.

At a May trilogue session, MEPs presented a compromise including the Council’s flat-rate reimbursement model —with an additional full cost option for non-profit organisations at 70 per cent. This held little sway with the ministers and it looked as though a stalemate might arise in negotiations, with Seán Sherlock, Ireland’s Minister for Research and Innovation, saying the funding model, "is a red line for the Council", but Ehler being equally adamant, saying, "If we need a second reading, we will have one."

But at the eleventh hour, a trilogue agreement was reached on 25 June, and it quickly became clear that the Council had won out in the money stakes – both overall spending (approximately €70.2 billion) and the reimbursement model (100 per cent direct costs plus 25 per cent flat-rate for indirect costs) remained unchanged.

In order to get these politically sensitive issues passed, ministers showed great flexibility towards the content of the programme and many of the Parliament’s ideas were accepted, including:

- An independent activity line with a dedicated budget of



The leaders of some of Europe’s wealthier countries discuss the EU budget during one of many ‘bilateral meetings’ that took place during the February 2012 gathering of EU heads of state and government. From left to right: Dutch prime minister Mark Rutte; UK prime minister David Cameron; Danish prime minister Helle Thorning-Schmidt and Swedish prime minister Fredrik Reinfeldt.



European Parliament in Brussels

1.06 per cent of the Horizon 2020 budget for "Widening Participation", including new activities such as teaming and twinning actions between research institutions;

- A pilot "Fast Track to Innovation" scheme to run permanently open calls with a reduced time to grant of six months, designed to attract small consortia with innovative ideas;
- The creation of Return Grants within the Marie Skłodowska Curie Actions for the reintegration of researchers after an international experience or to attract those already working in the EU towards less innovation intensive regions;
- The ear-marking of at least 20 per cent of the combined budget of Leadership in Enabling and Industrial Technologies (part of pillar II) and Societal challenges (pillar III); for SMEs;
- A dedicated budget and a single management structure for the SME instrument, with seven per cent of the combined budget of Leadership in Enabling and Industrial Technologies (part of pillar II) and Societal challenges (pillar III);
- Introduction of "Innovation Vouchers" to fund research and innovation activities within Phase Two of the SME instrument.
- The earmarking of 70 per cent of the energy budget for renewable energy, energy efficiency, smart grid and storage,

and an additional 15 per cent for activities for the market uptake of existing renewable energy and energy efficiency technologies;

- Reduction in the general time-to-grant to eight months from an average of a year under Framework Programme Seven. ■

# Horizon 2020 Timeline

*30 November 2011*  
European Commission adopts Horizon 2020 package. Beginning of negotiations between the European Parliament and Council of Ministers.

*January 2012*  
The European Parliament (ITRE committee) appoints rapporteurs for the Horizon 2020 dossier.

*July 2012*  
MEPs release a number of draft reports proposing amendments to the Commission's Horizon 2020 plan

*10 October 2012*  
Council reaches partial general approaches on the EIT regulation and on the rules for participation and dissemination in Horizon 2020.

2012

Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov D

*5-6 December 2011*  
Commission presents Horizon 2020 to Council of Ministers

*31 May 2012*  
Council reaches partial general approach on the Horizon 2020 Framework Programme

*28 November 2012*  
ITRE Committee presents the final reports on Horizon 2020 with amendments to the Commission's proposals.





*11 December 2012*  
Council reached partial general approaches on the Specific Programme implementing Horizon 2020 and on the Strategic Innovation Agenda (SIA) of the EIT.

*7-8 February 2013*  
European Council agreement on long term budget (MFF)

*25 June 2013*  
Trilogue agreement reached on programme for Horizon 2020

*10 July 2013*  
Commission announced its €6.5 billion plan for five Joint Technology Initiatives under Horizon 2020

*26 September 2013*  
ITRE Committee votes on consolidated texts of Horizon 2020 package

*Autumn 2013*  
Parliament votes on Horizon 2020 in plenary session

*January 2013*  
Start of 'trialogue' meetings between European Parliament, Commission and Council

*13 March 2013*  
Parliament rejects Council's deal on the MFF

*27 June 2013*  
Political agreement reached by negotiators from Council, Commission and Parliament on €960 billion long-term budget

*17 July 2013*  
Diplomats from each member state, acting through the Committee of Permanent Representatives, endorsed the agreement reached in June on Horizon 2020 and prepared draft legal texts

*End 2013*  
Adoption of Horizon 2020 legislative acts by Parliament and Council

*1 January 2014*  
Horizon 2020 starts; launch of first calls

2013

2014

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# A round-up of major research developments and initiatives

A number of new research funding programmes and policies will complement the final Horizon 2020 package



## 1. The Single European Patent

After four decades of talk and negotiations, the long-awaited single European patent will become a reality on 1 January 2014, following a compromise deal between the Council and the European Parliament in December 2012.

The promise is that the new patent will be cheaper and more effective in protecting inventions, with one patent grant providing protection in 25 member states, patent languages limited to English, French and German (in line with the European Patent Office system) and a single court to deal with disputes.

There is a long bedding-down process, with a transition period of 12 years to move from the existing system, in which a patent granted by the European Patent Office in Munich must then be translated into the language of any country in which it is to have effect, to the new three language system. When it is up to speed, the estimate is that a patent granted under the unitary scheme will cost €4,725, compared to the European Commission's current estimate of the average cost, which stands at €36,000.

## 2. COSME – the first EU programme designed to specifically support SMEs

The Programme for the Competitiveness of Enterprises and SMEs – COSME – named, as Commission Vice-President

Antonio Tajani noted, after the Renaissance merchant-prince Cosimo de'Medici – will run in parallel to Horizon 2020, with an independent budget of more than €2 billion over the next seven years.

Approximately sixty per cent of this sum, €1.4 billion, will be spent on instruments to improve access to finance for SMEs. This includes an equity facility that will provide risk capital to funds investing in SMEs in their growth phase, and a loan guarantee facility, which will provide financial intermediaries with risk-sharing arrangements so that they can provide finance to SMEs.

Support services, such as international contacts and advice on EU legislation and funding programmes, provided by the Enterprise Europe Network will seek to facilitate business expansion both within the internal market and further afield.

COSME and Horizon 2020 will together replace the Competitiveness and Innovation Framework programme (CIP) and will complement each other. The equity and loan facilities will operate across both programmes and the Enterprise Europe Network will be set up under COSME but provide support to all SMEs.

The budget of COSME is almost double that of its predecessor - the competitiveness part of CIP. The new initiative is a reflection of the rising

status of SMEs on the political agenda – now seen as a prime vehicle for economic recovery and job creation.

## 3. International collaboration in data-sharing

Europe is joining forces with the US and Australia in a bid to underpin data sharing through the formation of the Research Data Alliance (RDA), an international body set up to promote the development of new infrastructures, standards and tools for sharing and mining research outputs.

John Wood, the EU Co-Chair of the RDA, said, "The aim is to ensure that when scientists want access to the data of their peers, this data is available for them in a format that they can use."

The RDA has a long and difficult agenda, but at its heart is a mission to unlock the innovation potential of research data.

At present, only 25 per cent of researchers share their research data openly. This slows innovation, with a recent study on Danish SMEs showing that without speedy access to scientific research results, it takes firms on average 2.2 years longer to develop or introduce new products.

The objectives of the RDA are in tune with the open access theme of Horizon 2020 – where all journal articles reporting research funded under the

programme will have to be freely available.

## 4. Future and Emerging Technologies – Graphene and the Human Brain Project

The two winners of the biggest basic research grants in EU history – with €54 million for starters in 2013 alone - have been guaranteed the funding will be maintained over ten years regardless of any cuts to the EU's overall R&D programme. In total, the two programmes are in line to receive €2 billion in EU funding.

The Future and Emerging Technologies Flagships on Graphene and the Human Brain will also be the most collaborative projects ever funded by the EU, with Graphene involving 126 academic and industrial groups in 17 countries, while the Human Brain Project is comprised of 87 organisations in 23 countries, of which 16 are in the EU.

The two Flagships received €54 million from the European Commission's ICT 2013 Work programme to get off the ground, with the majority of the remaining funding coming from Horizon 2020.

## 5. The European Space Agency

The European Space Agency (ESA) has been allocated €10 billion for its programmes from 2013 – 2017.

While this was €2 billion less than hoped for, it represented a welcome conclusion to negotiations at a time of austerity, when the national governments that fund ESA directly are cutting spending elsewhere.

The investment will be focused on fields which the ESA claims have high growth potential or with a direct and immediate impact on the economy, such as telecommunications and meteorology.

## 6. Reform of public procurement rules

One key boost for innovative start-ups and SMEs in Europe is likely to come from increased public procurement of innovation from smaller and medium-

sized companies. Under new rules, agreed by political negotiators from the Parliament and Council on 26 June 2013, it will be possible to divide contracts into lots to improve access for small firms.

An Innovation Partnership Procurement tool will apply to contracts where there is a need for the development of an innovative product or solution that is not already available on the market. 'Innovation Partnerships' will enable contracting authorities to establish a long-term innovation collaboration for the development and subsequent purchase of new, innovative products, services or works. Forward-looking customers can provide the necessary 'market-pull' and underwrite the development of the innovative solution without foreclosing the market.

Simplification will come from a standard 'European Single Procurement Document' form, to be provided in all languages. The system will be based on self-declarations and only the winning bidder will have to provide original documentation. This aims to save companies filling in a lot of initial paperwork and make it easier for them to bid.

Malcolm Harbour MEP, Chairman of the Committee on Internal Markets and Consumer Protection in the European Parliament, has spearheaded the movement to get government agencies to spend a greater slice of the EU's €2.3 trillion procurement budget on innovative products. "Public procurement has immense power," Harbour said. "We have now ensured that the [European] legal framework is simple, easy to operate and encourages good innovative procurement – and doesn't discourage it, he added.

## 7. Erasmus Plus

Erasmus will continue for the next seven years, with the €16 billion programme enabling over four million people to study and train abroad between 2014 and 2020 - almost doubling the existing number. Erasmus Plus brings together all existing EU and international schemes for education, training and youth and, for the first time, includes sport.

Of the total funding, 77.5 per cent will be allocated to education and training, with 3.5 per cent going to the Loan Guarantee Facility, which will allow students to borrow €12,000 for one, or

€ 18,000 for two years, to do a masters' degree abroad. The EU will provide a partial guarantee to the financial institutions offering the loans.

"Knowledge Alliances" at university level and "Sector Skills Alliances" in vocational institutions are intended to promote the exchange of good practice. Meanwhile, the private sector will be encouraged to foster innovation and to help promote learning and education. ■



# Health Matters: Horizon 2020 must fund research in neglected diseases

The evidence is that research into poverty-related and neglected diseases will both benefit developing countries and improve Europe's economy. Amongst many competing demands it is crucial that R&D funding for global health is maintained in Horizon 2020 says Karen Hoehn

BY KAREN HOEHN, GERMAN FOUNDATION FOR WORLD POPULATION



**P**overty-related and neglected diseases account for 13.7 million deaths and the loss of 377 million healthy life years annually worldwide. Yet only 10 per cent of worldwide health research expenditure is used to address these diseases, which include HIV & AIDS, malaria and tuberculosis – three of the most deadly infectious diseases worldwide.

Now a study by the independent research group Policy Cures, 'Saving Lives and Creating Impact: EU Investment in Poverty-Related and Neglected Diseases' confirms that European funding for global health research and development through the new EU Framework Programme for Research and Innovation, Horizon 2020, will have a direct benefit on both developing countries and on Europe.

Funding for R&D in poverty-related and neglected diseases creates jobs, according to the study, which was commissioned by Deutsche Stiftung Weltbevölkerung, a German foundation that for the past twenty years has worked to implement and support family planning and reproductive health education and services in developing countries.

The study found that 13,000 new jobs were created in this area of disease research between 2002 - 2010 – many of these being exactly the kind of the smart, high-value jobs sought by the EU's growth strategy, Europe 2020.

Sixty-six cents of every €1 invested by EU governments in poverty-related and neglected diseases R&D is reinvested back into European laboratories, universities and companies.

## New treatments

Further strengthening European investment in global health R&D has led to the development of new treatments for diseases including HIV & AIDS, tuberculosis and malaria. In the last ten years, 43 new products were registered, including a pneumonia vaccine and new malaria drugs.

Research into these diseases also generates a net benefit to Europe's economy. For every €1 invested by the EU and member states, a further €1.05 is attracted from other donors.

In addition to the huge health impact and many secondary benefits in developing countries, EU investment in poverty-related and neglected diseases R&D also yields important domestic benefits. Closer to home, we also feel the benefit as European citizens are protected from these diseases, protecting Europe's global health security.

## Contributions vary

However, EU investment in this area is still low overall and is not spread equally between the member states. EU funding for R&D in neglected diseases is only 0.0024 per cent of the EU's

combined gross domestic product, and the contributions of individual member states vary greatly.

All EU funding for research and development into poverty-related and neglected diseases will be coordinated through Horizon 2020, including commitments towards the second phase of the European and Developing Countries Clinical Trials Partnership. Cutting global health funding in Horizon 2020 would be detrimental to the European economy, as well as to developing countries.

Given this, the next few weeks leading up to the vote in the European Parliament's Industry, Research and Energy Committee (ITRE) are critical to ensure that global health concerns are adequately taken into account under Horizon 2020.

To highlight the case, the Policy Cures report 'Saving Lives and Creating Impact: EU investment in poverty-related and neglected diseases' was launched yesterday (26 September) at an event in the European Parliament, hosted by MEP Maria Da Graça Carvalho.

*Karen Hoehn is Vice Executive Director and Director of International Affairs, Deutsche Stiftung Weltbevölkerung (German Foundation for World Population)*

*Policy Cures is an independent group providing research, information and strategic analysis for those involved in developing drugs for diseases that take a particular toll in the developing world, including malaria, TB, HIV/AIDS, pneumonia, sleeping sickness and helminth infections. The aim is to provide governments and funding bodies with information to guide R&D funding decisions. ■*

# 'A lot riding on' Britain staying in the EU – scientifically speaking

MEP Andrew Duff argues that it would be a disaster for science – in both the UK and Europe – if Britain left the EU

With Britain debating whether to leave the European Union, one UK Member of the European Parliament says the argument isn't just about trade and money – it's also about science and innovation.

Andrew Duff, a prominent Europhile from the UK region that includes Cambridge University, says the future of UK science and innovation is dependent on Britain staying in the EU – and, conversely, the rest of Europe needs the UK to make EU science stronger.

"There's an awful lot riding on us staying in the EU," said Duff in an interview with Science|Business.

With a Conservative-led coalition government in power – elements of which have been hankering for a fight over Europe since the fall of former Prime Minister Margaret Thatcher – Britain's position in the EU has come under scrutiny.

Duff, a long-time supporter of the UK in Europe, thinks Britain leaving the EU would "be a disaster" and would represent a substantial body blow for research and innovation within Britain.

However, Duff not only feels it would be bad for research and innovation in the UK if Britain left the EU, but it would also constitute a serious loss for the rest of Europe. The relative strength of the UK science base and its expertise in technology transfer and commercialisation means it has best practice to offer other EU researchers, especially in newer member states with less developed science and innovation infrastructures.

A Liberal Democrat MEP for Eastern England, Duff cited Cambridge University as a role model, with its high academic standards, world-leading science, and reputation for forming spin out companies. The city of Cambridge is also one of the longest-established high tech clusters in Europe, and remains among the strongest in both information technology and biotechnology.

## A wider scholastic community

EU research funding is extremely important for the UK, and by the end of the 2007-2013 Framework Programme 7 the UK will

have received around €7.5 billion in funding. Its importance is highlighted clearly at Cambridge, with estimates indicating that 20 per cent of the work undertaken by its researchers is funded by EU grants.

Whilst there have been arguments about the large amount of funding Cambridge receives from EU grants, Duff argues that the desire to remain within the EU isn't simply about "grant grubbing".

Instead he suggests it concerns the "cultural membership of a wider scholastic community – dating back to the Renaissance." He sees this as a framework to grow global connections and a key reason why Britain should stay in the EU.

As well as having a new postgraduate school of public policy which is to open in October,

Cambridge has been host to high profile guests such as Jose Manuel Barroso and Neelie Kroes, president and vice president of the European Commission – an example of the on-going, positive dialogue between Brussels and Cambridge and something, according to Duff, you "can't put a price on".

Duff is also keen to see the proposed EU/US trade agreement completed, saying it will be a boost to the world economy and create a transatlantic area of science and innovation. He predicts a protracted negotiation, but also feels the impact on services and sciences will be profound.

Whilst he's strongly pro-European, Duff is also very aware of EU failings and is keen to update and modernise EU structures. He cites "a waste of money, duplication, and the poor quality of a lot of scientific research" within Europe as having stemmed from insufficient integration. A mutual recognition of qualifications, alongside a more meritocratic and streamlined system, is essential in helping the calibre of science within Europe across the board, Duff believes.

Britain maintaining its EU membership is vital if the integration Duff wants is to be achieved. "We need to be more permissive, to encourage scholastic exchange and immigration. To close the borders as some of my Tory colleagues seem to wish to do would be a great mistake – and I hope we're not going to permit them to do that." ■



Andrew Duff MEP

# Let's go to Mars, not Strasbourg

As EU heads of state tried to fix the budget for Horizon 2020, MEPs, the EU's Chief Scientist, astronauts and a Star Trek actor highlighted the importance of inspiring a new generation of European scientists



As the European Union debates the shape and budget of Horizon 2020 – its research and innovation programme that will influence the continent's science climate for most of the coming decade - it should remember the need to inspire a new generation of European researchers through science fiction, science education and human space flight. This was the message put forward by representatives from the worlds of politics, research and science fiction meeting at the European Parliament in October 2012 on the invitation of EU40, a cross-party group of young MEPs.

Anne Glover, the EU's Chief Scientific Adviser, told an audience that included secondary school students from around Europe, "It is almost eerie how we can deliver what our imagination can think up."

Honouring the presence of Walter Koenig, the American actor who played the part of the Star Trek character Pavel Chekov, Glover pointed out that technologies such as mobile phones, tablet computers, biosensors, and needle-free injections which are emerging today, were part of Star Trek's science fiction world in the 1960s, and

helped inspire a generation of scientists. Long before the iPad there was the, "Kirk-pad, Picard-pad and Janeway-pad," Glover noted.

## The world is built on science

"We are not yet at Warp 9 today," said astronaut Frank De Winne, who served as the first European commander of the International Space Station (ISS) and currently heads the ESA's European Astronaut Centre in Cologne, Germany. "But certainly a lot of what has been shown in Star Trek in the past has become reality. The space industry is contributing a lot to growth and competitiveness in Europe," De Winne said.

"We live in the science fiction of the past," agreed André Kuipers, the ESA astronaut who holds the record as the European to have spent most time in Earth's orbit. Kuipers stressed the importance of science fiction to stimulate scientific creativity, and to captivate the imagination of children and students alike.

And science fiction apart, Kuipers said the fact he is an astronaut

today is thanks to researchers who enthusiastically told young TV audiences about science. "It is important that young people understand that this world is built on science," he said.

A career in science can be very exciting, regardless of the subject you pick, Kuipers assured the audience. "I was trained as a medical doctor, and would never have thought that I would become the co-pilot of a Russian spaceship," he said.

## Come out of your laboratories

Astronauts are happy to put themselves forward as role models, De Winne said, calling on other scientists to come out of their laboratories and share the excitement of science. And he suggested that scientists should not be afraid to discuss their personal excitement upon making a discovery, rather than feeling obliged only to highlight the possible impact on the public at large.

To take a Star Trek analogy, De Winne said, "We currently live in a pre-warp civilization." Life on earth as we know it today is not sustainable, and research is needed to change this and ensure long-

term survival. Drawing inspiration from his time in space, De Winne said that the view from the ISS shows how in reality there are no boundaries on earth.

Kuipers also spoke about the view from space, and how beautiful the bright, lit-up cities look. But this also brings home how vulnerable and how limited the Earth's capacity is. "The population is growing, but the planet is not. We have to find a way to grow in a sustainable way and give Earth time to recover," Kuipers warned.

## True Europeans

De Winne believes that the only way to retain the current quality of life over the next decades is through European collaboration. "Human space flight is a very good vehicle to start cooperating. Former enemies, the United States and Russia, have decided to work together in the International Space Station." De Winne said the core group of European astronauts, based in Cologne, is a "core of true Europeans."

Glover agreed that collaboration is key, saying, "Sometimes we are a bit too modest [.....] What Europe does is fundamental." Take the Large Hadron Collider in Geneva. "No individual

country could do that. It is only through working together that we can bring the best minds of the planet here to deliver that infrastructure," Glover said.

Star Trek's Captain Kirk was never seen struggling to deal with a budget, but in reality scientific advancement requires funding. Looking to the current infighting over the size of the Horizon 2020 budget, Glover said, "I hope that the politicians in Europe, even in difficult times, identify that this budget allows us to do things we can't do in individual Member States."

## Space, the final frontier

Mankind will have to go to the stars. "It is our destiny," said Koenig. Evolution is an on-going process; humans will continue the search to find what's out there. "We might destroy half the planet" before we get that far, Koenig said, but ultimately going into space is part of who we are. "Our purpose is to fulfil our potential as much as we can. That is the most noble thing humanity can do. Those are the building blocks of the future," Koenig concluded.

Asked by one of the students in the audience when humans will go to Mars, Andreas Mogensen, the first Danish

member of the ESA astronaut core, said, "Today, we are much closer to realising a manned mission to Mars than NASA was in the early sixties to organising a manned mission to the moon. Hopefully politicians will hear this and help all of us to reach that dream."

Alexander Alvaro MEP (ALDE-DE), one of Parliament's Vice Presidents, heard it and suggested Europe should start spending money on things that matter. "We should stop traveling to Strasbourg and instead go to Mars," he responded in a jibe at the Member States forcing the European Parliament to maintain its costly monthly shuttle between France and Belgium while suggesting cuts to the proposed EU research budget. Moderator Katarína Neveďalová MEP (S&D-SK) concurred.

*These views were expressed at a debate at the European Parliament in Brussels on 18 October 2012. The event was organised by EU40, a cross-party group of young MEPs, and moderated by Katarína Neveďalová MEP (S&D-SK). ■*



From left: astronaut Andreas Mogensen, EU chief scientist Anne Glover; astronaut Andre Kuipers; Star Trek actor Walter Koenig; astronaut Frank De Winne and vice president of the European Parliament Alexander Alvaro

# Parliament got everything on its wish-list, except for the money

Defeated in the budget and costing stakes, MEPs Christian Ehler and Maria da Graça Carvalho remain hopeful that a bottom-up approach and support for SMEs can open up Europe's latest R&D programme to new participants

“The negotiations were very long”, said Maria da Graça Carvalho MEP, Rapporteur for Horizon 2020, reflecting on the eleventh hour agreement on Horizon 2020, the European Union's next big R&D programme, due to run from 2014 - 2020. “There was a lack of communication at first, which meant that the Council did not fully understand the benefits of our proposals. They realised in the end that our proposal was very good for science and research,” she told Science|Business.

While a €70 billion budget for Horizon 2020 appears to be a significant increase from the €55 billion budget for the current Seventh Framework Programme, it includes the budget for the European Institute of Technology and part of the Competitiveness and Innovation Framework Programme. “Put inflation on top of that, and research and innovation has been the victim [of cuts to the overall budget]”, said Christian Ehler MEP.

## Fast track to innovation

While the €70 billion final ticket is a long way short of the demands from some MEPs for €100 billion, there was consolation that some of Parliament's proposals squeezed into the programme. The Fast-track to Innovation scheme, introduced to the Horizon 2020 package by Ehler is a case in point. The scheme, a response to “pleas from industry and research communities,” will establish a permanently open call for proposals. “This will suit small consortiums with innovative projects and uncomplicated budgets,” said Ehler. Proposals may relate to any technology field under the industrial leadership and social challenges streams of Horizon 2020.

Ehler believes this instrument may help break the policy inertia in Brussels. As an example of this, Ehler pointed out that although national heads of government decided that the EU should pursue the green car initiative in 2008, it took the Commission two years to set up calls. Under the Fast Track scheme, industry and academe need no longer wait for the Commission to open a call, but instead can suggest an idea.

The hope is that this bottom-up approach, combined with a reduced time-to-grant of six months, will increase industry participation in Horizon 2020.

## Time to grant

The Parliament also succeeded in getting the general time-to-grant cut to eight months. “Throughout the Seventh Framework Programme, the average time taken was a year,” said Ehler. “If we want to compete with China and elsewhere, we need to be faster. The worldwide benchmark for time-to-grant in similar programmes is much less than a year.”

The European Research Council and other programmes will be given the flexibility to exceed time limits where participants request more time for negotiations. Overall, the “Rules are much simpler and faster than under Framework Programme 7,” said Carvalho.

## Supporting SMEs

Ehler is also pleased that the Parliament's argument for more help for SMEs has translated through to the final agreement. Previous research programmes were not designed to suit SMEs. “Until now the EU has made artificial attempts to include SMEs in programmes through quotas,” Ehler said, but in reality the likelihood of SMEs getting any money has been low, with the cost and time involved in submitting an application eating into their resources.

Agreeing a dedicated SME instrument, “was one of the Parliament's biggest achievements in the negotiations”, said Ehler. The dedicated budget should ensure there a twenty per cent participation of SMEs in the programme, without having SME quotas in calls.

Innovation will also be supported through the inclusion of innovation vouchers for young scientists, noted Carvalho. “SMEs will be able to use these vouchers to work individually with one or more researchers,” she said.

## Reaching more regions

In addition, it is hoped that Horizon 2020 can also reach more regions than before. A separate budget line will include programmes such as twinning and teaming of research institutions. “All of my points are included in the package,” said Carvalho. This include grants for excellent researchers working outside of Europe who want to return, or those working within the EU who want to move to less-developed regions. But in terms of hard cash, Parliament's sole achievement is linking Horizon 2020 to the cohesion policy. A clear-cut definition linking Horizon 2020 with smart specialisation strategies and investments under the structural funds was endorsed. “Certain regional funds will be ear-marked for research and development but it will also be possible to [combine] money from both sources. That could have a leveraging effect on the Horizon 2020 budget,” Ehler said. ■



# Still room for improvement to ensure €70B Horizon 2020 delivers on innovation objectives

The architects of Horizon 2020 have worked long and hard to simplify things for researchers and SMEs. But bureaucratic barriers remain and there is still no proper system in place for tracking research outputs



Commissioner Máire Geoghegan-Quinn and DG Research director general Robert-Jan Smits

**I**mproved support for technology start-ups and better systems for handling research outputs are needed to maximise returns on Horizon 2020, according to a new study looking into how the €70 billion research programme is shaping up.

Research Commissioner Máire Geoghegan-Quinn has personally pledged to reduce the bureaucracy that is synonymous with EU research programmes on more than one occasion, promising simpler reimbursement rules, simpler overall objectives and simpler forms.

However, more is needed if Horizon 2020 is to deliver on one of the central objectives, which is to involve more SMEs in carrying out R&D and get them acting as conduits for translating research and pushing innovation through to the market, says a new report, “Europe’s ‘Horizon 2020’ science funding programme: How is it shaping up?”

“Getting rid of the burdensome tendering process would really help to foster a link between small businesses and science,” says one of the authors Michael Galsworthy, Senior Research Associate at University College London. “Small companies waste scarce time compiling bids which fail, and investigators are bound to strangers who present the lowest bid regardless of passion or competence,” Galsworthy said.

The Commission claims it is listening. “The article puts forward some very interesting ideas, some of which are already part of the discussions for Horizon 2020,” Michael Jennings, Geoghegan-Quinn’s spokesman told Science|Business.

## Proper use of public money

However, while the paper calls on the Commission to remove compulsory tendering for sub-contracting where

the sums fall below the procurement thresholds for public sector authorities, a Commission official has said this is not feasible given the responsibility the EU carries for the proper use of public money.

Galsworthy claims suitable safeguards are already in place. “All projects and budgets must be approved by the Commission. This is a check that the amount of money seems sensible for the job done,” he said. In addition, Horizon 2020 will require that projects bring together three partners from three different countries, meaning there is an international team to bear witness to the principal investigator’s ethical behavior. Everyone has something at stake in terms of the reputation and success of a project output, so it makes no sense to choose an under-performing partner, Galsworthy noted, adding, “If you really wanted to be corrupt, why wouldn’t you write your friend into the project from the beginning?”

## Information black holes

There is another major shortcoming with the Horizon 2020 programme as it stands, and that is around the requirements and systems for handling research outputs.

The US National Institutes of Health (NIH) allows anyone to freely search its database of research projects by geography, year or subject area, and to access resulting papers and patents. But there was no such tool available to Galsworthy and his fellow researcher Martin McKee, Professor of European Public Health at London School of Hygiene and Tropical Medicine, when the two were working on an EU-funded project, 'Health Research for Europe'.

When trying to compile a record of all health-related research funded by the EU's Fifth and Sixth Framework Programmes, they found the EU's Community Research and Development Information Service (CORDIS) to be of little use, claiming the experience was like looking into a black hole. In order to assemble the record they had to manually classify over 4,700 projects.

Aside from the issue of allowing open access to outputs of publicly-funded projects, mapping of research is important in ensuring funding

matches need, for example by cross-referencing with statistics on disease burden or patient demand. A detailed online hierarchical categorisation of EU investments would allow national funders to see collaboration opportunities or gaps.

As one stark example of how this might drive R&D funding policy, statistics show that the original 15 EU Member States have received 34 times more health research funding under FP7 than the 12 newest members. McKee and Galsworthy conclude that even allowing for gross domestic product and population differences, this represents dramatic underfunding.

## Access to publicly-funded research

The tools are on hand to provide comprehensive and reliable access to research funded by the EU, for example the Open Researcher and Contributor ID (ORCID) database, which reliably attributes research outputs to their author by assigning every scientist a unique digital identifier.

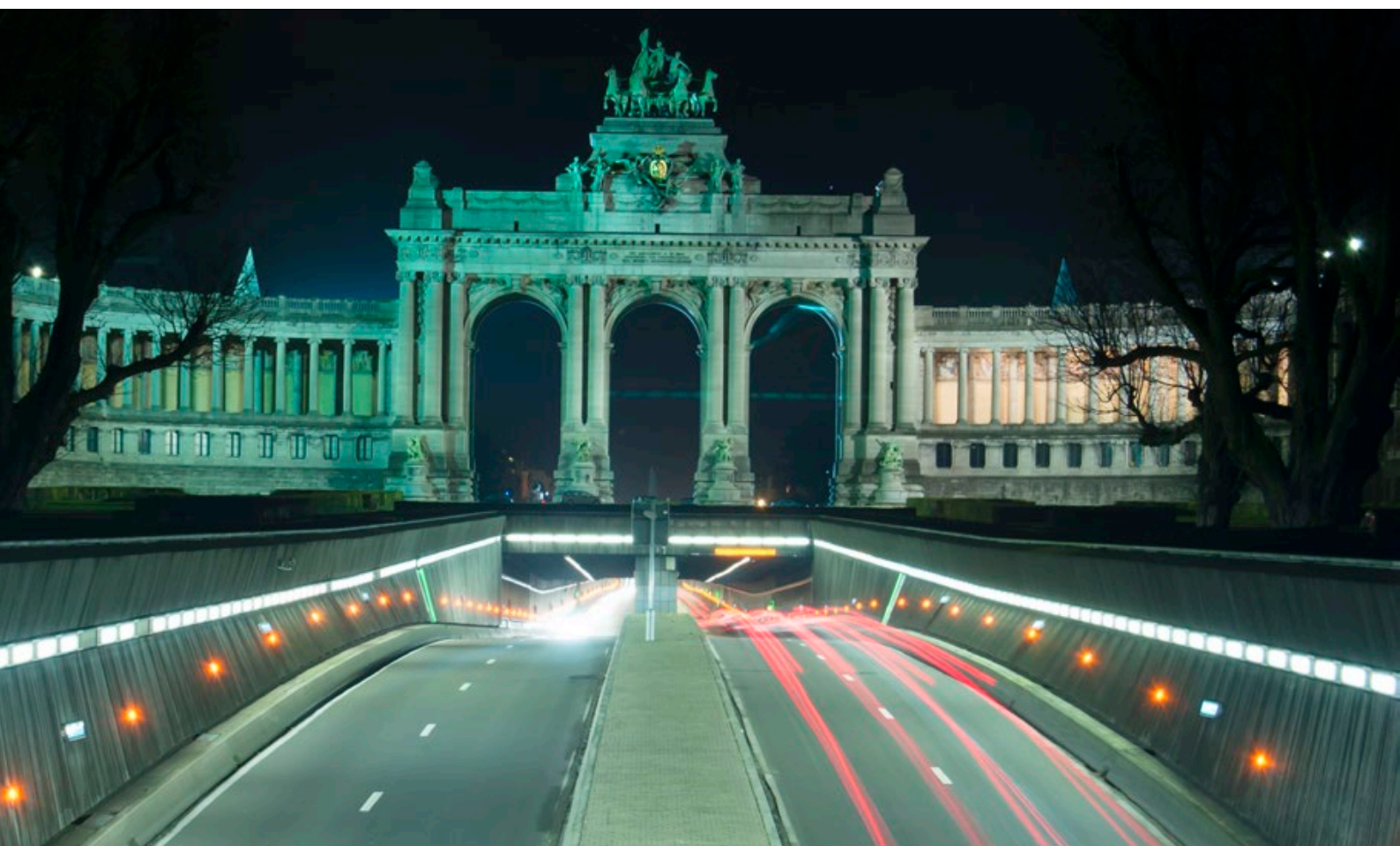
Galsworthy suggests the EU could require all project applicants to sign up to ORCID. "This would make the selection procedure much more

efficient," he said. "The ORCID number would allow the EU to judge the suitability of potential participants by giving them access to their previous work. Once the EU has decided to fund a project, they can then use the service to track the researchers' outputs."

Tracking could be further improved by assigning each project a code to be cited in papers. Entering a US grant code into PubMed, the free search engine of the US National Library of Medicine, allows all outputs from that project to be retrieved almost instantaneously. Galsworthy and McKee call for the EU to join other major funders in signing a contract with PubMed.

The Commission has stated that all articles produced with funding from Horizon 2020 will have to be accessible. Articles will either be made immediately accessible online by the publisher, so called Gold open access, or researchers will make their articles available no later than six months after publication in Green open access.

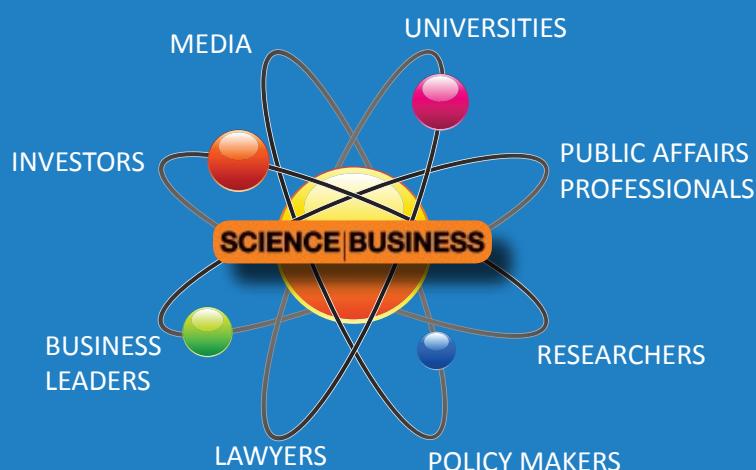
The promises on open data now need to be translated Galsworthy said. "Lots of research funding bodies are talking about data sharing but bold declarations are nothing without real action." ■



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