



# INNOVATION

## How Europe can take off

Edited by Simon Tilford and Philip Whyte





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**Esko Aho, Jim Attridge, Amar Bhidé,  
Albert Bravo Biosca, Nicholas Crafts,  
Máire Geoghegan-Quinn, Malcolm  
Harbour, John Kay, Helga Nowotny,  
Andreas Schleicher, Michael Schrage  
and David Willetts**

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## Foreword



Lundbeck is delighted to support the CER's latest publication. Innovation is the lifeblood of the pharmaceutical industry. Its business model requires it to bring a new medicine to market every 10-12 years.

As such the pharmaceutical sector represents an excellent model to illustrate the challenges facing the European economy. From being, in the former Vice President Verheugen's words, "the pharmacy of the world" in the 1980's, Europe is now witnessing a relative decline in investment, productivity and sales.

The pharmaceutical sector is facing increasing challenges in bringing a new medicine to market. Even when these are met, we can no longer be certain of market access. This is impacting companies' behaviour. For example, we are seeing companies exit the important area of depression. This is perhaps surprising given the high level of unmet medical need. A recent Health Council Conclusion noted that mental disorders account for the greatest share of disability-adjusted life years in the EU. The World Health Organisation estimates that mental disorders affect one in four citizens during their life time and can be found in ten per cent of the EU population during any given year.

What message should policy-makers send to companies that are committed to continuing to search for new treatments in depression? As the authors of this report note, governments need to champion and reward new research, especially incremental developments, and cease rewarding old technologies.

From a health perspective we need to change the way we regard illness. Rather than treating it with silo budgets, we need to look at illness holistically, treat medicine expenditure as an investment, and acknowledge that medicine can prevent expensive costs of hospitalisation, aide recovery and enable the patient to return to work rapidly and contribute to society.

The report marks an important contribution to the debate. It provides some valuable insights and recommendations for policy makers and others to consider. Lundbeck welcomes the publication and looks forward to the debate that will follow.

**Ulf Wiinberg, CEO, Lundbeck**

# 1 Introduction: Why does innovation matter? *by Philip Whyte*

Innovation policy is currently very much in vogue. The European Union (EU) has made it one of the seven ‘flagship initiatives’ of its ‘2020 strategy’. And the Obama administration has placed it at the centre of its own strategy for economic recovery. Whatever innovation means, there appears to be widespread agreement on either side of the Atlantic that more of it is essential – not only to raise productivity, but also to ‘compete with China’ and meet all sorts of other challenges, from climate change to energy security and population ageing. Indeed, claims to the effect that innovation is crucial if countries and companies are to prosper in an increasingly competitive world economy have become something of a commonplace – repeated with monotonous regularity by policy-makers, commentators and businessmen in speeches, interviews and opinion columns.

Yet it is not always clear what innovation actually means, or how it relates to prosperity. Some innovations, such as Facebook, may transform the way people interact, but do little to increase productivity. Others may have the potential to increase productivity, but require other things to happen before they do so. (This is the nub of ‘Solow’s paradox’ – the observation by the US Nobel laureate, Robert Solow, that the information technology revolution in the early 1990s was everywhere to be seen except in the productivity numbers.) Other innovations still may be positively harmful to prosperity. Those who extol the virtues of innovation often forget that one of the most consistently creative sectors of the economy is the financial sector – the relentless ingenuity of which

recently contributed to the most spectacular destruction of wealth in human history.

In short, what innovation is, how it influences productivity, and what policy should do to encourage it are less straightforward issues than is often assumed. The aim of this report is to explore these questions by bringing together the thoughts of leading experts in the field. It should come as no surprise that they often reach different conclusions on what innovation means and how it should be promoted. Nevertheless, most of the authors appear to agree on two things. The first is that there is much more to innovation than what goes on in research and development (R&D) laboratories. The second is that innovation is a multi-dimensional and increasingly ‘democratic’ process involving entrepreneurs and scientists, consumers and producers. Innovation is as much about finding new ways of using or delivering existing goods and services as about producing new ones.

Perhaps the most striking difference among contributors to the volume is that between academics (or think-tankers) on the one hand, and policy-makers on the other. The former point out that Schumpeter’s famous description of innovation as a process of ‘creative destruction’ has two components that are inextricably intertwined. One cannot embrace creation (that is, the emergence of innovative young firms) without accepting destruction (letting uncompetitive incumbents go to the wall). Yet policy-makers, particularly in Europe, want to have their cake and eat it: they want innovation, but without the accompanying economic dislocation and social disruption. This largely explains the difference in policies prescribed. Whereas academics tend to emphasise the need for lowering barriers to entry, politicians are more inclined to advocate policies that are supported by incumbents.

## What is innovation?

For many people, the word ‘innovation’ is likely to conjure the image of a scientist in a white coat conducting cutting edge research

in a laboratory, or of a pioneer applying the latest technology to developing new goods and services. For **John Kay**, an academic and columnist, both are misleading images of what innovation entails. It should not be conflated with R&D (because numerous innovative firms, like budget airlines, have no R&D budget to speak of). Nor should innovation be confused with novelty. The distinction between innovation and novelty is captured by the difference between Apple (an innovative firm that is adept at finding new and commercially successful ways of using existing technology) and Sir Clive Sinclair (an endearing eccentric who invented things that no-one wanted). The essence of innovation, Kay concludes, is finding new ways of meeting customer needs.

The President of the European Research Council, **Helga Nowotny**, accepts that innovation is a complex, multi-layered process which involves much besides the output of research laboratories. Even so, she argues that basic (or ‘frontier’) research remains vital. Even if advances in science do not always increase general prosperity, they are often significant drivers of it. It was basic research, she points out, which drove the information technology revolution. Besides, in many areas of research, the boundaries between basic and applied science are blurring. Scientific curiosity continues to drive basic research, but researchers increasingly work in inter-disciplinary environments in which the search for commercial applications is actively pursued (hence the term ‘frontier research’). Most European countries, she argues, need to become better at commercialising ideas.

Nowotny broadly agrees with Kay’s definition of innovation as finding new ways of meeting (and creating) consumer needs. The way she sees it, however, innovation is heavily influenced by scientists and researchers, whereas for Kay it is driven mainly by entrepreneurs. **Albert Bravo Biosca** of the National Endowment for Science, Technology and the Arts (NESTA), strongly agrees that innovation is about more than research and that entrepreneurs have a central role to play. But he points out that it involves more than launching new products and services. If one of its purposes is

to raise productivity, then innovation should be more broadly understood to include the new ways that businesses come up with to make the best use of technology. Placing a computer on every desk will not necessarily raise productivity if businesses do not change working practices.

### How should innovation be promoted?

**Nicholas Crafts** of Warwick University strongly agrees with Biosca on what policy-makers should do to support innovation and productivity: they should embrace creative destruction by encouraging the growth of innovative young firms and, where necessary, accepting the demise of stodgier incumbents. As Biosca notes, a lower ‘churn’ of firms suggests there is less creative destruction in Europe than in the US. Crafts suggests that the two most important things EU policy-makers can do to narrow the transatlantic productivity gap would be to ease employment law (making it easier for companies to reorganise themselves to make better use of information technology) and to enforce competition policy. Crafts suggests these are preferable policies to increasing spending on R&D, pursuing sector-specific industrial policies, or expanding numbers in higher education.

**Andreas Schleicher** of the OECD takes a slightly different view. For him, skills form the cornerstone of innovative societies. They spur innovation by generating new ideas, and by facilitating the adoption of existing technologies. Since innovation is not confined to R&D labs, a modern economy requires an ever broader participation in the innovation process – encompassing producers and workers, but also consumer and public-sector bodies. The bad news for Europe is that skills are unequally distributed, and that too many people do not even have the most basic competences to participate in an innovation-driven economy. Moreover, producing the right mix of skills is getting harder, because labour markets are becoming more complex and dynamic: workers have to upgrade their skills more regularly than in the past to adapt to changing work patterns.

The claim that innovation is becoming more multi-faceted and consequently less elitist (or more democratic) is also advanced by **Amar Bhidé** of Tufts University. Failing to recognise this trend, he goes on to argue, can often result in pointless or wasteful initiatives. For example, encouraging more people to become scientists and engineers will not increase a country’s prosperity if the result is a dearth of managers who understand how working practices within their organisations should be changed to make the best use of new technologies. The same goes for policies designed to improve funding conditions for young firms. Too much attention is arguably devoted to developing the venture capital (VC) industry. VC has its place. However, since most firms will never actually need VC funding, democratic innovation requires a diversified financial system to fund it.

**Jim Attridge** of Imperial College London argues that it would be wrong to ignore the importance of R&D and highlights how disadvantageous Europe’s business environment is becoming to innovation in the pharmaceutical sector. Firms in the pharmaceutical sector face three costly phases: a research phase, when they compete to patent discoveries; an even costlier development stage, when drugs are subject to clinical trials; and a diffusion phase, where firms must persuade clinicians and health bodies to adopt their new treatments. But across Europe, the economics no longer stack up. Faced with governments that enforce low prices and restrict patient access to innovative treatments, R&D in the sector is becoming increasingly unprofitable. If this situation is not reversed, pharmaceuticals companies will continue to withdraw from R&D activity in Europe.

### Promoting innovation in Europe

What sort of echo do the views expressed in the academic world find in policy-making circles? The European Commissioner for Research, Innovation and Science, **Máire Geoghegan-Quinn**, argues that promoting innovation is more necessary and more difficult in

an age of fiscal austerity – more necessary because increased productivity is key to ensuring debt sustainability, and more difficult because fiscal consolidation is often sought by cutting public investment in education, infrastructure and R&D. The Commissioner makes the case for a “strategic and integrated” approach to innovation, in which national governments, the European Commission and the private sector work closely together. Key elements would include the completion of the European Research Area, the adoption of a common EU patent, and the development of an EU-wide regime for VC.

**Malcolm Harbour**, a member of the European Parliament for the British Conservative Party, agrees with much of the European Commission’s thinking. The best thing the EU can do to promote innovation, he suggests, is to deepen the single market. National jealousies and protectionist habits must be set aside so that the best brains move to the best projects. The Services Directive must be properly implemented. The Commission should adopt an ‘innovation test’ to ensure that EU policies do not deter R&D. Standards should be harmonised so that common EU standards become global ones. Governments should ensure that public procurement acts as a catalyst for the growth of innovative firms by providing ‘lead markets’ for new technologies. And more should be done to increase spending on R&D, notably by improving the infrastructure for its funding.

A national perspective on what governments can (or should) do to promote innovation is provided by **David Willetts**, Britain’s minister for universities and science. Willetts agrees with the proposition that most European economies are experiencing diminishing returns from labour inputs and investment in capital and must therefore increasingly rely on innovation for future economic growth. Interestingly, given his party’s longstanding commitment to a smaller state, he recognises that governments can actively support innovation – notably as a big purchaser of goods and services. For example, the government wants to make sure that more public

sector contracts are awarded to small and medium-sized enterprises under the UK’s Small Business Research Initiative (SBRI), and that similar steps be taken at EU level before the next Framework Programme for R&D (FP8) comes into force.

For **Esko Aho**, a former prime minister of Finland and a current member of the executive board at Nokia, one of the most important things that the EU can do to promote innovation is to extend the single market. The EU’s four traditional freedoms of movement (for goods, services, people and capital) now need to be complemented by a fifth – for digital services and content. The absence of such a market, Aho argues, is a serious lacuna which hampers both innovation and productivity – not just in the information technology sector, but also across the economy more generally. Removing the barriers that hamper the emergence of a single European digital market would consequently bring numerous benefits. Not only would it help to spawn new solutions to the various challenges (social, demographic and environmental) that the region faces, but it would also support economic growth.

### **Do Europeans want to be more innovative?**

The penultimate article, by **Michael Schrage** of the Massachusetts Institute of Technology, throws cold water on European policy-makers by asking whether they are serious when they proclaim their ambition to make their countries more innovative. Innovation, he points out, is a disruptive process with risks and costs attached. It makes no sense to celebrate the upside of innovation while trying to resist the downside. Yet this is exactly what politicians across Europe do. They say they want to encourage the growth of innovative companies. Yet they spend their lives resisting the demise of staid incumbents because they fear the social and political costs of painful adjustments in labour markets. The debate Europe must have, it follows, is not about the role of entrepreneurs or new technologies. It is about Europe’s ability to tolerate – and manage – the disruptions which innovation inevitably provokes.

The concluding article, by **Simon Tilford** of the Centre for European Reform, shares some of these concerns. Policy-makers, he argues, think of innovation too narrowly. And their fear of economic dislocation often encourages them to advocate policies that have only a limited impact on productivity. Governments that want to promote innovation, he argues, should focus mainly on two areas. The first is delivering an education system that equips people with the ability to generate ideas, commercialise them and absorb them into working practices. The second is to promote competition and markets, so that young, innovative firms can emerge to challenge incumbents. Tilford wonders, however, whether the political climate in Europe is conducive to such policies. Since the financial crisis, traditional European suspicions of competition and markets have become more entrenched.

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## 2 What is innovation? *by John Kay*

Apple is the most innovative consumer products company of the last decade. It has redefined how people listen to music, blindsiding both music publishers and established electronics manufacturers. And it has reinvented the telephone. Yet Apple's achievement is not the result of its technology. The gizmos in the gadgets are much the same as the gizmos in the gadgets of other companies. Apple's success lies in deploying existing technology in ways that meet consumers' needs and in attracting buyers through coolly designed devices that do not require you to be a computer geek to use them.

Understanding the needs of customers is what distinguishes innovation from novelty. Quirky inventors have a place in the affections of everyone who enjoyed physics or chemistry at school. But the quartz watches and home computers that Sir Clive Sinclair championed in the UK were quickly overtaken by better products from other businesses, and his C5 electric vehicle was not wanted by anyone.

Pioneers of innovation are routinely pushed aside by competitors whose skills are in the marketplace rather than the laboratory. The invention of the body scanner won a deserved Nobel Prize for EMI's Geoffrey Houndsfield, but almost destroyed the company. The market for scanners is now shared by Siemens and GE.

My favourite innovative company is Easyjet. There is nothing technologically advanced about what it does. Indeed, there is nothing that it does that some other airline is not doing. Yet Easyjet catalysed fundamental change in the sleepy European airline industry. Innovation is about finding new ways of meeting

consumers' needs, often including needs they did not know they had. Sometimes such ideas come from a laboratory scientist but, more often, the innovation that changes the business landscape comes from the imagination of a Henry Ford or Walt Disney, Steve Jobs or Stelios Haji-Ioannou.

For years research and development scorecards have dutifully recorded how much pharmaceuticals companies spend on the search for new drugs and the expenditure of governments on defence electronics. But most of the spending that promotes innovation does not take place in science departments. The financial services industry may have been Britain's most innovative industry in the past two decades – perhaps too innovative, for many tastes – but practically none of the expenditure behind that innovation comes under “R&D” rubric. And the same is true of innovation in retailing, media and a host of other innovative industries. Most innovation is the product of entrepreneurs, not people in white coats.

So what should government do to promote innovation? Understand that support for innovation is not the same as support for R&D, still less the activities that established firms in industry regard as innovative. We despise geeks – but we are also intimidated by them, and they retain a powerful influence on our thinking. Outside many university cities around the world there are biotechnology estates established by governments that believe high technology is the key to a competitive future. The funds that governments provide to support innovation are all too often appropriated by large companies that are better at forming committees to pontificate about what the global village will want in the future than they are at assessing what their customers want today.

If you were in a government department pondering the future of the computer industry in the 1970s, you would naturally have turned to IBM for thoughtful experts and presentations. You would not have consulted Bill Gates or Steve Jobs, who were barely out of school, or

Michael Dell, who was barely in it. But IBM did not know the future of the industry. If it had known, it would – sensibly – have tried to prevent it. The interests of the industry and of consumers were not only different from those of the dominant business: they were diametrically opposed.

If a decade later you had wondered what government could do to promote Britain's civil aviation industry, you would have asked British Airways – and perhaps its main rival, British Caledonian. The government tried to promote competition through liberal policies that particularly favoured Caledonian. All irrelevant, of course – Caledonian would disappear and the people who controlled the future were Michael O'Leary and Stelios Haji-Ioannou. But as business minister, you would have had no reason to give them the time of day. Companies such as Easyjet see opportunities that others have missed. Most of these opportunities do not actually exist and the innovations fail. But only a few such entrepreneurs have to be right to change the face of business.

Confusion between the interests of an industry and the interests of existing companies pervades last year's Digital Britain policy document and the legislation that followed. An admirable desire to promote Britain's creative industries is translated into a wish list for corporate lobbyists, hired by large companies and trade associations. Who else could they be hired by? There are few certainties about how these creative industries will evolve. But one such is that if an industry is to advance, much – perhaps all – innovation will come from businesses that do not yet exist. Their founders may not even have imagined the activities that will one day make them celebrities.

The primary role of government in promoting innovation is the promotion of markets. The objective of promoting innovation should not be to reward grantees with knighthoods, favours and positions on committees: it should be to encourage a new generation of people such as Gates, Dell and Jobs, Haji-Ioannou and O'Leary.

Promoting innovation means making it easy for new entrants to develop new products and business processes, not subsidising existing research and development.

*John Kay is a visiting professor at the London School of Economics and a columnist for the Financial Times.*

### 3 Innovation and frontier research *by Helga Nowotny*

There has always been an inherent tension between the demands of policy-makers for practical innovation, seen as the undisputed motor of productivity and hence economic growth, and the deeply-rooted interests of scientists in curiosity-driven research. Some of my academic colleagues fear that, by stressing ‘innovation’, politicians focus on incremental technological advancement only. As a result, the pivotal role of basic research remains largely unacknowledged. Politicians, on the other hand, feel that researchers are often uninterested in confronting today’s pressing problems, preferring to remain ensconced in their labs.

The US has been more successful than Europe at resolving this tension between the research community and policy-makers. European scientists seem to want to wish away the tension, while the policy-makers, maybe even more naïvely, believe that commercially-applicable knowledge can be commissioned top-down. Innovation is a collective bet on our future. We have to get this right. With its rapidly ageing population Europe has to compensate for its falling birth rate by becoming more innovative.

The contradictory perspectives of scientists and policy-makers are shaped by their differing time horizons. For politicians, the battle to ‘win the future’ means that results must be obtained immediately. For their part, scientists know from long experience that it is impossible to predict research outcomes, and that even when the outcomes are known, it may still take years to fully realise their benefits.

What is innovation? We can broadly define innovation as the successful economic application of an idea. It results from enhancing

the way something is produced or from introducing new products. It can also involve new ways of organisation and modes of financing. As a result, it is difficult to identify the processes through which innovation actually happens. Moreover, innovation does not always have to be a technology. In the 'real' world, social innovations may be just as important. The more technological innovation we want, the more social innovation we need.

Nobody doubts its importance for economic growth and societal development, but the results of innovation cannot be foreseen and success remains unpredictable. Innovation describes a very complex, non-linear process on various levels. It is therefore misleading to think of innovation merely as a chain starting with an idea and ending in its profitable application. Such a 'linear model' of knowledge production fails to capture the nature of research or how firms operate. Sometimes, the successful commercial development of a new technology triggers basic research by opening up new ways of tackling a problem. Sometimes research conducted in a lab turns out to be tremendously productive and useful for other purposes outside the lab.

Innovation should therefore be understood as a multi-layered process. First, there is the interaction of individuals, firms, organisations and governments. Second, invention and innovation are both continuous and discontinuous processes. Many important innovations are continuous in the sense that subsequent improvements in a product may be vastly more important than the initial idea. This is what 'incremental innovation' is all about. But there is also a discontinuous, deeply disruptive form of innovation. Had we continued to improve candles we would never have developed electricity. And had we continued to improve the production of electricity, we would never have come up with the laser. Such 'radical innovation' has enormous repercussions for the structure of our economies and their growth potential. Radical innovation is almost entirely due to new scientific insights, discoveries and technologies made in basic research.

The process of innovation depends on many variables: the specific field of scientific knowledge and technological know-how; national and EU-level institutional contexts; regulatory frameworks that seek to ban state-aid while encouraging governments to use public procurement to stimulate demand for new technologies; intellectual property rights which may help as well as hinder the burst of activities in novel areas; and, crucially, geographic location. Innovation ecosystems tend to emerge in certain places and not in others. Excellence (and the opportunities it provides) attracts excellence. Finally, there is the elusive, yet vital Schumpeterian human element of leadership. If we were to make progress in understanding and coping with all these elements, we could make a giant step forward in what I call the institutionalisation of innovation.

What does this mean for basic research? Firstly, we cannot draw a concrete link between specific scientific insights and increases in productivity. But there is no doubt that investment in basic research contributes significantly to the processes that lead to innovation and productivity. For example, it was basic research that underpinned the breakthroughs in ICT, biotechnology and nanotechnology that have driven such pervasive economic and societal changes over the last 30 years. Basic or investigator-driven research generates the scientific insights that lead to the development of new technologies and markets.

Secondly, the European Research Council, an EU funding body set up to support investigator-driven frontier research, was wise to change the term basic or fundamental research to frontier research. This was not only semantic. It indicates a change in the way research is conducted and its very nature. In many areas of frontier research, the boundaries between basic and applied science have become blurred. While frontier research continues to be driven by scientific curiosity, researchers are often working in an interdisciplinary context and increasingly with potential applications in mind.

Thirdly, past experience shows that governments are poor at picking winners. The once so popular discourse on National Innovation Systems based on the idea of nationally centralised innovation is rapidly giving way to a debate about ‘open innovation’. Again, with a more distributed, diverse and hybrid innovation ecosystem emerging, public and private actors will continue to mix; and markets and research will move closer to each other. Moreover, the ideas of collective property rights and open access have begun to challenge the more orthodox views of intellectual property rights.

Crucial questions remain. How do we manage the inherent tension between the political impatience for practical results and the insistence of scientists that in frontier research the outcome is impossible to predict? How do we foster innovation across a wide spectrum of possibilities and cope with the inherent uncertainty and risks that scientists face when working at the frontier between what is known and yet unknown? And how do we contribute to the establishment of the European Research Area?

Rather than trying to suppress the inherent tension between the interests of policy-makers and scientists, we need to acknowledge it openly. If we want to foster innovation, we need to boost frontier research. That does not mean pouring money indiscriminately into basic research. Although frontier research is inherently uncertain, that does not mean everything can be left to chance. It is vital that scientific excellence is the sole criteria for the funding of frontier research. This will inevitably mean that funds continue to be concentrated in leading institutions. This is as it should be, but excellence does not equal exclusivity. We should do everything to nourish existing innovation ecosystems, and enable new ones to emerge.

The process of innovation is a complex and unpredictable one: we cannot pick winners. However, we do know that basic or frontier research is an indispensable element of this process. Perfecting existing technologies is important, but it will not lead to step-

changes in productivity. Such paradigm shifts are driven by curiosity-driven scientific enquiry. However, Europe also needs to get much better at commercialising or diffusing new insights. Closer links between scientists on the one hand and policy-makers and businesses on the other would help. But we also need to make sure that the national and EU-level institutional contexts are conducive to innovation. Policy-makers need to strike the right balance between the rights of developers of intellectual property and the need to disperse new technologies. Firms must face strong market incentives to commercialise technologies and/or to reorganise in order to make the best use of them. This is Europe’s sputnik moment. Europe cannot afford to fail to develop more favourable innovation ecosystems if it is to meet its mounting economic and social challenges.

*Helga Nowotny is director of the European Research Council.*

## 4 New evidence on 'creative destruction' in Europe and the US *by Albert Bravo Biosca*

Europe faces major challenges recovering from the recession. The immediate ones are to avert a full blown sovereign debt crisis, consolidate the nascent recovery and create jobs. But in the longer term more fundamental changes are needed. The European economy has structural weaknesses that preceded the financial crisis. So a return to 'business as usual' is not an option. Improved productivity is essential if European economies are to thrive in the next decade: European businesses are less productive on average than their US counterparts, and the gap had been widening for over a decade before the recession took hold.

Closing this gap requires a more innovative and dynamic economy. For much of the second half of the twentieth century, European countries could grow by accumulating capital and imitating others' inventions. Now we need to foster innovation to drive productivity growth. This is also the most appropriate response to increasing competition from emerging markets. And it is the only sustainable route if firms and countries are to move up the value chain.

Innovation needs experimentation in the real world, going beyond the R&D lab. Innovation is about putting new ideas into practice. Trying a new business model, exploiting a new technology or launching a new product often requires a firm to expand its current capabilities (for example, by setting up a new plant or hiring a new marketing team). However, since innovation is uncertain and market selection harsh, too many companies prefer an ostensibly safer 'wait

and see' approach to riskier experimentation, particularly if failure is too costly. In the long term, such conservatism could be far riskier.

While experimentation is necessary, it is not enough. Companies must build on their innovations. This means growing and replacing less successful firms, and forcing competitors either to improve their performance or to shrink and exit the market altogether. This creative destruction is what ultimately drives productivity growth.

Are European economies up to the challenge? The evidence is not encouraging. Both Europe and the US have highly successful companies, but the European ones are generally much older. A study by Bruegel, a Brussels-based think-tank, shows that only 2 per cent of the European companies in the world's largest 500 firms by market capitalisation were founded after 1975, compared with 14 per cent in the US.

This is not just about differences in rates of entrepreneurship. Researchers at the OECD and the World Bank have shown that the main differences between the US and Europe lie in the rate at which new firms grow rather than the number of new firms. US start-ups grow much faster in their early years than their European counterparts.

To shed further light on the dynamism of Europe's business landscape, the Danish Ministry of Economic and Business Affairs and Britain's National Endowment for Science, Technology and the Arts (NESTA), with support from the International Consortium for Entrepreneurship, collaborated with researchers and statistical agencies in 11 countries across three continents to collect new and comparable data on business growth. The resulting database, which draws on individual records for six million businesses, provides useful lessons for policy-makers.

The dearth of European equivalents to Google or Microsoft – innovative start-ups that grow quickly to dominate their markets –

has long vexed European policy-makers. But the new database shows that this is only part of a wider picture:

- ★ European countries have a lower share of high-growth firms than the US. But they also have fewer medium-growth firms and fewer shrinking firms. At the same time, Europe has a much larger share of 'static' firms, that is, firms that neither expand nor contract over time.
- ★ The fastest growing half of firms grow faster in the US than in the average European country, while the bottom half shrink faster. Thus, the gap between successful and unsuccessful firms is larger in the US than in Europe.
- ★ There is a strong negative correlation between the growth rate of firms at the top and the bottom of the growth distribution. In other words, the faster successful companies grow, the faster unsuccessful companies in the same industry shrink.
- ★ The average high-growth firm multiplies its workforce by 2.5 over three years. Therefore, despite their small share (3-6 per cent of firms), high-growth firms account for a disproportionate share of job creation (between a third and half of all jobs created by surviving firms with ten or more employees).
- ★ A less dynamic business growth distribution, with a larger share of 'static' firms as in Europe, is associated with lower productivity growth. Importantly, both a higher share of growing and shrinking firms are correlated with higher productivity growth, which is consistent with a faster reallocation of resources (both labour and capital) towards successful innovators.

Europe's less dynamic businesses – both in terms of growth and contraction – should be a concern. We are not good enough at creating an environment where firms experiment with new projects,

scaling them up when successful while being able to backtrack and shrink when unsuccessful. As a result, innovation in Europe suffers.

This has implications for European policy-makers. The debate on high-growth firms often considers them in isolation. But policies targeted solely at high-growth businesses, such as improving the climate for venture capital, are not enough to address the lack of dynamism that hampers Europe's productivity. They need to be combined with deeper structural reforms that remove not just barriers to entry, but also barriers to growth and contraction, such as improving product and labour market regulation and tackling access to finance. Some European countries are more advanced than others in this respect, so governments have much to learn from their experiences.

Finally, Europe needs an ambitious push to reduce its market fragmentation. While the single market has made it easier to sell goods across borders, the liberalisation of the market for services has been too slow. And even with planned reforms, differences in regulation between member states will still make it difficult for companies, particularly SMEs, to operate across borders.

The European Union represents a potential market of half a billion customers, the third largest after China and India, and has a combined GDP larger than that of any country in the world. But a firm wishing to set up establishments across the 27 EU member-states would still be subject to 27 different legal regimes, with different registration requirements, labour regulations, intellectual property systems, tax rules, commercial law, judicial traditions and bankruptcy proceedings, among others. While dealing with 27 different jurisdictions may be merely an annoyance for large multinationals (to the benefit of their armies of advisers), it can be an insurmountable challenge for innovative smaller firms willing to grow (in fact, some ambitious entrepreneurs simply choose to relocate to the US altogether to avoid the hassle).

Current attempts to create an EU-wide corporate tax system (the common consolidated corporate tax base), a single European patent (the EU patent) and a single legal form for SMEs (the European Private Company – 'SPE') suggest a potentially valuable third way. A new '28<sup>th</sup> regime', sitting alongside the 27 national regimes without replacing them, could give firms the option to operate under the same set of simplified rules and procedures across the EU, while still preserving the rights of member-states over specific issues such as tax rates. Other benefits would follow. For instance, it would make it easier for firms from different countries to work together, create a less fragmented market for business services providers, and facilitate the development of Europe-wide financial intermediaries.

Achieving a more innovative Europe requires action in multiple areas. Removing barriers to make it easier for innovative businesses with high-growth potential to experiment and expand across Europe is crucial. European policy-makers must make it happen. After all, the sooner we start addressing our long-term growth challenge, the easier it will be to navigate today's uncertainties.

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## 5 Improving productivity performance is not rocket science *by Nicholas Crafts*

From the mid-1990s to the eve of the global financial crisis, European productivity performance was disappointing. The rate of labour productivity growth in the EU-15 averaged 1.5 per cent per year, compared with 2.1 per cent in the US. Around this European average, there were, of course, large national variations, with labour productivity growing by 3.5 per cent a year in Ireland, but by just 0.4 per cent in Italy. The fact remains, however, that in ten European countries labour productivity grew by less than 2 per cent a year. For the first time since World War II, much of Europe has been falling further behind the US, rather than catching up.

European politicians often respond to these figures by stressing the importance of promoting a dynamic, knowledge-driven economy. The task, they argue, is to achieve faster economic growth by prioritising a stronger research and development effort and expanding higher education. Accordingly, they are often tempted to launch initiatives to encourage the rebalancing of economies towards high value-added, new-technology growth sectors through selective industrial policies. These approaches to the productivity agenda are seen as modern and proactive and often get a good press.

It is certainly reasonable for governments to support research activities, including those in universities. There are divergences between private and social returns, so there is a traditional market-failure justification for such policies. More generally, government has an important role in underpinning productivity performance

through ‘horizontal’ industrial policies. Policies which raise the rate of return to private investment and innovation – notably by raising the quality of state education or improving the provision of transport infrastructure – can have a favourable impact on the long-run rate of productivity growth.

However, there is usually no good case for ‘selective’ industrial policies which subsidise favoured businesses or sectors. Economic theory tells us that such policies will generally be skewed not only to advancing producer interests at the expense of consumers, but also to supporting declining industries which have the most to gain from lobbying. Economic history from the 1930s through to the 1970s and beyond bears out these predictions and shows that such policies were a dismal failure in terms of improving growth performance.

It is also important to put the role of domestic R&D in true perspective. Recent research has confirmed that investment in ‘intangible capital’ has a significant impact on productivity growth. However, intangible capital includes much more than just conventional R&D. Typically, about two-thirds of intangible capital is made up of other components such as computerised information, design, and economic competencies – items which are generally not good candidates for subsidy on market-failure grounds. Recent research suggests that investment in ‘innovative property’ (a broader concept than traditional R&D) accounted for only about 10 per cent of the productivity growth difference between Europe and the US after the mid-1990s.

The two most important things that EU countries can do to raise productivity is to encourage the rapid diffusion of new technologies, and to facilitate creative destruction. For the typical European country, at least 90 per cent of the R&D that contributes to its productivity growth is conducted abroad. It is therefore the effective transfer and assimilation of this knowledge that is required. Information and communications technology (ICT) is an excellent example: for most countries, the big issue has not been whether to

produce ICT equipment, but how to make best use of it. And this consideration has been influenced more by regulations than by shortfalls in human capital or domestic R&D spending. Employment protection legislation, for example, can make it hard and expensive for businesses to reorganise themselves to make best use of the ICT they have invested in. Similarly, restrictions on retailing create barriers to entry and slow down the exit of less efficient firms.

Consider the case of distribution. It is a large sector across Europe, typically employing as many people as manufacturing. And it happens to account for a sizeable share of the widening transatlantic productivity gap after the mid-1990s (when labour productivity growth in this sector fell from 1.7 per cent to 1.3 per cent per year in the EU, but rose from 2 per cent to 6.5 per cent in the US). The US’s strong productivity performance was based on the entry and exit of retail establishments – in other words, creative destruction. Retailing has become a big user of new technology, especially ICT. But since it carries out very little R&D, it would never be the focus of a so-called ‘growth strategy’. In short, the example of the distribution sector underlines the importance of competition policy (rather than industrial policy) and of technology diffusion (rather than R&D) for innovation and productivity growth.

There is compelling evidence that competition promotes productivity growth. Yet competition is generally weaker in the EU than in the US. Competition works through its positive impact on management quality, by creating pressure to invest and innovate or lose market share, and by ensuring that productive resources are reallocated to better uses. It is therefore disappointing to note that regulations which inhibit competition and the rapid take-up of new technologies are still prevalent in many European economies. Moreover, the impact of the single market programme on productivity has been impaired because its implementation by many member-states has been half-hearted. The symptoms of inadequate competition are relatively high price-cost mark-ups, as well as lower market shares

of high-productivity firms in the EU compared with the US. Rather than reverting to industrial policy, strengthening competition policy is much the better way to go.

The message must be that an effective policy to promote innovation is not just, or even mainly, about stimulating R&D and giving subsidies to hi-tech sectors. It is mainly about the decidedly unglamorous, even thankless, task of putting in place a framework that encourages the efficient diffusion of new technology and ensures the exit of the inefficient and outmoded. Both literally and figuratively, it is not about rocket science. The economics is quite straightforward; the problem is the politics. Implementing an appropriate policy will provide fewer photo opportunities for politicians, and may in any case lose rather than win votes.

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## 6 Skills, education and innovation by *Andreas Schleicher*

Skills have never been as central to the prosperity of nations and individuals as they are today. Skills spur innovation by generating new knowledge, and facilitating the adoption and adaptation of existing technologies and ideas. In so doing, they contribute to productivity (and hence economic growth). They also play a key role in countering earnings inequality.

Because innovation is not confined to corporate R&D laboratories, a modern economy requires broad participation in the innovation process – among users, suppliers, workers and consumers, and in the public, private and non-profit sectors alike. It is worrying, therefore, that skills are highly unevenly distributed across Europe, and that substantial numbers of people still do not even reach the minimum levels of basic skills. While some countries have managed to improve their skills base in recent years, others have stagnated or even declined – this at a time when the economic and social costs associated with low skills have been rising.

Matching the supply of relevant skills to the demand for them is never straightforward. Skills mismatches can occur when a worker would be more productive in another job, or when there is a general surplus or shortage of specific skills. And they can result from any number of factors. Employers may be ineffective at signalling their needs; education and training systems may be unresponsive to changes in demand for certain skills; and skills can atrophy or be lost altogether – either because they are not developed or sustained through education and training, or because they are not used (commonly as a result of unemployment).

What does all this mean for policy? The foundation for building a skills pool remains the acquisition of what can be called ‘cognitive foundation skills’ – in plain language, basic literacy and numeracy. Both are key tools for continued learning, and for developing more advanced and specific types of human capital. If countries are to avoid wasting talent from the outset, they must ensure access to education for all – not just to reach the right level of basic education, but also to make it possible to upgrade and extend skills during the course of a person’s lifetime.

However, making the optimal use of existing skills and preventing the erosion of skills through lack of use is just as important as producing the right skills in the first place. As job and occupational mobility increases, and the shelf-life of domain-specific knowledge declines, individuals must upgrade their skills more regularly than in the past. With demand for skills growing and changing over time, traditional education and training systems that select individuals and assign them to particular streams are increasingly out of date. Governments need to improve skills across the population as a whole; ensure that vocational training focuses on more than immediate employability (notably by developing transferable skills that facilitate occupational mobility); and make sure that skills are developed through lifelong learning (which may require new ways of ‘bringing learning to the learner’).

Governments must also develop more targeted policies to support groups that are currently marginalised in the labour market. School drop-outs represent one group at risk. Key policy actions for this group must include early interventions to support young people at risk of leaving the education system without a recognised qualification, as well as measures to assist young people in finding jobs. Other groups at risk include immigrants and minorities. The integration of such communities into the labour market remains a major challenge in many EU countries.

Despite welcome change in recent years, women still represent the largest under-utilised pool of human capital in OECD countries.

Female educational achievement has increased significantly and, for the younger cohorts, it has now overtaken that of men. But while female participation in the labour force has increased, the gender gap remains substantial: on average, only about 60 per cent of women in OECD countries are employed or looking for work, compared with 80 per cent of men.

Lifelong learning will require the development of new funding models. Investment in learning needs to be cost and tax-efficient for individuals and their employers. For those out of work, funding needs to be accessible to support and incentivise learning. Governments should encourage, via the tax system and regulation, the development of new financial instruments that allow learners to access opportunities when they need them most. For learning beyond universal education, education and training systems need to find ways to share the costs among government, employers and students based on the respective benefits obtained.

Policies must become less piecemeal than they have often been in the past. Large gains can be achieved by co-ordinating efforts at all levels and by investing tight public budgets more effectively and efficiently. To this end, governments must build new relationships with learners, providers, businesses, social investors and innovators.

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## 7 Innovation policy in the EU: The biopharmaceutical sector *by Jim Attridge*

The pharmaceutical industry creates many positive spill-overs. Aside from the development of treatments for crippling, painful and life threatening conditions, wider social and economic benefits flow from having healthier populations and high quality employment. For years now the industry has been consolidating its research and development (R&D) spending in fewer places and on a reduced number of diseases. There is less R&D money around and more competition for it. Europe is losing out to the US and increasingly to fast-developing economies such as China and India. This is because the EU and member-state governments are failing to strike the right balance between the need to contain rising healthcare costs and the need to provide pharmaceuticals firms with sufficient incentives to develop new innovative medicines in Europe.

Innovation in the pharmaceutical sector epitomises what Schumpeter called routine innovation. The research component of R&D investment is much like many other sectors, involving laboratory-based studies by academic and industry-based scientists and a competitive race to patent inventions. But the second stage – the development phase – is exceptionally long and expensive; it is dominated by clinical trials, which test the efficacy and safety of treatments against stringent criteria. The third phase of the innovation process – the often overlooked diffusion phase – requires innovators to persuade conservative clinicians and financially-pressed health bodies to adopt their new treatments. Once a product enters the market, the firm responsible for its development benefits

from only around ten years of market exclusivity before it faces competition from cheaper generic versions of the drug.

The discovery of a new way to treat a disease results in the filing of numerous patents by many competing academic and industrial organisations across the world. Companies with the necessary resources then have to decide whether to risk embarking on a ten year development programme – costing around US\$1bn – to translate the invention into a commercially viable product, which stands a good chance of being approved by the various regulators. Early market access benefits both patients and the innovator seeking a return on their investment.

However, the full therapeutic potential of a new treatment may only be realised following many more years of additional investment in clinical trials and associated product development. This highlights the crucial distinction between the primary research, which leads to the initial invention, and the incremental development of that treatment over many years. This distinction is at the heart of a vigorous debate over how and where to invest public research funds and how EU governments should determine access to treatments and the prices paid for them. Public health insurance schemes are the dominant funders of prescription medicines in the EU. Burgeoning demand for treatments combined with weak public finances means that these organisations are under huge pressure to cut costs. Over many years this has spawned a plethora of national regulations for the pharmaceutical sector, the main thrust of which has been to enforce low prices and restrict patient access to innovative treatments. This, in turn, has reduced the amount of revenue accruing to a firm over the life-time of an innovative new treatment, and undermined the attractiveness of Europe as a location for pharmaceutical R&D.

Over the next three years the patents on a large number of high value drugs will expire, reducing companies' revenues and providing substantial savings for both public and private health systems. This

should militate against the need for further regulations to limit the prices of new patented treatments or to cut the prices of those already on sale in EU countries. Governments need to recognise that after decades of 'cut and cut again' cost saving measures, Europe's R&D-based pharmaceuticals industry is wilting. This is largely the result of a failure to recognise the impact that cost containment by governments has had on the attractiveness of Europe as a location for pharmaceuticals R&D. The threat emanates not only from the US – where European pharmaceuticals firms are doing an increasing share of their bioscience R&D – but increasingly from China and India, whose fast-growing markets make them formidable rivals for R&D investment.

There have been some positive EU initiatives to increase the rewards for investing in innovation. The EU's 'orphan drug concept', introduced in 2001, has encouraged R&D into treatments for numerous rare diseases. This has been achieved by fast-tracking regulatory approval for the medicines and extending the period of time that firms benefit from patent protection. However, patient access to the new treatments varies greatly across EU member-states, with some countries severely restricting access to them on cost grounds. The Innovative Medicines Initiative, a joint public-private collaboration between the European Commission and the pharmaceuticals industry, aims to both promote a wider science base through funding research projects and through initiatives to streamline development processes. Whilst such initiatives are undoubtedly helpful, their scale and effect are unlikely to offset the much greater impact of ever tighter price controls and regulatory changes.

The lack of a holistic approach encompassing all three of the innovation phases – research, development and diffusion – has led to poor policy towards the pharmaceuticals industry. A key EU policy shift in recent years has been to reduce the amount of money firms receive for what are considered minor or incremental advances in treatments; the aim being to concentrate R&D investment in areas likely to produce major new medicines. Despite the obvious appeal

of such policies, they are incompatible with the inherent nature of the innovation process. All the evidence suggests that reducing the amount of money pharmaceuticals firms receive for incremental innovation will accelerate the withdrawal of R&D activity from ever more areas of disease. This trend is well illustrated by the current crisis in the development of new antibiotics. Declining R&D investment into antibiotics means that there are now few new products to treat resistant organisms, such as *c.difficile* or MRSA. Over the coming decade further ‘innovation deserts’ will emerge, and the capabilities and infrastructure necessary to respond quickly and effectively to new diseases will be much diminished.

To prevent this, the EU and member-state governments need to re-think policies on two fronts:

- ★ The European Commission needs to focus less on maximising the short-term interests of consumers and do more to champion the pharmaceuticals industry as a strategic EU asset in a global context.
- ★ EU member-states need to integrate better their national strategies for healthcare – balancing the need for affordable treatment with the need for a thriving pharmaceuticals industry. Better integrated models will need to acknowledge that Europe faces intensifying competition for internationally mobile bioscience and biopharmaceutical activities.

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## 8 Financing the venturesome economy

*by Amar Bhidé*

A relatively small number of individuals and organisations is often credited with advancing the scientific and technological frontier (and hence with sustaining the well-being of all). In reality, however, this common yet elitist conception of innovation misrepresents its nature and role. Widespread prosperity and rewarding work depend on the creativity and enterprise of many individuals, rather than a few. Innovation is a multiplayer game, not a professional sport in which a few highly talented and well paid athletes put on a show for the rest of us. Narrow conceptions of innovation are damaging in a modern economy because they often prompt pointless and wasteful initiatives.

### **Inclusive innovation**

In earlier times, new artefacts were often developed by a small number of inventors and sold to a few wealthy buyers. Alexander Graham Bell, for example, invented the telephone with one assistant. Likewise, automobile pioneers were one- or two-man shows – Karl Benz and Gottlieb Daimler in Germany, Armand Peugeot in France, and the Duryea brothers in the US. Early car buyers were rich hobbyists.

These days, innovation is far more inclusive. Innumerable entrepreneurs, venture capitalists, executives of large companies, researchers at universities and commercial and state-sponsored laboratories, programmers and members of standard-setting institutions as well as politicians have played their part in turning the

Internet into a revolutionary medium of communication. Steve Jobs, often portrayed as a brilliant solitary inventor, relies on tens of thousands of individuals working at Apple and its network of suppliers. And, unlike the early buyers of automobiles, millions of regular consumers scoop up products such as Apple's iPad and Microsoft's Kinect.

The many kinds of ideas and know-how needed for the development and widespread use of new products and services favours such 'inclusive innovation'. Consider the microprocessor, which is at the heart of so many modern gadgets. The necessary know-how ranges from high-level general principles (the laws of solid state physics, mid-level technologies including circuit designs and chip layouts, and so on) to ground level problem-solving (like tweaking conditions in a specific semiconductor fabrication plant to maximise the quality and yield of the microprocessors produced). The development of these multiple levels is best entrusted to many individuals and organisations with specialised knowledge and skills.

In general, therefore, the development of new technical know-how is not enough. A new 'diskless' computer, for instance, will generate value only if it is effectively marketed by producers and properly deployed by users – all of which requires marketing and organisational innovations. Innovation also requires venturesome consumers. The use of a new product or service is not a passive act: each time we buy a new computer we take a chance that it will be worth the money and effort.

### Policy implications

Policies to advance cutting edge science and technologies that derive from an elitist view of innovation often do more harm than good by diverting resources away from other activities. Encouraging more people to become engineers and scientists instead of managers will exacerbate the problem if the development of technology is not the

primary bottleneck. We should always remember that the most important innovations are often the organisational changes needed to make use of new technologies.

Official preference for particular technologies conflicts with the principle of encouraging the many to draw on their unique imaginations and experiences. Faced with the same general opportunity, different innovators will often come up with very different solutions – and no one can predict whose will work best. So, for example, the problem of global warming is best confronted with numerous independent approaches, from more efficient solar cells to carbon capture and storage, safer nuclear power, better insulation of homes, and fewer cars.

At the same time, official indifference will not do either: technological advances often require an increase in the role of government. The growth of the automobile industry, for example, required the building and maintenance of roads, the formulation and enforcement of driving rules, a system of vehicle safety inspections, and controls on vehicle emissions. Rather than lead or ignore technological advances, governments should provide broad but 'oblique' support, as John Kay would put it. The ups and downs of the US financial system illustrate the importance of a sensible indirect government role.

### Funding innovation

Financing innovation often brings to mind professional venture capitalists (VCs) who invest in high-tech start-ups. But it is often forgotten that VCs fund less than one half of one per cent of annual US business start-ups. Most small businesses are not suited for VC funding and never develop revolutionary products, yet still play a crucial role in the innovation game. Innumerable small outfits – including retailers and customisers of off-the-shelf software – worked hand-in-hand with enterprises such as Apple, Microsoft and Intel to put a computer in virtually every home and office in the US

and Europe. And small businesses usually cannot thrive without bank loans because they cannot raise much equity capital.

Venturesome consumption also hinges on credit. Henry Ford's genius would have counted for little without millions lining up to buy the Model T. And even though revolutionary manufacturing methods made cars much more affordable, few buyers had sufficient savings. By 1926, two-thirds of all cars sold in the US were purchased on credit. Today, consumer lending underpins the explosive growth of smart-phones.

By and large, sensible bankers will not make medium or long-term loans to businesses or consumers if they are worried about the stability of their own deposits: the risk of unexpected withdrawals (or 'runs') encourages banks to stick with well-secured and short term loans. In fact, until the passage of the Banking Acts in 1933 and 1935 that created a comprehensive system of deposit insurance, US banks did not lend to consumers. The buy-now-pay-later plans of the 1920s that helped create a mass-market for cars, radios and vacuum cleaners were promoted by consumer loan companies and other such non-bank finance companies. It was deposit insurance that permitted banks to offer longer term loans to businesses and to finance the consumer boom that followed World War Two.

Prudent lending requires careful, case-by-case judgment. A borrower's credit history certainly merits consideration, but in a pervasively dynamic economy, 'past performance is no guide to the future'. In addition, the time and expense required for careful judgments about what is likely to happen can encourage bankers to cut corners. Deposit insurance only increases the temptation by removing the fear of bank runs. For many years, tough regulatory oversight of loans and lending practices effectively checked the imprudence that deposit insurance alone might have encouraged. Even as bank lending in the US grew by over 9 per cent a year in the 1950s and 60s, the largest number of banks that failed in any given year was just seven.

The rules that sustained sound but not stagnant lending steadily unravelled after the 1970s. Policies that favoured light touch banking regulation and arm's length markets fostered the growth of an unregulated and uninsured depository system. They also encouraged lenders to rely on backward-looking statistical models that paid little heed to the specific circumstances and prospects of borrowers, instead of case-by-case forward-looking judgments.

The growth of such 'robotic lending' was hailed as an advance akin to Henry Ford's assembly line. Among other things, it sharply reduced the costs of extending credit, especially to poorer home buyers. Lending to consumers with limited immediate means certainly helps create mass markets for new products. But it can only be sustained if lenders select individuals who are likely to repay their loans. Skimping on due diligence and showering all comers with credit does more harm than good. Moreover, not all credit decisions can be easily mechanised. Small business lending for instance is harder to mass-produce than housing loans. This no doubt explains why, as housing credit surged before the 2008 crash, banks neglected the small business borrowers that make a larger contribution to the long-run growth of innovative economies. Worse, after the crash banks withdrew credit from sound businesses.

Several measures such as fiscal stimuli and quantitative easing have since been deployed to get developed economies moving again. But growth cannot be sustained without innovation, as many realise. A clearer and broader appreciation of how the structure and orientation of modern finance undermines innovation in its broad sense is a necessary first step.

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## 9 Promoting innovation in an age of austerity: The European dimension *by Máire Geoghegan-Quinn*

As Europe emerges from the global financial crisis, member-states must press ahead with consolidating their public finances and transforming their economies to tap new sources of growth. Several challenges must be tackled simultaneously: restoring fiscal sustainability, tackling the long-term financial problems associated with an ageing population, and preparing for increased competition from emerging economies. Ever since the crisis broke out, the European Union has therefore taken a holistic approach: it has sought to address short-term challenges, while also taking action geared towards the medium- to longer-term.

In its Europe 2020 strategy, the European Commission set out how to achieve high levels of future growth. Raising productivity through innovation is one of the key ingredients of the Union's response to the crisis. This is why innovation has been put at the heart of the Europe 2020 strategy. The so-called 'Innovation Union', which the Commission presented in October 2010 as one of its seven 'flagship initiatives' under the Europe 2020 strategy, charts the course for the years ahead.

Europe has no shortage of potential. It has some of the world's most successful and innovative economies. There is a long tradition of inventions, many of which have changed the world and improved our quality of life. The political systems of the EU are based on the rule of law and stable democratic institutions. The EU has the largest single market in the world and a majority of its

members now share a common currency. Last but not least, our people, our common values and our cultural diversity and creativity are sources of great strength.

Europe's competitive strength must derive from higher productivity, from improving our skills and from producing high quality products and services, which compensate for higher wages and costs of production. Europe must regain a first-mover advantage and strengthen its share of global markets. In short, our future prosperity depends on the quality of the European labour force and on Europe's ability to drive innovation in a range of different areas.

All member-states are currently working to reduce their budget deficits and to keep public debt levels under control. While this process is necessary, it is critical that budget cuts be implemented in a way that supports sources of future growth. Smart fiscal consolidation involves protecting investments in areas such as education and skills, research and innovation, high-speed internet, and other information and communication technologies on which our future growth will depend.

Several member-states have recognised the need to turn the crisis into an opportunity. Some countries, like Germany and France, have opted to increase their public investments in education, research and innovation despite cuts to their overall budgets. Other countries, such as the UK and Spain, have decided to keep their research and innovation budgets stable, against a background of deep cuts elsewhere. These are examples of 'smart' fiscal consolidation. Other member-states should, as far as possible, follow suit.

The positive effects of (increased) investment in growth-enhancing areas must be further reinforced by undertaking targeted structural reforms, notably of research and innovation systems. More than ever, fiscal pressures require us to maximise the quality – and the leverage effect – of public-sector funding. These principles will be applied to EU research and innovation funding in the next financial

framework. The aim will be to bring together the different instruments into a common strategic framework to focus on areas with the highest EU added value, and to provide seamless support for innovations from research to market application.

What Europe lacks compared to key trading partners such as the US, Japan, South Korea and China is a strategic and integrated approach to innovation – that is, one in which innovation objectives guide policies in relevant areas such as education, skills, labour, product and services markets, and in infrastructure and regional development. Only a handful of member-states pursue such a strategic approach, which is steered at the highest political level.

Innovation does not happen in a vacuum. There are essential conditions that need to be fulfilled for innovation to flourish. What the leading countries and regions have in common – whether it is in ICT, renewable energy or healthcare – is an integrated, well-functioning innovation ecosystem, where government policy works hand-in-hand with the private sector.

National governments have a key role to play, notably by providing excellent education, equipping people with the skills needed to thrive in a knowledge-based society, and supporting entrepreneurship and risk-taking. There are several world-class universities in the European Union, but Europe's ambition should be to have many more, to promote networking and to ensure that many more young people can gain experience in setting up and running their own businesses.

Alongside policies at national level, there is much that can be done at European level to improve the overall framework conditions:

- ★ The completion of the European Research Area (ERA) by 2014 will create major opportunities for closer cross-border co-operation between researchers, educational institutes, research

centres and industry that are not currently being exploited because of obstacles in the single market. The finalisation of the ERA will produce mutually beneficial spill-overs between member-states' investments in the fields of research, innovation and science.

- ★ An EU-wide venture capital scheme must be put in place and the conditions for an EU-wide 'knowledge market' need to be established. Such a market will not only facilitate the better exploitation of knowledge but also give rise to important new sources of revenue that can be re-invested into research and innovation.
- ★ A common EU patent would provide a major boost to innovation in all parts of Europe – notably by reducing the costs of getting new products to the marketplace (particularly for SMEs).
- ★ Interoperable standards must be encouraged to ensure that research reaches the marketplace more rapidly and to reinforce Europe's global reach.
- ★ EU, national and regional authorities, as well as the various stakeholders (such as researchers, industry, consumers and users), should work closely together through the system of European Innovation Partnerships. This will help speed up breakthroughs, reduce the fragmentation (and resulting duplication) of effort, cut costs and facilitate ideas being turned into commercial successes.
- ★ International co-operation is critical if the EU is to benefit from the best scientific and research capacities available globally. The EU is already one of the most open markets in the world. Our Research Framework Programme, for example, is accessible to many third countries. But other countries should not be allowed to innovate at the EU's expense. We should use

the Framework Programme as leverage to secure comparable access abroad – and adopt a common EU front where needed to protect our interests.

*Máire Geoghegan-Quinn is the European Commissioner for Research, Innovation and Science.*

# 10 How the EU's single market can promote innovation

*by Malcolm Harbour*

The Commissioner for Research, Innovation and Science, Máire Geoghegan-Quinn, is giving strong leadership on ways to make the EU a more innovative economy. Her comprehensive initiative, the Innovation Union, rightly focuses on all the factors that have led to Europe's under-performance, as revealed by a whole range of independent benchmarks.

This essay examines how single market policies can contribute to the Innovation Union. The European Parliament's internal market and consumer protection committee is fully behind this initiative and is working closely with other parliamentary committees to give this project the support it deserves.

## **Encouraging researcher mobility and knowledge transfer**

Benchmarking data shows that high quality research in the EU too often fails to be translated into innovative products and services. Notwithstanding large investments in a succession of EU research programmes, EU academic research and technology transfer policies remain fragmented. Healthy competition is one thing, but universities need to co-operate too. There needs to be a shift away from entertaining national intellectual rivalries, towards embracing each other's experience and knowledge. Improved employment and career prospects for researchers must also be part of the EU's strategy to fight the 'brain drain' to the US and, increasingly, to China, Japan, and South Korea.

Despite repeated political commitments and numerous Commission initiatives to create more favourable conditions, the free movement of researchers across the EU continues to be hampered by all manner of obstacles. Fostering greater cross-border mobility must therefore be a priority. We need to build on successes in the field of mutual recognition of qualifications and break down remaining barriers. Better salaries, allied to transferable pensions and other benefits, would encourage the best brains to move to the best projects. It is good that new plans for pension portability feature prominently in the Innovation Union strategy and that the implementation plan has been picked up in the proposed Single Market Act.

### **Making EU policy more innovation friendly**

Just as the Commission has accepted the importance of an ‘SME test’ to make sure that its proposals take smaller enterprises into consideration, we need to establish an ‘innovation test’ to ensure that new policies do not hamper research and development through unnecessary bureaucracy. We must eliminate undue costs of doing business, and create a truly business-enabling EU regulatory framework. This will release more funds in business for innovation and support the development of better products and services.

The Services Directive has removed a number of constraints on cross-border trade and the right of establishment, making it easier for businesses to set up operations in other member-states. But there is still a long way to go. Governments must ensure that they liberalise services in all the areas concerned, as there are still some laggards. In addition, the directive must be publicised more effectively because businesses have been slow in exploiting the opportunities it has created. Innovative companies should make full use of these new freedoms by expanding their business in other member-states. The single market must also now ‘go digital’. The full potential of the Internet must be released and the Commission must offer an ambitious approach to breaking down the barriers to e-commerce.

Standards in the EU must also continue to be harmonised. The EU has a structural advantage in setting international standards by virtue of its dominant voting rights in the International Standardisation Organisation. It should capitalise on this advantage. The Commission’s forthcoming initiative to extend standardisation to services is particularly welcome. Improved broadband connections and the increased use of radio spectrum will enable more commerce to be conducted swiftly across national borders, and will boost the sharing of information as well as collaboration between geographically separated businesses and universities. Finally, intellectual property protection is a crucial element in stimulating research investment. Agreement has finally been reached on an EU wide patent, which will cut the cost and complexity of patent protection.

### **Exploiting lead markets and innovative procurement**

Around 17 per cent of EU GDP is accounted for by public procurement. This spending must be harnessed to encourage the development and diffusion of new technologies. The Commission’s Innovation Union plans rightly highlight the importance of public procurement generally, and pre-commercial procurement in particular, as a catalyst for the growth of innovative companies. Employed correctly, public procurement should generate ‘lead’ markets for new technologies, for example in the environmental and healthcare sectors.

EU rules on public procurement should help contracting authorities obtain the best value for money for quality public services. But they should also create new opportunities for businesses. Procedures need to be further clarified as the procurement landscape evolves, in particular for new forms of procurement including shared services, public-private ventures, pre-commercial procurement, and e-procurement. Following pressure from the European Parliament, the Commission has launched a consultation bringing forwards a wide-ranging review of the EU’s rules. Modernisation and the take up of e-procurement

will significantly contribute to improving the delivery of public services, particularly in ICT, transport and environmental services.

### **Funding research and innovation**

In many EU countries, spending on R&D is comparatively low. To rectify this problem, new sources of funding need to be found.

The EU is well-placed to direct funding programmes, such as regional and rural development funds, to encourage innovation. There are many good examples within individual countries of incubators and ‘seed corn’ finance for high-growth SMEs. However, more systematic exchanges of best practice and better networks between regions might help to improve outcomes.

In addition to selective public funding, it is important to boost capital availability from private sector sources. Pan-European venture capital instruments would create a more effective funding environment for high-growth and innovative SMEs. The Commission should take this important work forward with the European Investment Bank, the European Investment Fund, and expert bodies in the member-states. At EU level, crucial instruments that have already been adopted, such as the Strategic Energy Technology Plan (SET), remain under-funded. This problem must be addressed.

One of the Commission’s most promising new proposals is for pan-EU Small Business Innovation Research (SBIR) programmes to underpin innovative procurement. SBIR should identify technology-oriented public sector challenges and fund R&D projects to develop new solutions to both old and emerging problems. This should now be rolled out as a priority.

### **Delivering on EU 2020**

The EU 2020 programme recognises that the single market is one of the most important policy tools for the recovery of the European

economy. Despite the single market’s remarkable achievements, it is still rich with untapped opportunities. This is why the Commission adopted in late 2010 the so-called Single Market Act – a series of proposals to deepen market integration in the EU. It is now essential that member-states push on with adopting the measures outlined in the Act. If they take up the challenge, then the EU 2020 programme could be the key that unlocks Europe’s economic recovery. If they do not, it will be another lost opportunity.

*Malcolm Harbour is a Conservative Member of the European Parliament.*

# 11 Innovation policy: A view from the British government

*by David Willetts*

The UK's coalition government aims to support sustainable economic growth and deliver better public services. The means to those ends – new knowledge, new technologies, smarter ways of working – can all be described as innovative.

Later this year, the British government will publish an innovation strategy detailing how we will target support and spending to have the greatest impact on growth and attract private sector investment. The document will set out how we will make the UK a more attractive location for R&D and technology start-ups. It will also encompass how we will promote innovation in and through the public sector, and make the country's innovation infrastructure (including the Design Council, National Measurement System and Intellectual Property Office) more efficient and responsive.

This approach is informed by the latest evidence. NESTA's 'Innovation Index' (January 2011) showed that innovation has accounted for 63 per cent of labour productivity growth in the UK since 2000. More significantly, it revealed that private sector investment in innovation helped to reduce the negative impact on productivity at the beginning of the recent recession. We must increase and broaden these investments in the coming years.

Ahead of the strategy, the government has already signalled its intent. In particular, it cast a vote of confidence in science and research by maintaining and protecting its budget in cash terms. For the first time higher education research funding in England has

been included within the protected funds, providing greater stability and certainty to academics.

We have also made it clear that the Technology Strategy Board (TSB) will become the prime channel through which we will incentivise business-led technology innovation, including the future allocation of R&D grants for small businesses. Allied to a stronger TSB will be two networks focused on developing critical mass and helping firms to exploit new and emerging technologies: an elite group of technology and innovation centres, backed by over £200 million of new investment; and local coaching for growth, linking small and medium-sized enterprises (SMEs) with high-growth potential to sources of capital and other professional services.

In terms of the potential of governments to drive innovation through their own purchasing power, the evidence is just as compelling. As the Commission stated in its communication on Innovation Union (October 2010): “Public procurement accounts for some 17 per cent of the EU’s GDP. It represents an important market, particularly in areas such as health, transport and energy. So, Europe has an enormous and overlooked opportunity to spur innovation using procurement.” The UK public sector has, for example, been spending around £220 billion annually. It must become a more willing and reliable customer of innovative goods and services.

Through the UK’s Small Business Research Initiative (SBRI), more than £35 million worth of public sector contracts have gone to SMEs – including micro-businesses, the firms that find it hardest to seize such opportunities. But this record bears no comparison to the equivalent scheme in the United States, the SBIR. The US scheme issues \$2 billion worth of contracts annually. Since its inception almost 30 years ago, it has helped to develop more than \$21 billion worth of research and over 45,000 patents. The US Innovation Development Institute estimates that SBIR delivers a multiplier of between five and seven in terms of economic benefit accrued – a

plausible figure given that, in the US, SMEs generate 60 to 80 per cent of net new jobs annually; employ 30 per cent of high-tech scientists, engineers, and computer workers; and produce 13 to 14 times more patents per employee than large firms.

We will therefore improve the effectiveness of SBRI in the UK. In addition, we want to realise an equivalent scheme within the EU. Successive rounds of EU Framework Programmes (FPs) have sought to increase SME participation in Europe, in recognition of their contribution to economic growth. It is vital to make further progress on this before the Eighth Framework Programme (FP8) enters into force, by allocating some FP funding to an SBRI-type scheme which fosters product development and commercial exploitation of technology. Most SMEs simply lack the resources to participate in international research-based projects.

Numerous studies have shown the need for improved innovation performance in Europe. The US and Japan continue to outperform the EU, while China is rapidly closing the gap. Meanwhile, analysis by the OECD suggests that developed economies must increasingly rely on innovation for future growth as their population levels stagnate (or decline), and they experience diminishing returns from labour inputs and investment in capital.

The UK government therefore welcomes the decision of the European Council, on February 4<sup>th</sup> 2011, to pursue a range of proposals designed to smooth the passage of innovative products to the marketplace. Easier access to finance for SMEs; faster, interoperable standard setting; more affordable intellectual property rights; joint public procurement and EU-wide measures to support venture capital investment: these are all essential for economic growth and competitiveness.

*David Willetts is Britain’s minister for universities and science.*

## 12 Growth and innovation: The contribution of the digital single market *by Esko Aho*

Europe aspires to remain a global powerhouse with its own values and social model. Sadly, there is a large gap between the rhetoric of its political leaders and the reality of its economic and industrial potential. The global financial crisis has cruelly exposed the EU's weaknesses and vulnerabilities. A more sustainable foundation for the future must include a more stable financial system, allied to stronger public finances. However, while necessary, such measures are not sufficient to put Europe back on track. The most critical issue is how to create the potential for future growth.

There is much that Europeans can do to boost innovation and productivity. Perhaps one of the most important is to encourage the transition to a 'digital society' by extending the EU's single market to digital services and content. The underlying aim should not be the creation of a digital society for its own sake. It should be to ensure that digital products, services and solutions reshape all aspects of our economy and society – from the way that energy is managed in homes and offices, to the way that goods are transported and culture is consumed. The key to this transition will be political will. The political obstacles to carrying out the necessary pro-growth changes are very real. But the alternative – of low growth or none – will hurt Europe far more in the long run.

## **Economic strategy: It is about execution**

The EU is often better at designing medium-term strategies than at implementing them. The Lisbon Strategy, which was adopted by the EU in 2000, is a case in point. Although it was in many ways an excellent programme, it failed because of poor implementation. The EU has now launched a successor programme, known as EU 2020. Its ambition is to make the EU more productive, knowledge-driven and greener. These are all excellent aims. But why should EU 2020 succeed where the Lisbon Strategy failed?

The region's economic experience over the past decade suggests that EU leaders were right to set out an economic strategy based on information and know-how. Their failing was that they did not implement the strategy assiduously enough. Basing our future on world-class know-how, creativity and technological innovations is the only way Europeans will maintain an economic leadership role and meet some of the key challenges that they face: supporting growth, jobs and environmental sustainability, managing demographic change, and so on. This is why completing the EU's digital single market is so critical – not only for the ICT sector itself, but for other industries too.

## **Why deepening the single market is critical**

The EU's single market gives companies access to a much larger, integrated market than they would otherwise enjoy. One of the advantages of such a market is that it gives European entrepreneurs the opportunity to grow to scale in the same way that their counterparts from the US already can. Europe has already seen the positive effects that an integrated regional market can have on its own firms. European companies such as Nokia, Ericsson, Alcatel, Siemens, Vodafone and Telefonica have played leading roles in the revolution in mobile technology – in the process, creating millions of high quality, well-paid jobs across Europe. The rise of Europe's telecoms cluster during the course of the 1990s was closely associated with the adoption of the GSM standard in 1987 and the

subsequent liberalisation of the telecoms sector (pursuant to the single market programme).

Europeans should aim to repeat this success story. Without the digital single market (and the clusters to which it can give rise), we risk being squeezed between the content-driven innovation of the US and the manufacturing capabilities of Asia. The four freedoms based on the single market programme have been key building blocks of Europe's competitiveness. It is now time to add a new one by implementing a 'fifth freedom' – the free movement of digital content. The EU should harmonise fragmented regulations and remove barriers to buying, selling and interacting online in the EU, as it has done for the sale of most products. EU measures should target not only physical goods and digital content, but also the intellectual property that is the fruit of our creativity. Our aim should be to ensure that the world's leading online content distributors are European.

A more integrated digital market would bring a whole host of benefits. Not only would it help to spur new solutions to many of the social, demographic and environmental problems that Europeans now face. But it would also support growth, create new jobs and generate much-needed tax revenues. The economic fruits of a more integrated digital market would be huge. The European Policy Centre, a Brussels-based think tank, estimates that removing obstacles to the free flow of digital content could lead to incremental EU GDP growth of €500 billion – or 4 per cent – over ten years.

## **Who will lead the revolution?**

The digital revolution is underway. Major trading partners such as the US, China, India, Japan, South Korea and Brazil are transforming their economies and their societies to reap the benefits. Europe must take urgent steps if it is not to lag behind. As prime minister of Finland in the early 1990s, I witnessed at close quarter how economic crisis can be followed by growth and technology-

induced economic transformation. It is now time for Europe to build the framework for a new phase of post-recessionary growth through investment and pan-European co-operation. For that we need a digital single market to ensure that Europe is the birthplace of globally successful economic firms and clusters.

*Esko Aho is a member of the executive board of Nokia. He is a former prime minister of Finland.*

## 13 Does Europe really want to be innovative? *by Michael Schrage*

Innovation enjoys a remarkably good press. The mind's ingenuity. The power of a new idea. Opportunities for profit. A chance to change the world. And so on. Innovation reeks of the same sort of 'political correctness' – or should I say 'economic correctness'? – that 'multiculturalism' once enjoyed. That should be warning enough. The immaturity, trendiness and ahistorical quality of Europe's discussions on innovation policy are dangerously disingenuous. If 'innovation' is the answer, then what – exactly – is the question?

Just a few short years ago objective observers from the media to ECB spokesmen insisted that Europe's financial services firms were remarkably innovative. Certainly, the numbers said so. High-powered maths, software-driven securitisation and digital network distribution produced dizzying arrays of novel financial instruments. CMOs, CDOs and CDSs constituted some of the most ingeniously high-tech products ever devised by the best-educated minds from many the world's finest universities.

Just to be safe, elegant algorithms and Monte-Carlo-tested 'risk models' gave quantitative assurance that these clever innovations could not misbehave too badly. Over a trillion euros of annihilated wealth and one global financial crisis later, the world knows better. 'Too clever by half' and 'too big to fail' have given new meaning to Schumpeter's romantic aphorism on innovation: creative destruction.

Policy-makers take note. Schumpeter deserves to be taken more seriously. The empirical reality is that 'innovation' isn't a

euphemism for economic growth but a dynamic that comes with risks and costs attached. Ignore the received wisdom and accompanying agitprop. Inherently, innovation is neither a societal nor an economic 'good.'

Just as they desire public spending without deficits, politicians and technocrats want innovation's benefits without its costs. This is well-illustrated not just by innovation-enabled financial crises but by the persistent economic underperformance of Spanish wind-farms and other eco-greenery innovation.

Somehow, techno-subsidies never quite generate the growth that has been promised. There is a 'Concorde-like' quality of undeniable technical cleverness without measurable private sector success.

While policy-makers extol innovation's importance, realpolitik suggests that, more often than not, they actually celebrate the importance of new jobs and rising incomes. Innovation is a code word not for invention, novelty and productivity but for the higher employment and pay packets it purportedly generates. Innovation is creative destruction where the destruction is pronounced silently.

Is this characterisation unfair? Perhaps. But consider this thought-experiment: the typical European technocrat or politician is offered an innovative deal to boost their nation's economic growth. With a snap of their fingers, they can procure a 0.5 percentage point increase in their country's GDP. All they have to do is accept, in exchange, a 1 percentage point rise in their country's rate of unemployment.

In other words, to increase GDP from 3 to 3.5 per cent – which would be tremendous – they would have to raise their country's unemployment level from, say, 8 to 9 per cent. Newspaper headlines and economic analyses would read: "GDP rises but unemployment still climbs."

And what is the secret ingredient making this economic growth possible? Let us call it 'innovation.' (We could call it 'free trade' – but that is another essay.) Innovation adds a full 0.5 percentage point to GDP and a percentage point to the rate of unemployment. That is the benefit – and the cost – of an innovation policy. That is the thought experiment.

How many French, German, Spanish, British, Dutch, Italian or Greek politicians would leap at the offer? How many eurocrats would declare this a healthy exchange? Who would publicly argue that the benefits of a rise in GDP clearly outweigh this unfortunate cost in unemployment?

Clarifying economic assumptions, trade-offs and aspirations is an important obligation of serious policy-makers. Voters should know whether their technocrats value generating economic growth over preserving jobs. Taxpayers deserve to know whether 'innovation' excuses speculative subsidies to unproven technologies. People should know whether their public servants believe they can consistently outperform their private sector counterparts in identifying cost-beneficial innovation opportunities. In democratic societies, 'innovation' should not be a semantic shield concealing policy-makers' real priorities.

This thought experiment illustrates arguably the biggest single misunderstanding around innovation policy: innovation is not an end, but a means. Only ideologues cherish innovation for innovation's sake. But innovation for the sake of innovation is no more meaningful an economic policy than quantitative easing for the sake of quantitative easing. Economic purpose must underlie economic policy. Innovation is the means to what economic ends? More jobs? Better jobs? Greater productivity? Environmental sustainability? Subsidising innovators?

What real-world economic trade-offs does innovation make politically palatable? If state-sanctioned innovation initiatives

eradicate more jobs over three years than they create in ten, other forms of measurable economic benefit had better accrue. Innovation policies facilitating the demise of tens of thousands of medium-wage jobs in the hope of creating hundreds of thousands of minimum wage jobs surely suggest a ‘revealed preference’ of policy-makers. So do innovation policies converting industries filled with tens of thousands of middle-class jobs into ones with thousands of high-paying jobs.

The point is not to caricature innovation’s destructively creative – or creatively destructive – economic implications but to mock the pretensions of policy-makers who think they understand what they are doing.

Ambitious technocratic plans promoting innovation may have a miserable track record, but that apparently does not deter policy-makers from believing they have successfully learned from their predecessors’ mistakes. Surely this generation of European technocrats are significantly smarter and wiser than the last.

Even putting aside perennially exhaustive and exhausting debates about ‘industrial policy,’ history suggests that innovation has perverse and unpredictable impacts on national incomes and employment. If we take Schumpeter – or even Keynes – seriously, it is painfully clear that innovation-as-economic-policy does not lend itself to the sort of ‘rational planning’ methodologies and analyses so beloved of technocratic elites.

So what should policy-makers do? The answer is not nothing or as little as possible. To the contrary, policy-makers and technocrats have an enormous influence – but it should not be in their traditional and typical role of budgeting, planning and regulation.

As John Kay rightly observes, innovation is not R&D – and vice versa. The argument that more R&D funding invariably assures more innovation is *prima facie* ridiculous. Similarly, the fact that

innovation’s impact cannot be reliably predicted – even with literally hundreds of billions of euros at stake – should inspire caution, even from policy-makers who desire greater dynamism in their economies.

The most important thing that policy-makers can and should do is to force a larger argument around what kinds of economies enterprises and wider society desire.

Do they want the ‘top down’ diktats of policy innovations designed by the centre? Or are they prepared to deal with the inevitable disruptions caused by bottom-up innovators like Ryanair, Facebook and Google? Is entrepreneurship a value that should be cherished in an economy? Or do the competitive discontinuities they threaten mean that the precautionary principle should rule?

It may seem dissatisfying to draft a policy essay about innovation that portrays it as too rude and unruly to craft meaningful policies around. But, again, to steal from John Kay: “The primary role of government in promoting innovation is the promotion of markets.”

This is an undeniably important insight and I agree with it wholeheartedly. But, respectfully, he begs the larger question: What markets are we seeking to promote?

Precisely because innovation is a means to an end, the debate Europe must have has little to do with the cleverness of individual entrepreneurs and the promise of new technologies. It has to do with the willingness of societies – and their economies – to accept that innovation means, yes, creative destruction of jobs, livelihoods, established institutions and economic security. This is in exchange for what history indicates are increased standards of living, quality of life and more choices for more people.

While the past is always prologue, it is not guarantor of the future. The simple reality is that focusing on innovation distracts from the

economic issues that truly matter. Europe does not have an innovation problem, but a ‘what kind of growing economy do we want to have?’ problem.

*Michael Schrage is a research fellow at the Massachusetts Institute of Technology’s Sloan School of Management.*

## 14 Conclusion

*by Simon Tilford*

Innovation is widely held to be a ‘good thing’. Most of the contributors to this report agree that innovation accounts for a rising share of productivity growth in advanced economies; and that Europe is not as innovative as it needs to be. Productivity growth across much of the EU has been terribly weak for around 20 years – not just compared with past performance, but also in comparison with the US. However, politicians often think of innovation too narrowly, and advocate policies which promise to have only a limited impact on innovation and productivity growth. This is unsurprising. Innovation is a messier and more destructive process than is commonly understood. It holds out the promise of higher living standards, but often at the cost of existing jobs, livelihoods, established institutions and economic security.

Politicians usually place considerable emphasis on research and development (R&D) and patents as measures of innovation, and on high technology being the key to a country’s ‘competitive future’. This emphasis, which is based on the belief that there is a strong link between domestic R&D and productivity growth, leads them to believe that innovation and productivity are best promoted by policies aimed at boosting R&D spending. As a result, the EU and most member-states continue to use R&D spending and the levels of patents filed as indicators of their economies’ capacity for innovation.

Such assumptions often encourage policy-makers to advocate active industrial and research policies. They focus on fostering a strategic approach to innovation, where ‘government policy works hand in hand with the private sector’. Much emphasis is placed on strategies

to bring firms, governments and universities closer together, on policies that will make better use of Europe's research capabilities by encouraging pan-European research networks, and on pushing ahead with an EU patent. Policy-makers believe such policies are synonymous with support for innovation. If economies are to flourish economically, they must boost their R&D spending.

However, as a number of the expert contributors to this report convincingly argue, strategies which focus solely on R&D-intensive sectors can be misdirected and wasteful. An obsession with meeting targets for R&D spending, they point out, leads policy-makers to pay insufficient attention to other forms of innovation which do not involve R&D spending, but which are the main source of productivity growth. And they bolster their argument with two key points.

First, there is extensive research showing that only a small part of the productivity growth difference between Europe and the US is down to different levels of R&D investment. Moreover, in a typical European country at least 90 per cent of the R&D that actually contributes to productivity growth is conducted abroad. It is the diffusion of technology, rather than its generation, which is the crucial driver of productivity. The most important innovations, in other words, are often the organisational changes needed to make use of technology.

Second, many of the most important future innovations will be made by companies that do not yet exist. Innovation results from new entrants with innovative new models and/or products replacing existing, less successful, ones. This process of 'creative destruction' is what drives productivity growth. The disappointing rate of productivity growth across much of Europe reflects a relatively static industrial structure: too few firms grow rapidly, or are allowed to shrink or disappear. In many EU countries, resources (labour and capital) need to be reallocated more quickly towards successful innovators.

These points have obvious implications for policy. Governments should place greater emphasis on competition policy than on industrial policy and concentrate on encouraging technology diffusion rather than supporting R&D. The most important thing that governments can do to encourage innovation is to promote markets, and to make it easier for new entrants to challenge incumbents. This requires structural reforms that remove not only barriers to entry, but also barriers to the growth and contraction of firms, such as restrictive product and labour regulation and financial systems that fail to make capital available to dynamic new firms. Public support for primary research is also important. But for the main part, the process of innovation is so complex and uncertain that it is pointless, and almost certainly counter-productive, to try and second-guess it. By working with existing businesses, governments risk subsidising existing R&D or supporting declining industries.

However, government's role should extend beyond the promotion of markets; it also has a big contribution to make as the provider of crucial public goods. The quality of state education, in particular, can have a favourable impact on an economy's capacity for innovation and hence on the rate of productivity growth. Skills play a crucial role in spurring the generation of new ideas and knowledge. But it is perhaps at the more prosaic level of technology diffusion where they have the most important impact: they facilitate the adoption and adaptation of existing technologies, ideas and working practices. And it is the pace of technology diffusion, combined with differing levels of commitment to competition, that explains variations in productivity across the EU.

Why are policy-makers attracted to policies that often have a poor record of boosting innovation, while underplaying the contribution of competition policy? The answer is that actively encouraging the exit of inefficient firms – and embracing more rapid changes in industrial structure – is politically unpalatable. And this is the crux of the problem. Innovation is a destructive and unpredictable

process. European electorates want the benefits of innovation – cheaper, better products – but not the disruption and the insecurity that come with it. As the report’s concluding author, Michael Schrage, writes, European politicians talk a lot about innovation, but are not prepared to come clean about what is necessary to increase it.

Could Europe yet embrace the kind of creative destruction needed to drive innovation and productivity growth? The evidence suggests not. Several of the authors in this report argue convincingly for a deepening of the EU’s single market. But many member-state governments show little enthusiasm for this. The crisis-hit members of the eurozone are implementing far-reaching reforms of their labour and product markets in return for financial support. But there is little sign of comparable action elsewhere in the currency union, or indeed across the EU more generally. The belief that creative destruction is the driver of innovation has always been weak in Europe. But it has been further undermined by the financial crisis, which has done much to discredit market-led reforms. If anything, EU governments are now more wedded to defending national champions and more wary of competition than they were prior to the crisis. For most, placing their countries’ ‘competitive’ future in the hands of such unpredictable forces is an article of faith too far.

*Simon Tilford is chief economist at the Centre for European Reform.*



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**CENTRE FOR EUROPEAN REFORM**

# INNOVATION

## How Europe can take off

**Edited by Simon Tilford and Philip Whyte**

Every EU government supports innovation, believing that it will help Europe to meet the numerous economic, social and environmental challenges that it faces. But innovation is a vague concept and there is disagreement on what policies best promote it. The articles in this report discuss what innovation entails and what policy-makers can do to encourage it. There is general agreement that innovation is a broader and more ‘democratic’ process than what goes on in companies’ research and development laboratories. More controversially, however, some authors believe that an innovative society requires ‘creative destruction’, and that Europe has failed to accept the social and economic dislocations that a more innovative economy must entail.

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