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# Hidden keys to Europe's R&D

**Economist and author Mariana Mazzucato argues that for innovation to flourish in Europe, its governments must become more entrepreneurial and invest in technologies that private investors consider too risky.**

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In the US, the onset of the biotech, nanotech and internet revolutions saw massive amounts of state funding. The radical technologies behind the iPhone, from GPS and touch screen display to the new voice-activated assistant application Siri, were all backed by the government.

When Steve Jobs came up with cool ideas about design and putting these things to use, he was riding a wave of state-funded investment. So too did Google, whose algorithm was state-funded through the National Science Foundation (NSF).

The 'green' revolution, which Europe is backing as the catalyst for transforming all sectors of today's economy, will mean an even greater transformation than the internet.

The lesson we in Europe have taken from Silicon Valley is that we lack an entrepreneurial culture and need more 'garage thinkers' and venture capital. Yet what really happened in the US is that some 15 to 16 state institutions funded innovations from the early stages of basic research right up to market launches. Venture capital surfed that wave. Is there a wave to surf in Europe when most Member States' public and private R&D level remains so terribly low?

R&D in America has long been very mission-oriented, whether it be putting someone on the moon, developing the bio-agricultural sector or funding medicine the private sector won't invest in. Top-level scientists were hired because these missions have been exciting and well funded. China is spending EUR 1.5 trillion on mission-oriented areas that include new engines, environmentally-friendly technologies and new generation IT.

China has increased its R&D spending by 170 %, with large sums going to new 'green' technologies. Brazil has unveiled an exciting innovation policy led by its BNDES state investment bank and is becoming a world leader in renewable energy and biotechnology. You need vision to steer public sector investment, and in the EU only

Germany, Denmark and Finland seem to have that vision - and along with investments in key areas like R&D and human capital formation, that vision is helping them be more resilient to the crisis.

**Governments must invest in R&D**

So in Europe we need entrepreneurial governments that create markets. In too many European countries, the view is that the state is to get out of the way by cutting red tape – or at most fund education, R&D and skills. But it must also make the large investments in future technologies that involve too much risk and uncertainty for private actors.

In many technological 'revolutions', private actors have entered only after state investments had absorbed the greatest uncertainty. As well as being about investment, entrepreneurial government is about the state sending coherent signals to business and developing strategic visions that create excitement. In the UK, for instance, this isn't happening. Companies are hoarding profits that add up to almost GBP 700 billion of net financial surplus. And companies like GE [General Electric] and the wind energy firm Vestas are leaving, claiming an absence of 'green vision'.

Germany has much more 'patient' private sector capital thanks to the KfW state investment bank that is willing to earn returns over far longer periods than venture capital, which expects a return within 3-5 years. The EU needs to think much more about how to spearhead the development in its Member States of the kind of patient capital needed for innovation-led growth. In this respect, the European Investment Bank is key and should be recapitalised with unused Structural Funds, as well as by co-financing European Central Bank bonds. As a rule, the financial system should be reformed so that companies that create value are rewarded above those that simply extract it.

In particular, Europe should not follow the increasingly financialised US model whereby firms worry mainly about boosting their stock prices through share buybacks: in the last decade, the Fortune 500 companies have spent USD 3 trillion on buybacks. We also need much stricter controls of what private companies pay in tax. In the US, Apple has benefited enormously from publicly-funded innovations yet has moved its headquarters to Nevada to reduce its taxes.

Innovation is about risk and it is interesting how the idea of who the risk takers are has shaped policies, often badly. Venture capitalists, who generally step in with funding at a much later stage, have convinced governments in the US, and also the UK and the Netherlands, that as risk-takers they deserve lower taxes on capital gains. This has fuelled inequality, not investment.

**Avoiding parasitic relationships**

We talk about economic ecosystems but not enough about parasitic relationships in the private sector. One consequence of the public sector funding so much of the knowledge base in bio-pharma has been the decision by many pharma companies to cut their R&D: they get it anyway from the public sector and/or small biotech companies. Is this good? Focusing only on the ecosystem as though we are 'all in it together' has hidden these side effects.

We also need to think much more strategically about how to avoid returns from publicly-funded research getting siphoned off into private hands. Rather than blaming governments when they fail (an inevitable part of the innovation process), we should make sure they are rewarded for success, both to cover the costs of the failures and to fund the next round of investments.

Such returns could come in the form of income contingent loans, equity stakes or allowing governments to retain a 'golden share' in the intellectual property rights (IPR) that arise from government-funded research. Html, the language that displays web pages, was developed at the CERN research centre but the returns were privatised. There are models for avoiding this situation: In Finland, a public body like Sitra, which funded much of Nokia's early development, retains equity. So does the Brazilian BNDES, which has earned 21 % on returned equity on its investments in infrastructure and innovation. The Treasury then takes a big chunk of that money and redistributes it around the economy: a win-win for the citizens who funded the innovation.

**How to be really smart and inclusive**

Europe talks of smart, inclusive and sustainable growth, but to get there we need better and more direct mechanisms, like state investment banks or other tools that recapture some return to put in an 'innovation fund'. This is especially crucial in the new era of deficit reduction. If governments spend creatively on R&D we want to be sure a fair share of the profits go into the state's coffers to fund the next round. The US federal government in effect paid for Google's algorithm, and had it earned back even 1 % of Google's profits and put that into an innovation fund, it would have been able to invest substantially in green technology.

And when it comes to the 'green' economy in its widest sense, rather than just solar energy and biofuels, we have to develop a different approach to production and consumption. We need a common European vision of how to steer companies and consumers in a 'green' direction that involves rewards, because otherwise companies won't innovate and consumers won't change their habits.

Most of all, to make European countries innovative we need to encourage greater solidarity. Right now what we have is each country seeing the others as free riders or parasites. We must dispel the myth that Germany is strong because it tightened its belt, and instead recognise that it spent a lot on R&D and has a pluralistic institutional structure that fuels innovation through patient capital, as well as strong science-industry links.

We can all talk green till we're blue in the face but what we really need is a proper European vision of what enabled the 'core' countries to grow while the 'periphery' is drowning, with little skill at investing in innovation.

*Mariana Mazzucato was speaking to Brigid Grauman for Horizon magazine.*

# More info

Mariana Mazzucato is an economist and RM Phillips Professor in Science and Technology Policy at Sussex University, and author of *The Entrepreneurial State*. She recently coordinated an FP7 project on Finance Innovation and Growth aimed at reforming finance in Europe to better nurture Schumpeterian innovation.