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## Be afraid, very afraid, of the tech crisis

By Andre Geim

Social media will not save us from a cosmic rock on course to hit Earth, writes Andre Geim

**W**hat are you doing here?" The software billionaire choked in astonishment when I told him I was a physicist. The reaction was informative: it was as if he had encountered a seasonal labourer at our meeting place, the World Economic Forum in Davos.

Between networking, self-promotion and all the other things politicians and financiers normally do (including skiing), the distinguished crowd at Davos last month discussed the poor health of the global economy. Heads of state saw the cure in better governance; central bankers, in better financial controls; investment bankers, in the markets. Economists offered new theories and internet entrepreneurs put their trust in social media. The only thing they shared was a belief that a quick fix was available.

The advantage of ivory towers is that they allow a view beyond immediate problems. Where one sees banking crisis, debt crisis, currency crisis or some other crises, academics may see even more worrying developments. We are in the midst of a technology crisis. Disruptive technologies now appear less frequently than steady economic growth requires. Even bankers complain about a dearth of new technologies in which to invest.

Look back to the second half of the last century and it was packed with technological advances. The silicon revolution led to computers, microchips, mobile phones and the web. There was also Sputnik, lasers, the Moon race, the Global Positioning System. In the past two decades, apart from social media, it has been less about disruption, more about honing the same gadgets.

Many economists argue that the "low-hanging fruit" have been picked and we approach a prolonged period of stagnation. But since this has not yet led to a clear economic decline, people pay little attention. The fact that economists are well known for their eloquent explanations as to what went wrong with previous theories does not help.

My own ivory tower provides a view of basic science, where economists do not venture. I see a severe crisis in delivering new knowledge. It is not that discoveries no longer occur but that the rate has slowed. Without new knowledge, only derivative technologies are possible – and, however important, they are incapable of sustaining the sorts of economic growth rates the world has enjoyed since the coming of the industrial revolution.

For a lay person, blue-sky research can appear a waste of money as it does not immediately provide the modern equivalents of bread and circuses. Taking a longer view, however, there is no such thing as useless fundamental knowledge. The silicon revolution would have been impossible without quantum physics. Abstract maths allows internet security and computers not to crash every second. Einstein's theory of relativity might seem irrelevant but your satellite navigation system would not work without it. The chain from basic discoveries to consumer products is long, obscure and slow – but destroy the basics and the whole chain will collapse.

This logic dictates that we invest in blue-sky research to gain new knowledge. Everyone I spoke to at Davos was unequivocally in favour of increasing support for science. Unfortunately, humans are not logical animals. When I asked the same people whether their companies would pay a science-targeted tax, the answer was an equally unequivocal No. No to a personal tax, too. As if the money could come from somewhere else.

Until 40 years ago, the threat of hot and cold wars forced countries to look for long-term advantages over potential enemies. At the risk of being simplistic, let me say this threat fed back into investment in science, which allowed the industrial revolution to continue. Today, the threat from global warming, overpopulation and scarce natural resources seems insufficiently scary.

Western governments have been folding their blue-sky programmes in response to financial restraints and voters' negative view of academic research. Davos persuades me there is little hope of change. This would require a change in human nature. I fear economists might be right this time, and Japanese-style stagnation will look like a best-case scenario.

But I have a dream. The industrial revolution and economic growth continue. This is because astrophysicists find a huge cosmic rock on course to hit Earth in 50 years. This should be scary enough. The world can surely deflect this threat but will need to develop new knowledge and technologies. Finally, in my dream, humans realise social media can make some people very rich but cannot save the planet. The latter requires new fundamental discoveries.

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