

HOW MANY LIGHT BULBS does it take to CHANGE THE WORLD?



Acclaimed author **MATT RIDLEY** previews
his forthcoming IEA lecture...

As Friedrich Hayek knew all too well, innovation is the source of most, if not all, prosperity.

A new tool, a new rule or a new idea is what makes people better able to fulfill their needs and their wishes as they go through life.

I'm sitting at a table, dressed in cotton clothes, using a Microsoft programme and employing the English language to write this article – four ways in which my life is made better by things that people invented: an object, a processed plant, some software and a cultural phenomenon.

What is innovation and why does it happen to us and not to rabbits or rocks?

There was a time when it did not happen: Homo erectus, our ancestor, used roughly the same design of stone tool – the Acheulian hand axe – for more than a million years with little change. The habit of innovation had to be invented.

23 DIFFERENT PEOPLE INVENTED THE LIGHT BULB INDEPENDENTLY IN THE SAME DECADE

The key seems to have been exchange: once human beings started exchanging ideas as well as objects, they began recombining them in novel ways.

Cut people off from exchange networks and they not only stop innovating, they sometimes go backwards and disinnovate.

Here are ten things about innovation that might surprise you:

Mostly it happens by a sort of recombination, very like the way genetic change happens through the rearrangement of genetic sequences.

Every technology is a combination of other technologies, every idea a combination of other ideas. The pencil that lies on my desk is an improbable combination of wood and graphite to produce a new function.

Innovation is an evolutionary, incremental process.

The English language is a man-made thing, but there was no founder, and nor is anybody in charge.

We are far too ready to worship heroic inventors, and forget just how gradual and

team-like invention nearly always is.

Did you know that 23 different people invented the light bulb independently in the same decade?

The technology was ripe to be invented and it was inevitable it would be. That's why patent disputes accompany most discoveries and innovations.

You cannot invent things before they are ready to be invented.

Powered flight had to wait for engines. Computing software had to wait for programmable computers, which had to wait for integrated circuits, which had to wait for semiconductors.

It is surprisingly hard to think of things that could have been invented decades before they were. Even wheeled suitcases came at about the right time as airports expanded.

It's also surprisingly hard to plan, predict or stimulate innovation.

Forcing it to happen is hard. Steve Jobs took a gamble on the idea that making computers more user-friendly would generate novel features and make a successful business.

But when Elizabeth Holmes tried to emulate his approach with blood diagnostic tests, assuming that innovation would arrive if she demanded it, she ended up presiding over an infamous fraud called Theranos.

Innovation is not necessarily speeding up.

I've lived through spectacular changes in communication and computing, but relatively little change in transport – the personal gyrocopters and routine space travel I was promised as a child never arrived.

My grandparents had the opposite experience, being born before the car or the aeroplane, and dying after men landed on the moon, but seeing little change in telephones, telegraphs and typewriters during their lives.

Innovation helps people diversify as consumers while specialising as producers.

Compared with animals, or with subsistence farmers, most people can exchange a few hours of highly specialised production – a "job" – for a cornucopia of different foods, goods, experiences, entertainments and travel.

Innovation that does not cut the cost of acquiring things usually fails. Wind turbines are a good example.

💡 Innovation is as much the mother as the daughter of science.

The steam engine led to thermodynamics not vice versa. Social media, the mobile phone, drones, block chain – all owe little to academic discoveries. Sure, government funding of science does lead to innovation too, but it's a two-way street. And as scientists often discover, the invention gets you only 5% of the way. Much of innovation is turning an idea into an affordable and useful product.

💡 Innovation does not lead to unemployment.

Quite the reverse. Ever since the first threshing machines on farms, people have worried that automation costs jobs.

Instead it creates them by freeing people and capital to seek out new ways for people to employ each other.

True, we have ended up with more leisure, but it has been equitably shared: most people spend half their life now in education or retirement, and in the other half spend only 20% of their time actually at work – not counting sleep, weekends and lunch hours.

💡 There are huge vested interests ranged against innovation.

Big companies and public agencies do their best to protect their rent-seeking opportunities.

Intellectual property, occupational licensing and government favouritism also do much to keep innovators out.

As long ago as 1679 William Petty pointed out that “when a new invention is first

propounded, in the beginning every man objects and the poor inventor runs the gauntlet of all petulant wits.”

💡 Everybody knows innovation is generally a good thing and yet lots of people fear it.

The dairy farmers of America got margarine banned in several states. The hansom cab operators of London tried to get the umbrella banned (and later, Uber). Canal owners campaigned against railways.

Today the precautionary principle is used

INNOVATION IS THE CRUCIAL INGREDIENT OF MODERN SOCIETY

by some activists to prevent life-saving new technologies like genetically modified food or electronic cigarettes, even when these are demonstrably safer and better than existing technologies.

In short, innovation is the crucial ingredient of modern society, yet economists struggle to explain it.

Most, including Friedrich Hayek, assumed it to be an “exogenous” force that lands like manna from heaven upon a fortunate country.

Some, like Paul Romer, argued that it is itself a product of economic activity.

Nobody really knows how it happens, which is rather wonderful, I think •

Matt Ridley

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Matt Ridley's books have sold over a million copies, been translated into 31 languages and won several awards. His books include *The Rational Optimist* and *The Evolution of Everything*.

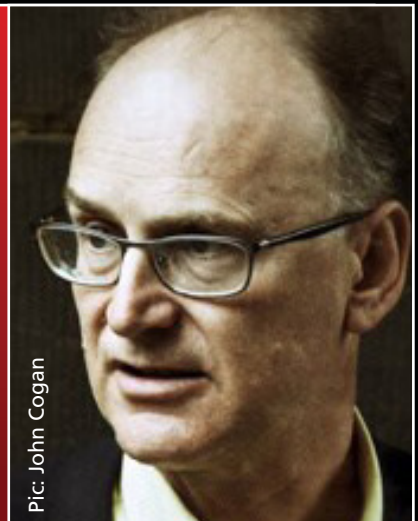
His TED talk “When Ideas Have Sex” has been viewed more than two million times.

As Viscount Ridley, he was elected to the House of Lords in February 2013 and served on the science and technology select committee 2014-2017.

Matt worked for *The Economist* for nine years as science editor, Washington correspondent and American editor.

He will give this year's IEA Hayek Memorial Lecture at Church House, Westminster, on November 14.

To attend, email events@iea.org.uk



Pic: John Cogan