TIM HARFORD: DON'T FORGET the SMALL STUFF

The best-selling author on technological progress – and why the little things mean a lot

Fans of the 1982 sci-fi classic *Blade Runner* – and I am one of them – have to admit that the film has a few moments that, to modern eyes, look a little odd.

When our hero Deckard falls for "Rachael", he already knows that Rachael is a highly intelligent organic robot, with memories uploaded from a human.

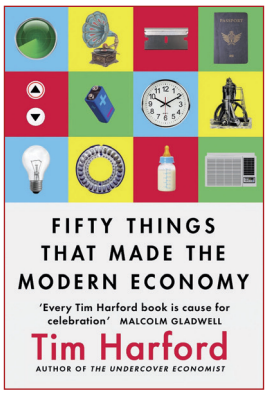
She is so sophisticated that she cannot be distinguished from a human without specialised equipment in the hands of an expert operator (such as Deckard himself).

Yet Deckard likes her. So, faced with an artificial intelligence in a synthetically organic body that has been schooled through a memory upload – how does he ask her out on a date?

Simple: he goes to a graffiti-scrawled public payphone in the corner of a bar and dials her number.

It's a jarring gap between the humble payphone and beguiling robot on the other end of the line.

Yet we often make such mistakes when imagining new technologies. We wrongly assume that a technology like "Rachael" could somehow appear, yet little else would change.



And we're hypnotised by the most sophisticated stuff. In doing so, we miss humble ideas that quietly change the world.

When I embarked on my latest project – a book and BBC series about "Fifty Things That Made the Modern Economy" – everyone I spoke to urged me to include Gutenberg's movable type printing press, which was developed in the mid-1400s, and which ushered in the reformation, mass literacy, the novel, the newspaper, and much else. It was, of course, a revolution.

Yet when I came face-to-face with a 1450s Gutenberg bible, with its dense black columns of glorious Latin text, I realised that there was another story to tell: the story of paper.

This is the economist in me speaking: without paper, the economics of printing simply do not work.

It is possible to print on animal skin parchment – Gutenberg did just that with some of his bibles.

But the whole point of a printing press is to mass produce writing at scale. To make that a profitable affair, you need a way of

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mass-producing a writing surface. That cheap, affordable writing surface is paper – now so cheap that we even use it to wipe (ahem) all sorts of things.

Other revolutionary cheap-as-toilet-paper inventions include: barbed wire, the cheap fencing material which allowed the colonisation of the American west; the imperfect-yet-convenient MP3 music format; and the shipping container, a simple box that transformed global trade beyond anything the World Trade Organization could manage.

Of course, some innovations truly are revolutionary, producing effects that would have seemed like sorcery to previous generations: electricity is one example; the computer is another.

Such inventions fit our instincts about what "new technology" should be. They are a far cry from paper and shipping containers – much more like the mysterious organic robot Rachael.

Yet even here we focus too much on the cool technology itself, and too little about the everyday organisational and social changes

needed to make it work.

Electricity could have transformed US manufacturing in the 1890s: the technology was ready. Yet it wasn't until the 1920s that electric motors delivered on their promise and productivity surged.

The reason for the thirty-year delay? As the economic historian Paul David explained, in a famous paper published in 1990, the new electric motors, which replaced steam engines, only worked well when everything else changed too.

Steam-powered factories had delivered power through awe-inspiring drive-shafts, secondary shafts, belts, belt towers, and thousands of drip-oilers. Replacing the single huge engine with a huge electric motor didn't change much.

Electricity blossomed only when factories themselves were reconfigured. The huge steam engine was replaced by dozens of small motors, drive-shafts by wires. Factories spread out, working on the logic of a production line rather than the logic of proximity to a drive-shaft. There was room to use ceiling-slung cranes – perhaps even room to introduce a few skylights.

Workers were given responsibility for their own machines, which meant that they needed better training and a different structure of pay and bonuses. The electric motor was a wonderful invention, once we changed all the everyday details that surrounded it.

I know as little about the future of technology as anyone else.

But I have learned three lessons by looking at its past. One: don't be dazzled by the clever stuff. Two: simple inventions can change the world; what matters is that they're cheap. Three: always ask, "To make this invention work, what else will have to change?" ●

Tim Harford is an economist, journalist and broadcaster.

He is author of *Fifty Things That Made the Modern Economy*, *Messy*, and the million-selling *The Undercover Economist*.

Tim is a senior columnist at the Financial Times. He also presents Radio 4's "More or Less" and the iTunes-topping series "Fifty Things That Made the Modern Economy".

Tim will speak at our upcoming **THINK** conference this June. For a chance to win tickets – and a copy of *Fifty Things* – please see page 26.

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