

Wasiu O Popoola

Of old habits and new ideas

Dr P Marazzi/Science Photo Library



Dogged by controversy

Calestous Juma argues that the polio vaccine is just one in a long distinguished line of innovations that meet resistance and controversy.

Innovation and Its Enemies: Why People Resist New Technologies

Calestous Juma

2016 Oxford University Press
£19.99hb 432pp

Poliomyelitis or polio is a disease that causes irreversible paralysis and even death. Unfortunately, it mainly affects children under the age of five. This debilitating disease must be banished and it is indeed on its way out. According to the World Health Organization, polio cases have decreased by over 99% since 1988, from an estimated 350 000 cases in more than 125 endemic countries. This is mainly thanks to the “Global Polio Eradication Initiative” (GPEI) that rolled out a large-scale polio vaccination programme in the late 1980s. One might be excused, then, for assuming that the invention and administration of the Polio vaccine, which made the GPEI possible, is a good thing that must surely be globally applauded. Well, not quite. Innovations such as the polio vaccine are often not embraced by everyone. It should therefore come as no surprise that in certain parts of the world, the polio vaccination is still dogged by controversy even today.

There are various reasons why a section of the population will vocally, and sometimes even militantly, oppose any innovation. Some of these reasons are explored by

author Calestous Juma in *Innovation and Its Enemies: Why People Resist New Technologies*. When it comes to innovation, the book explains that neither the genuineness nor the gravity of a problem being addressed is enough to make the innovation universally acceptable. For example, the author talks of “transgenic farming” or genetically modified crops. If you think the burgeoning world population requires food security and that engineering the genetic make-up of crops to increase yield is a universally acceptable solution, then dream on. Environmentalists, green campaigners and self-styled “friends of the Earth” believe that it is in the best interests of our planet to protect it from any such farming and its proponents, who are often deemed as “foes of the Earth”.

Juma argues that some of the controversies that follow innovations could be directly traced to the very change brought about by the innovation itself. He echoes Austrian-American economist Joseph Schumpeter’s concept of “creative destruction”, which suggests that “the change that comes with innovation requires the destruction of

something old and replacing it with something new”. This very process brews tension between the proponents of incumbency and the people promoting innovative ideas. The palpable tension is further fuelled by the “fear of loss”, or better still, “perceived loss” that is associated with change. Loss here could be anything from economic loss, to loss of the Earth’s biodiversity and even one’s cultural heritage.

In the book, Juma addresses the controversy that follows each of nine flagship innovations. With enough attention to fine historical details, the book promises not to bore the reader, especially combined with Juma’s lively and engaging style. Each chapter starts with a detailed historical background to the chosen innovation, followed by a lucid description of its specifics, before delving into the controversies surrounding the innovation and the reasons behind the tension. Starting with the ancient but lively story of the innovations relating to coffee and its consumption, through to controversy-laden transgenic farming, Juma tries to communicate to the reader, the justifications and evidence that are often used by antagonists in suppressing a particular innovation. Some of the reasons why a certain group will vehemently oppose a breakthrough, and the methods used to stop it, are quite obvious, but readers should be prepared to be surprised or in the very least, amused.

Take the battle of electric currents, for example. The book chronicles how the proponents of Thomas Edison’s direct current (DC) vilified the alternating current (AC) championed by George Westinghouse in the 1800s. Edison and his supporters publicly demonized AC as cruel and unsafe. To substantiate their claim, they sent 300 volts AC through the spinal cord and brain of animals to electrocute them. This inadvertent act of horror would later pave the way for the use of the electric chair as a form of capital punishment in the US. Edison actually realized the superiority of AC and his primary intention was not to stop its adoption, but rather to delay it so he could recover/divest his investment from DC.

Juma really demonstrates his storytelling prowess while writing about the incredibly rich history of coffee (*Coffea arabica*) and how this beverage, native to the highlands of Ethiopia, conquered the rest of the world, and of course, the resistance encountered along the way in doing so. Juma discerningly narrates the political, cultural and at times the “dodgy” premises used by antagonists to oppose the global spread of coffee and coffee houses. Sadly, not all the chapters in the book are as rich in detail as the story of coffee.

In the very last chapter of the book Juma addresses the question of whether the controversies that accompany innovations can ever be avoided and gives some practical suggestions directed at policymakers and public-office holders on this. While his ideas might not entirely avert controversies, he certainly believes they can help manage controversies better.

Readers should be aware that Juma gives no reasons or excuses for his choice of selected innovations discussed in the book. Some very topical and interesting innovations along with their controversies are therefore not tackled. Of the long

Being an innovator is never plain sailing

list of overlooked controversy-prone innovations, one that is conspicuously missing in my view is birth-control pills. These are embroiled in controversy even today in different parts of the world. Ever since Margaret Sanger, who coined the term “birth control” in 1914, opened her first family planning clinic in around 1916, birth control has always been controversial. The *Zubik v. Burwell* case before the US Supreme Court in May 2016 is a stark reminder of the never-ending controversy surrounding birth control pills. It certainly would be interesting to know what Juma thinks about this innovation and why many people are so against it. I doubt very much that the author is oblivious to this example; it must have been a conscious decision to

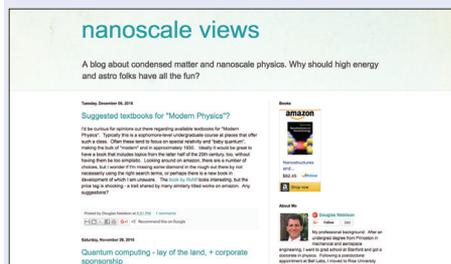
leave this particular example out. By so doing, the breadth of the book is narrowed and this might disappoint some readers.

Moreover, except for the stories of coffee and the printing press, the other controversies discussed in the book are overly focused on a particular geographical location – the US – though this may well be the author’s target audience. With so much history of innovation and resistance to choose from, some level of selectivity is to be expected in a book of this size. Nonetheless, some readers will find the geographical confinement unappealing.

What is certainly not missing in the book is the unmistakable passion of Juma regarding innovation. This comes across strikingly clear right from the first page of the book to the very last. Reading *Innovation and its Enemies* will not make anyone an innovator, but it brings to the fore why being an innovator is never plain sailing.

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Web life: Nanoscale Views



URL: nanoscale.blogspot.co.uk

So what is the site about?

Nanoscale Views is a blog written by physicist Douglas Natelson, who heads the physics and astronomy department at Rice University in the US. The blog has a catchy strapline – “A blog about condensed matter and nanoscale physics. Why should high energy and astro folks have all the fun?” – that essentially describes why Natelson began blogging in mid-2005. Indeed, in his first post, he describes hunting around the Internet for atomic, molecular and optical physics blogs, only to come up empty-handed. Since then, Natelson’s blog has been regularly updated, at a rate of four to five posts a month, and examines a myriad of topics.

What are some of the topics covered?

As the blog’s title suggests, condensed-matter posts are a regular feature: from quantum

computing to metasurfaces. These are often in-depth, but Natelson keeps the contents and his language as simple as possible, making all his writing enjoyable. He often covers a topic in a series of posts over a week or two, so no individual post is onerously long. He also regularly follows up on previous research news and topics, even a few years on, providing a swiftly developing field with the necessary context. Apart from research, Natelson also writes a variety of posts on everything from conference and workshop reports, collections of short and interesting news briefs and job postings. He often writes about academic life – be it career advice or academic publishing or even occasionally funding and policy news. Interestingly, Natelson also reports on general big physics news – for example, the discovery of a terrestrial exoplanet around habitable zone around Sun’s nearest neighbour – that does not lie strictly in the AMO field, but is of definite interest to anyone in physics.

Who is it aimed at?

The vast variety of topics covered means that the blog’s readership is wide. While a healthy interest in condensed-matter physics would benefit regular readers, it is not at all a prerequisite. In fact, the blog would be a good place for anyone looking for a solid introduction to the field (especially thanks to Natelson’s wide archive of

topics, which he links to in most posts), as well as for those who wish to keep up to date with developments within it.

Can you give me a sample quote?

From a February 2016 post introducing “density functional theory”: “Let me try an analogy. You’re trying to arrange the seating for a big banquet, and there are a bunch of constraints: Alice wants very much to be close to the kitchen. Bob also wants to be close to the kitchen. However, Alice and Bob both want to be as far from all other people as possible. Chairs can’t be on top of each other, but you still need to accommodate the full guest list. In the end you are going to care about the answers to certain questions: How hard would it be to push two chairs closer to each other? If one person left, how much would all the chairs need to be rearranged to keep everyone maximally comfortable? You could imagine solving this problem by brute force – write down all the constraints and try satisfying them one person at a time, though every person you add might mean rearranging all the previously seated people. You could also imagine solving this by some trial-and-error method, where you guess an initial arrangement, and make adjustments to check and see if you’ve improved how well you satisfy everyone. However, it doesn’t look like there’s any clear, immediate strategy for figuring this out and answering the relevant questions.”