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Jacek Mańko, MA
is a cognitive scientist by education, currently researching the impact of technology and digital media on society.
jmanko@kozminski.edu.pl

The "Machinery Question"

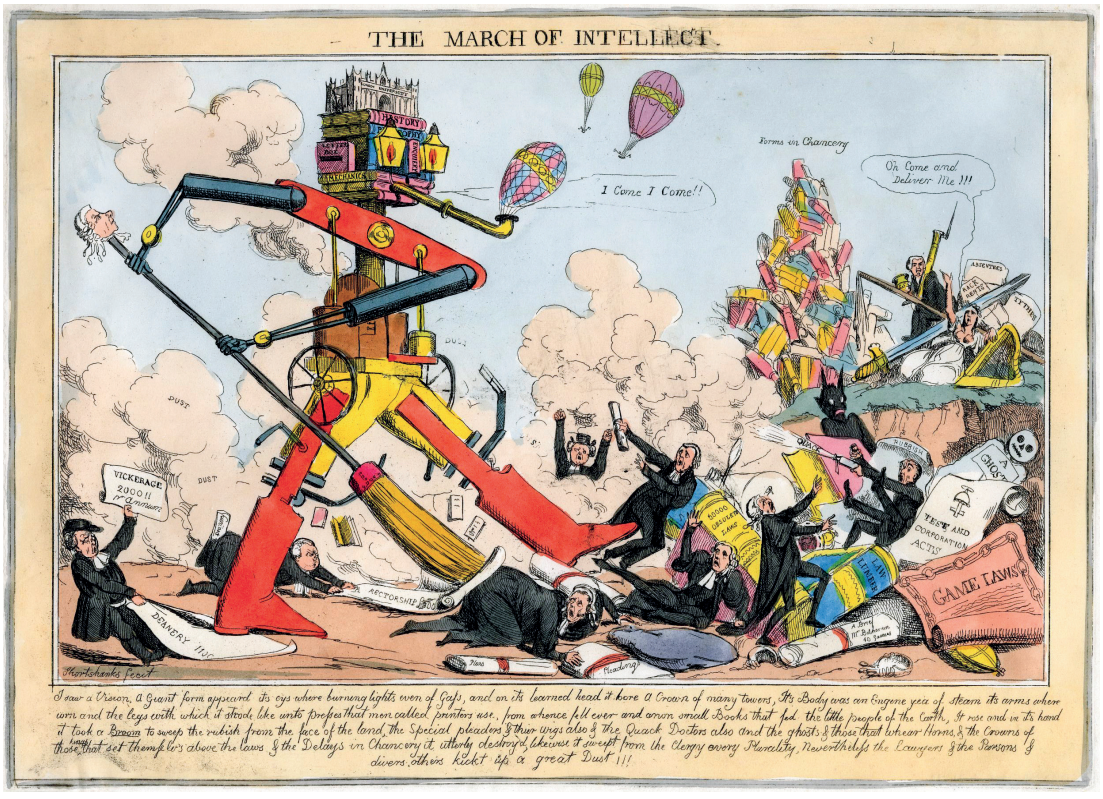
On the historical evolution of views regarding technology's impact on human labor.

Jacek Mańko

Department of Management in Networked Society
Kozminski University, Warsaw

Humankind – the species *Homo sapiens* – emerged on Earth around 300,000 years ago. For much of our history, however, there was little to suggest that one day, within the course of just a few millennia, we would come to develop advanced civilizations, land on the Moon, and invent TikTok.

The use of tools – if not fully-fledged machines – has always been a defining characteristic of our species. But it was not until classical antiquity that more sophisticated machines, some centuries ahead of their time, began to appear. Furthermore, technological and societal progress has never followed a straightforward path; rather, it has been intermittently marked by major breakthroughs and, at times, abrupt revolutions. The broader economic and social context has also played a key role: for instance, improvements in



Satire against corruption: A massive automaton representing the new London University (later University College London) tramples greedy clergymen, "quack" doctors, lawyers, and the crown

agriculture created a surplus of labor, allowing more people to work in the nascent industries.

Historically, the Industrial Revolution, kicked off in the United Kingdom in the late eighteenth and early nineteenth centuries. The steam engine was then first applied on an industrial scale, spurring the growth of many sectors, especially textiles. With the rise of factories and mechanization, questions emerged about the future of human labor and the role of workers. This "machinery question" (as it was then called) was already being discussed by 1817, when British economist David Ricardo wrote:

> "If, by improved machinery, with the employment of the same quantity of labour, the quantity of stockings could be quadrupled, and the demand for stockings were only doubled, some labourers would necessarily be discharged from the stocking trade."

While this example may seem a bit outdated today, and Ricardo likely had little understanding of what we today call marketing or demand generation, his words clearly echo modern concerns about automation (even if the term itself was not yet used) and the fear of being replaced by machines – of being "discharged," becoming part of the "Uneccessariat."

The Industrial Revolution reshaped British society, bringing a surge of interest in spreading scientific knowledge, especially in the natural sciences – a movement known as the "March of the Intellect." This trend sparked intense public debate and captured imaginations. An 1828 drawing by Robert Seymour vividly illustrates the spirit of the era, showing a steam-powered, humanoid robot sweeping away outdated laws, court cases, and "quack doctors" with a giant broom.

In a sense, nothing new

The rapid development of artificial intelligence (AI) tools – particularly the rise of generative AI since late 2022 – has sparked debates reminiscent of those from the nineteenth century. Once again, there is widespread discussion about the kinds of advancements these "new machines" might bring to science and society. At the same time, concerns are rising about their potential impact on jobs and even entire economies, with some suggesting that we might be on the brink of another watershed comparable to the Industrial Revolution.

Amid the flood of media coverage about AI, one recurring theme is the potential for mass automation of numerous jobs. One report has predicted that AI could displace up to 300 million jobs globally, whilst simultaneously boosting productivity and creating new employment opportunities. Many workers now worry about the future, considering career shifts to fields less vulnerable to automation. There are also more ominous voices warning that, should AI reach highly advanced levels, it could spiral out of control or even rebel, leading to disaster – even spelling doom for humanity.

But in fact, this is actually nothing new. The "machinery question" has been around since at least the nineteenth century, yet remains unresolved.

History shows a recurring resistance to new technology, whether it was opposition to early railways (even back when trains moved at modest speeds) or teachers' protests against calculators in classrooms in the 1960s. Around that same period, more advanced "calculators" – computers – were becoming widespread, sparking fears of massive job losses. Yet the expected mass technological unemployment never materialized; as many old jobs disappeared, new ones emerged. Almost a century ago, British economist John Maynard Keynes predicted that technology would soon reduce the workweek to 15 hours – a forecast that has yet to come true. In fact, despite technological progress, it often feels as though we are working longer hours.

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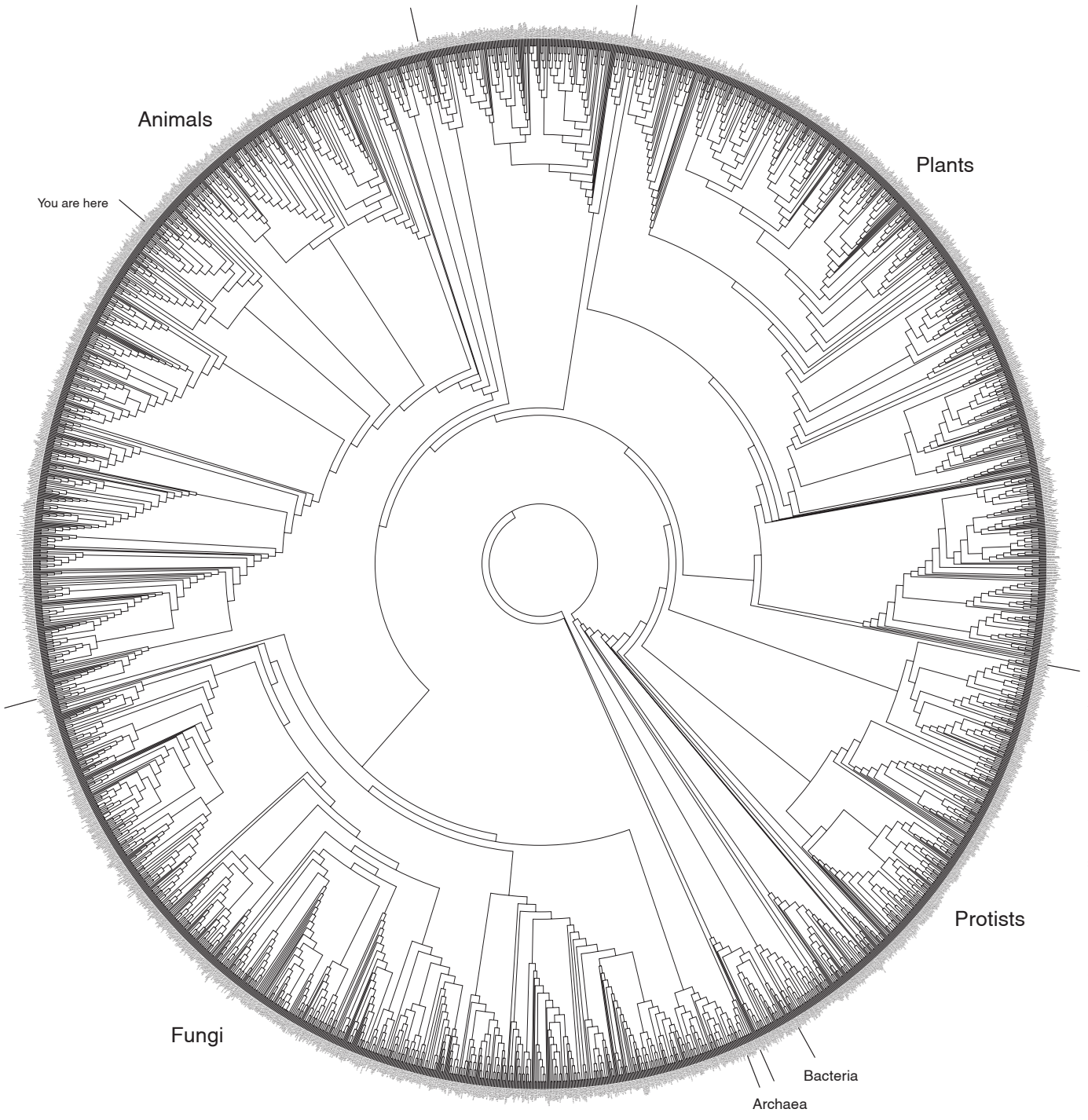
Today some argue that just as the fears voiced decades ago about calculators in classrooms or about technological unemployment were exaggerated, today's anxieties about AI (especially generative AI) in education and the workplace might also prove to be be overblown. However, this time, the debate has a different tone, as technology now plays a dominant role in almost every aspect of life and is being manufactured in unprecedented ways. More optimistic voices view AI as part of an inevitable march of progress – from the steam engine to electricity to digital devices. AI, potentially transformative and even superhuman, is seen as the culmination of this long technological evolution, with companies like OpenAI claiming it "benefits all of humanity."



The "cloud" forming the perimeter of this circle consists of the names of various species, visible only upon significant magnification. A curious reader might want to try to zoom in to search for where our species, *Homo sapiens*, is positioned.

But that's not exactly how things work – or perhaps not at all how they work.

Neither biological evolution nor technological progress follows a linear path, advancing from simpler forms to a so-called "pinnacle of creation" – be it humanity (*Homo sapiens*) or AI. Humanity is often regarded as the crowning glory of evolution due to our intellect, and the hopes and fears surrounding AI revolve around the idea that it could potentially dethrone us in this regard. The concept of an "evolutionary ladder" has been a popular belief throughout history and remains so today, essentially a myth that dates back to pre-Darwinian times.

In reality, biological evolution does not really resemble a ladder; it's more like a disk radiating outward over time, with currently existing species lined up around its perimeter. Unlike in the "ladder" concept, here all (living) organisms are depicted as having followed the same kind of evolutionary path and achieved evolutionary success – it's impossible

to declare which segment of the circle, and based on what criteria, might be rightfully considered the "pinnacle of creation."

At the same time, this view highlights the many possible paths evolution can take. Not all of them are successful – biology is full of examples of organisms that turned out to be evolutionary dead ends, surviving only briefly or being poorly adapted. The same is true for technological evolution. In the twentieth century alone, there were numerous intriguing ideas that, for various reasons, failed to catch on.

Take, for example, the Cybersyn project – an original attempt in Chile to create an early internet of sorts, developed between 1971 and 1973, which was abruptly cut short by a military coup. Or consider the rise of cybernetics in the mid-twentieth century, which often presented a radically different view on the roles of computers, humanity, and the environment. Some cyberneticists did not want to limit computers to tasks like calculations, predictions, or work automation; in their vision, technology could significantly expand our horizons, rather than just passively offering new products to consume or producing them autonomously. However, none of this came to fruition, as cybernetics lost a sort of evolutionary race to the emerging field of artificial intelligence (which, interestingly, later adopted many ideas from cybernetics).

We do have an influence

Unlike blind biological evolution, which operates like a tinkerer with a "if it ain't broke, don't fix it" mindset, technological progress relies primarily on human decision-making – though we, too, can be shortsighted. Ironically, this progress is by no means automatic or mechanical; it does not happen on its own. Instead, it results from a complex mix of factors – not just technological but also social and political.

The Industrial Revolution brought factories, but with them came child labor and terrible working conditions. In its early years, the new wealth mainly flowed to industrialists and economic inequalities soared. This situation ultimately fueled the struggle for what we now call labor rights, health and safety standards, and trade unions.

The development of artificial intelligence may follow a similar path (and it has sometimes already done so). Digital technologies and AI are primarily driven by a handful of massive corporations that use innovation to increase profits and consolidate control and/or power. Ironically, while AI's growth is being driven by all of us who provide online data every day (as well as by a poorly paid army of workers in the Global South), much like in nineteenth-century England, the profits remain concentrated among a narrow oligopoly of tech companies.

These companies often seem indifferent to issues like the spread of fake news, deepfakes, and the erosion of democratic processes. And, much like back in the nineteenth century, resistance to this digital monopolization is growing – consider last year's strike by US screenwriters and actors against AI and streaming platforms, or the recent (if sluggish) protests for media freedom in Poland.

Although people are not machines, in the clash against non-human technology, we may end up being reduced to something like machines – albeit as less efficient ones, easily replaced by newer, more effective alternatives. Yet, there's nothing remotely wrong with striving to automate work: this drive is the outcome of a relatively recent tech/business consensus that has given rise to the very technologies we have today.

Humans has an influence on biological evolution, driving some species to extinction or breeding others on a massive scale. Analogously, humankind is also able to shape technological development (albeit by less drastic methods), which could indeed become a democratic and democratizing tool or, as envisioned by the cyberneticists, expand our horizons in unexpected ways. But this will not be possible if crucial decisions are left in the hands of a small group of tech leaders self-assuredly convinced of their mission to "benefit all of humanity."

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These companies, already gargantuan and valued at record levels, are still constantly pursuing further expansion. At the same time, their carbon footprint, particularly that of generative AI, is enormous (through hard to measure precisely). We are already now nearing the planet's limits for such exploitation, as unrestrained growth cannot continue without consequences.

These problems were unknown back at the start of the Industrial Revolution, which initiated the global processes of extracting (and burning) fossil fuels and automating labor. The "machinery question" is still awaiting resolution. If not now, then when? Another future is (still) possible. ■

Further reading:

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