Citation for published version (APA):

Citing this paper
Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher’s definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher’s website for any subsequent corrections.

General rights
Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

• Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the Research Portal

Take down policy
If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.
WHETHER AUTOMATION WREAKS HAVOC ON EMPLOYMENT OR NOT, THE FUTURE OF WORK UNDER CAPITALISM LOOKS INCREASINGLY BLEAK. WE MUST NOW LOOK TO POST-WORK HORIZONS.

Nick Srnicek & Alex Williams
In recent months, a range of studies has warned of an imminent job apocalypse. The most famous of these—a study from Oxford—suggests that up to 47 percent of US jobs are at high-risk of automation over the next two decades. Its methodology—assessing likely developments in technology, and matching them up to the tasks typically deployed in jobs—has been replicated since then for a number of other countries. One study finds that 54 percent of EU jobs are likely automatable, while the chief economist of the Bank of England has argued that 45 percent of UK jobs are similarly under threat.

This is not simply a rich-country problem, either: low-income economies look set to be hit even harder by automation. As low-skill, low-wage and routine jobs have been outsourced from rich capitalist countries to poorer economies, these jobs are also highly susceptible to automation. Research by Citi suggests that for India 69 percent of jobs are at risk, for China 77 percent, and for Ethiopia a full 85 percent of current jobs. It would seem that we are on the verge of a mass job extinction.

NOTHING NEW?

For many economists however, there is nothing to worry about. If we look at the history of technology and the labor market, past experiences would suggest that automation has not caused mass unemployment. Automation has always changed the labor market. Indeed, one of the primary characteristics of the capitalist mode of production has been to revolutionize the means of production—to really subsume the labor process and reorganize it in ways that more efficiently generate value. The mechanization of agriculture is an early example, as is the use of the cotton gin and spinning jenny. With Fordism, the assembly line turned complex manufacturing jobs into a series of simple and efficient tasks. And with the era of lean production, we have had the computerized management of long commodity chains turn the production process into a more and more heavily automated system.

In every case, we have not seen mass unemployment. Instead we have seen some jobs disappear, while others have been created to replace not only the lost jobs but also the new jobs necessary for a growing population. The only times we see massive unemployment tend to be the result of cyclical factors, as in the Great Depression, rather than some secular trend towards higher unemployment resulting from automation. On the basis of these considerations, most economists believe that the future of work will likely be the same as the past: some jobs will disappear, but others will be created to replace them.
Most economists believe that the future of work will likely be the same as the past: some jobs will disappear, but others will be created to replace them.
While these jobs are gone, and highly unlikely to come back, the next wave of automation will affect the remaining sphere of human labor. An entire range of low-wage jobs are now potentially automatable, involving both physical and mental labor.

Given that it is quite likely that new technologies will have a larger impact on the labor market than earlier waves of technological change, what is likely to happen? Will robots take your job? While one side of the debate warns of imminent apocalypse and the other yawns from the historical repetition, both tend to neglect the political economy of automation—particularly the role of labor. Put simply, if the labor movement is strong, we are likely to see more automation; if the labor movement is weak, we are likely to see less automation.

**WORKERS FIGHT BACK**

In the first scenario, a strong labor movement is able to push for higher and higher wages (particularly relative to globally stagnant productivity growth). But the rising cost of labor means that machines become relatively cheap in comparison. We can already see this in China, where real wages have been surging for more than 10 years, thereby making Chinese labor increasingly less cheap. The result is that China has become the world’s biggest investor in industrial robots, and numerous companies—most famously Foxconn—have all stated their intentions to move towards increasingly automated factories.

This is the archetype of a highly automated world, but in order to be achievable under capitalism it requires that the power of labor be strong, given that the relative costs of labor and machines are key determinants for investment. What then happens under these circumstances? Do we get mass unemployment as robots take all the jobs? The simple answer is no. Rather than mass decimation of jobs, most workers who have their jobs automated end up moving into new sectors.

In the advanced capitalist economies this has been happening over the past 40 years, as workers move from routine jobs to non-routine jobs. As we saw earlier, the next wave of automation is different, and therefore its effects on the labor market are also different. Some job sectors are likely to take heavy hits under this scenario. Jobs in retail and transport, for instance, will likely be heavily affected. In the UK, there are currently 3 million retail workers, but estimates by the British Retail Consortium suggest this may decrease by a million over the next decade. In the US, there are 3.4 million cashiers alone—nearly all of whose work could be automated. The transport sector is similarly large, with 3.7 million truck drivers in the US, most of whose jobs could be incrementally automated as self-driving trucks be-
come viable on public roads. Large numbers of workers in such sectors are likely to be pushed out of their jobs if mass automation takes place.

Where will they go? The story that Silicon Valley likes to tell us is that we will all become freelance programmers and software developers and that we should all learn how to code to succeed in their future utopia. Unfortunately they seem to have bought into their own hype and missed the facts. In the US, 1.8 percent of all jobs require knowledge of programming. This compares to the agricultural sector, which creates about 1.5 percent of all American jobs, and to the manufacturing sector, which employs 8.1 percent of workers in this deindustrialized country. Perhaps programming will grow? The facts here are little better. The Bureau of Labor Statistics (BLS) projects that by 2024 jobs involving programming will be responsible for a tiny 2.2 percent of the jobs available. If we look at the IT sector as a whole, according to Citi, it is expected to take up less than 3 percent of all jobs.

What about the people needed to take care of the robots? Will we see a massive surge in jobs here? Presently, robot technicians and engineers take up less than 0.1 percent of the job market—by 2024, this will dwindle even further. We will not see a major increase in jobs taking care of robots or in jobs involving coding, despite Silicon Valley’s best efforts to remake the world in its image.

This continues a long trend of new industries being very poor job creators. We all know about how few employees worked at Instagram and WhatsApp when they were sold for billions to Facebook. But the low levels of employment are a widespread sectoral problem. Research from Oxford has found that in the US, only 0.5 percent of the labor force moved into new industries (like streaming sites, web

---

**THE BIRTH OF The Robot**

**robot /ˈrəʊbət/ noun - a machine capable of carrying out a complex series of actions automatically, especially one programmable by a computer.**

The word “robot” first entered the public lexicon in 1920, when the Czech writer Karel Čapek published his play R.U.R. (Rossum’s Universal Robots). The story of the play centers around a factory producing living creatures resembling humans as an alternative emotionless and obedient workforce. When the robots—roboti, as they are called in the play—eventually become conscious beings, a global robot rebellion leads to the extinction of the human race.

It was not Čapek himself who came up with the term “robot”, but rather his brother Josef who derived the word from the Czech robota, meaning “corvée” or “serf labor”. The word robota had been used in many Slavic languages to indicate the period a serf was forced to work for his lord.
Robots were popularized by the American author and professor of biochemistry Isaac Azimov, who focused on the relation between robots and society in many of his science fiction stories. In his 1942 short story *Runaround* he introduced the famous Three Laws of Robotics, designed to minimize the threat robots posed to human society.

1. A ROBOT MAY NOT INJURE A HUMAN BEING OR, THROUGH INACTION, ALLOW A HUMAN BEING TO COME TO HARM.

2. A ROBOT MUST OBEY THE ORDERS GIVEN TO IT BY HUMAN BEINGS, EXCEPT WHERE SUCH ORDERS WOULD CONFLICT WITH THE FIRST LAW.

3. A ROBOT MUST PROTECT ITS OWN EXISTENCE AS LONG AS SUCH PROTECTION DOES NOT CONFLICT WITH THE FIRST OR SECOND LAW.

He later formulated a fourth, or zeroth law that outranked the others:

0. A ROBOT MAY NOT HARM HUMANITY, OR, BY INACTION, ALLOW HUMANITY TO HARM.
design and e-commerce) during the 2000s. The future of work does not look like a bunch of programmers or YouTubers.

In fact, the fastest growing job sectors are not for jobs that require high levels of education at all. The belief that we will all become high-skilled and well-paid workers is ideological mystification at its purest. The fastest growing job sector, by far, is the healthcare industry. In the US, the BLS estimates this sector to create 3.8 million new jobs between 2014 and 2024. This will increase its share of employment from 12 percent to 13.6 percent, making it the biggest employing sector in the country. The jobs of “healthcare support” and “healthcare practitioner” alone will contribute 2.3 million jobs—or 25 percent of all new jobs expected to be created.

There are two main reasons for why this sector will be such a magnet for workers forced out of other sectors. In the first place, the demographics of high-income economies all point towards a significantly growing elderly population. Fewer births and longer lives (typically with chronic conditions rather than infectious diseases) will put more and more pressure on our societies to take care of elderly, and force more and more people into care work. Yet this sector is not amenable to automation; it is one of the last bastions of human-centric skills like creativity, knowledge of social context and flexibility. This means the demand for labor is unlikely to decrease in this sector, as productivity remains low, skills remain human-centric, and demographics make it grow.

In the end, under the scenario of a strong labor movement, we are likely to see wages rise, which will cause automation to rapidly proceed in certain sectors, while workers are forced to struggle for jobs in a low-paying healthcare sector. The result is the continued elimination of middle-wage jobs and the increased polarization of the labor market as more and more are pushed into the low-wage sectors. On top of this, a highly educated generation that was promised secure and well-paying jobs will be forced to find lower-skilled jobs, putting downward pressure on wages—generating a “reserve army of the employed”, as Robert Brenner has put it.

**WORKERS FALL BACK**

Yet what happens if the labor movement remains weak? Here we have an entirely different future of work awaiting us. In this case, we end up with stagnant wages, and workers remain relatively cheap compared to investment in new equipment. The consequences of this are low levels of business investment, and subsequently, low levels of productivity growth. Absent any economic reason to invest in automation, businesses fail to increase the productivity of the labor process. Perhaps unexpectedly, under this scenario we should expect high levels of employment as businesses seek to maximize the use of cheap labor rather than investing in new technology.

This is more than a hypothetical scenario, as it rather accurately describes the situation in the UK today. Since the 2008 crisis, real wages have stagnated and even fallen. Real average weekly earnings have started to rise since 2014, but even after eight years they have yet to return to their pre-crisis levels. This has meant that businesses have had incentives to hire cheap workers rather than invest in machines—and the low levels of investment in the UK bear this out. Since the crisis, the UK has seen long periods of decline in business investment—the most recent being a 0.4 percent decline between Q12015 and Q12016. The result of low levels of investment has been virtually zero growth in productivity: from 2008 to 2015,
growth in output per worker has averaged 0.1 percent per year. Almost all of the UK’s recent growth has come from throwing more bodies into the economic machine, rather than improving the efficiency of the economy. Even relative to slow productivity growth across the world, the UK is particularly struggling.

With cheap wages, low investment and low productivity, we see that companies have instead been hiring workers. Indeed, employment levels in the UK have reached the highest levels on record—74.2 percent as of May 2016. Likewise, unemployment is low at 5.1 percent, especially when compared to their neighbors in Europe who average nearly double that level. So, somewhat surprisingly, an environment with a weak labor movement leads here to high levels of employment.

What is the quality of these jobs, however? We have already seen that wages have been stagnant, and that two-thirds of net job creation since 2008 has been in self-employed jobs. Yet there has also been a major increase in zero-hour contracts (employment situations that do not guarantee any hours to workers). Estimates are that up to 5 percent of the labor force is in such situations, with over 1.7 million zero-hour contracts out. Full-time employment is down as well: as a percentage of all jobs, its pre-crisis levels of 65 percent have been cut to 63 percent and refused to budge even as the economy grows (slowly). The percentage of involuntary part-time workers—those who would prefer a full-time job but cannot find one—more than doubled after the crisis, and has barely begun to recover since.

Likewise with temporary employees: involuntary temporary workers as a percentage of all temporary workers rose from below 25 percent to over 40 percent during the crisis, only partly recovering to around 35 percent today. There is a vast number of workers who would prefer to work in more permanent and full-time jobs,
but who can no longer find them. The UK is increasingly becoming a low-wage and precarious labor market—or, in the Tories’ view, a competitive and flexible labor market. This, we would argue, is the future that obtains with a weak labor movement: low levels of automation, perhaps, but at the expense of wages (and aggregate demand), permanent jobs and full-time work. We may not get a fully automated future, but the alternative looks just as problematic.

These are therefore the two poles of possibility for the future of work. On the one hand, a highly automated world where workers are pushed out of much low-wage non-routine work and into lower-wage care work. On the other hand, a world where humans beat robots but only through lower wages and more precarious work. In either case, we need to build up the social systems that will enable people to survive and flourish in the midst of these significant changes. We need to explore ideas like a Universal Basic Income, we need to foster investment in automation that could eliminate the worst jobs in society, and we need to recover that initial desire of the labor movement for a shorter working week.

We must reclaim the right to be lazy—which is neither a demand to be lazy nor a belief in the natural laziness of humanity, but rather the right to refuse domination by a boss, by a manager, or by a capitalist. Will robots take our jobs? We can only hope so.

*Note: All uncited figures either come directly from, or are based on authors’ calculations of, data from the Bureau of Labor Statistics, O*NET and the Office for National Statistics.*