Automation

Compiled and written
by Matt Cole

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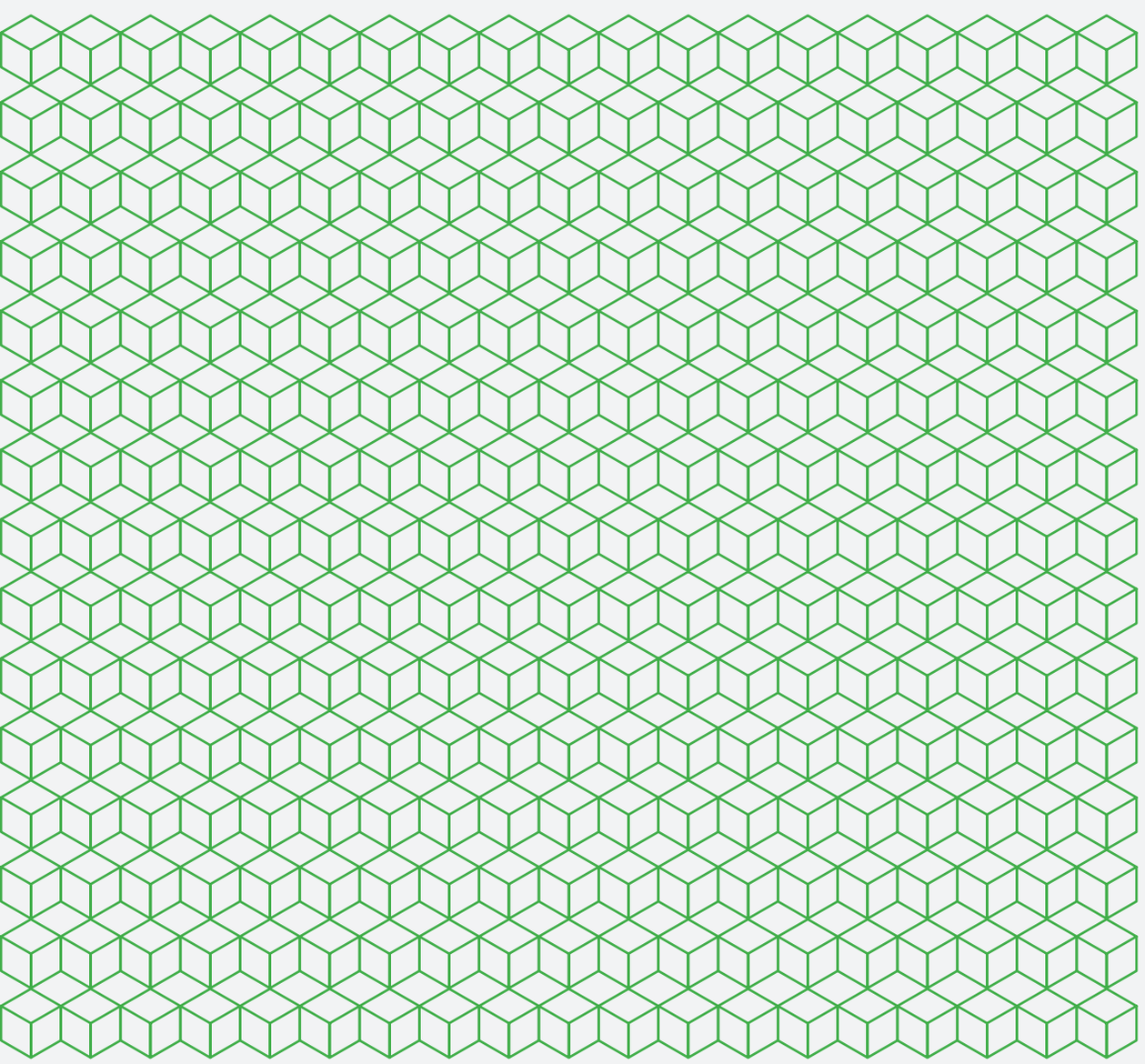
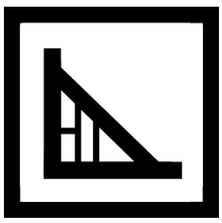




Autonomy

Automation

Like any concept, automation has a history. Etymologically, automatic has its root in the combination of the Greek autos or "self" and matos "thinking, animated". *Automatos* refers to both persons acting of their own will and self-moving or self-acting things. This referent endows the concept with an almost magical quality, a parallel that the cybernetic theorist Norbert Wiener observed in *God and Golem Inc*. Wiener claimed that this magical quality should serve as a prescient warning, due to the problems of interpretation i.e. what we wish for or program may not produce the result that we intended.

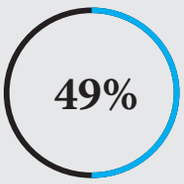
Ford Motor Co. VP Delmar S. Harder coined the term 'automation' in 1948, from the English automatic, which came into usage in 1812.

Automation is not new; however it has recently expanded at such an exponential scale, that some claim we are experiencing a 'second machine-age' or 'fourth industrial revolution'. The automation of goods, services, and knowledge production has reached a qualitatively new stage with the introduction of large-scale data collection. This has allowed for automated machine-learning on an unprecedented scale. The self-acting machine can now not only analyse, but also synthesise entirely new processes

"If a typical person can do a mental task with less than one second of thought, we can probably automate it using AI now or in the near future"
(Andrew Ng, VP and Chief Scientist of Baidu and Adjunct Prof. at Stanford University)

One robot per thousand workers reduces the employment to population ratio by about 0.18-0.34 percentage points and wages by 0.25-0.5 %.

The so-called 'rise of the robots' has provoked much research, analysis, and unfortunate hyperbole around the idea that robots will soon steal all our jobs. This focus on occupations is misleading. Human work will not disappear in five, ten, or even 20 years. Instead, humans will be in an ever-increasing competition with machines, as an increasing amount of activities are automated. This will likely have serious social, economic and political consequences.



Globally, up to 49 % of activities in work could be automated right now by adapting current technologies. (PwC)

Less than 5 % of jobs [current occupations] in the world can be fully automated; however 60% have at least 30% of activities that can be automated. (PwC)

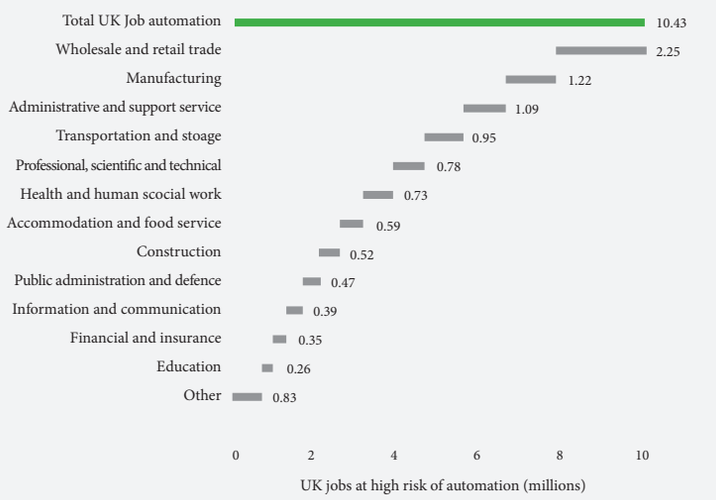
As these technologies become financially viable and widely available, they will transform entire business models and labour processes, redefining work hours, tasks, pay and eventually our social relation to work as whole. This will polarise what people do and these different types of jobs will lead to different lives. 'High tech' jobs are already surging alongside a substantial number of 'low tech' (and low paid) jobs.

The potential impact of job automation was given added urgency in 2013 when Carl Benedikt Frey and Michael A. Osborne, researchers at Oxford University, estimated that around 47% of US and 35.4% of UK employment had a "high risk of computerisation" over the next couple decades. However, last year Melanie Arntz, Terry Gregory and Ulrich Zierahn revisted this research and produced drastically different conclusions, that actually only around 10% of US and UK jobs and were under a high risk of automation. The starkly contrasting results were explained by the shift from the occupations-based approach of Frey and Osborne to the task-based approach of Arntz, Gregory, and Zierahn. PricewaterhouseCoopers [PwC] examined both studies and developed their own methodology, which not only linked the automatability of tasks that workers must perform, but also the education and training required of the workers themselves in order to do them.

30% of UK jobs, 35% of German jobs, and 38% of US jobs could potentially be at high risk of automation by the early 2030s. (PwC)

The scale of possible job losses in each sector is determined by two components: the share of these jobs in relation to total employment and the share of jobs in a sector that are estimated to have a high risk of automation. This means that while a sector like transportation and storage faces the highest potential impact of job automation at 56%, it only accounts for about 5% of total UK jobs, so the actual number of jobs at risk in this sector is close to 1 million or 9% of total potential job losses.

Potential Jobs at high risk of automation by UK industry sector



Sources: ONS, PIAAC data, PwC analysis (Graph from PwC March 2017 report)

For workers in the UK, there are two key differentiating factors: education and gender. Those individuals with an undergraduate degree or higher, the estimated potential risk of automation is only around 12%, while those with a GCSE-level education or lower face a daunting 46% potential risk. Based on PwC analysis, male jobs are at a greater risk of job automation, since men make up the majority of the workforce in many low-education sectors such as transportation and storage, manufacturing, and wholesale and retail trade sectors (which have risks of 34%, 22%, and 28% respectively).

Employee shares, estimated proportion and total number of employees at potential high risk of automation by UK worker characteristics

Worker Characteristics	Employment share%	Job automation (% at potential high risk)	Jobs at potential high risk of automation (millions)
Gender:			
Female	46%	26%	4.1
Male	54%	35%	6.3
Education:			
Low education (GCSE level and lower)	19%	46%	3.0
Medium education	51%	36%	6.2
High education (graduates)	30%	12%	1.2

Sources: ONS, PIAAC data, PwC analysis (Graph from PwC March 2017 report)

It is clear that human work will not disappear anytime soon. But it is also clear that technology will radically transform how we work. As the means of automated production become ever more financially viable, and the data required for machine-learning becomes more comprehensive, there will be fewer and fewer tasks in which humans can outperform machines. Manual, intellectual, and soon emotional labour could eventually be displaced.

How the 'rise of the robots' will shape the future is ultimately a political question.

Given this, we might currently be witnessing the end of human labour power being the central factor of production; however how the 'rise of the robots' will shape the future is ultimately a political question. So far, social crises induced by automation have not resulted in a surge of radical social welfare initiatives; however there is growing support for policies such as universal basic income and a shorter workday or week. Unless we start changing the discourse toward more collective models of social reproduction, automation will result in compounded inequality.

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