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**Book reviews
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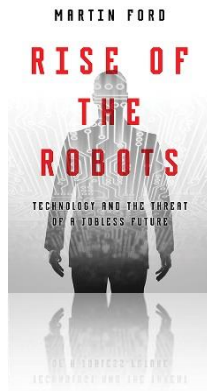
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The Rise of the Robots: Technology and the Threat of Mass Unemployment



Ford, Martin, (2015), Oneworld Publications, Britain.

“The frightening reality is that if we don’t recognize and adapt to the implications of advancing technology, we may face the prospect of a “perfect storm” where the impacts from soaring inequality, technological unemployment, and climate change unfold roughly in parallel, and in some ways amplify and reinforce each other. If, however, we can fully leverage advancing technology as a solution – while recognizing and adapting to its implications for employment and the distribution of income – then the outcome is likely to be far more optimistic. Negotiating a path through these entangled forces and crafting a future that offers broad-based security and prosperity may prove to be the greatest challenge for our time.”

Summary

The robots are coming and we have to decide whether a future with them will bring prosperity or disaster. Historically, there has always been widespread scepticism that technological progress could bring disaster. Moreover, there were supporting arguments: in the West, especially in the twentieth century, the development of technology led to a more prosperous society. As the machines used in production processes improved, so did the productivity of workers operating the machines. This made the workers more valuable, and enabled them to demand higher wages. However, for the author of *The Rise of the Robots*, there are good reasons to believe that this spiral of progress has changed. For example, the average American employee in the manufacturing sector in 2013 earned 13% less than in 1973, although productivity had increased by 107% – and prices of housing, education, and health had increased exponentially. The reason, according to Martin Ford, is the rapid advance of computer technology.

Martin Ford challenges the widespread belief that machines are tools at the service of workers, and help workers increase their productivity. Rather, he argues, machines are turning against workers. Computers are increasingly efficient in acquiring new skills, thus making it harder for workers to adapt to their pace and level. This, in turn, leads to a global economy that requires less labour. In the near future, doctors, journalists, and ironically, even computer programmers may all be replaced by robots. Ford emphasises

the growing threat that intelligent algorithms represent – not only for traditional crafts (which are already disappearing) – but also for white collar jobs.

Nobody in Silicon Valley doubts that technology has the power to devastate entire industries and dominate sectors of the economy and job market. But Ford goes further and asks if the acceleration in technological progress is threatening the whole system. Ford analyses the impact the introduction of robotics has on the economy of developed countries, in key sectors such as health, education, and technology. The author's double degrees in computer engineering and business administration leads him to argue that we are facing the biggest societal change since the Industrial Revolution; and that we risk an implosion of the system unless we radically change our economic and political structures.

The author

Martin Ford is the founder of a software development company in Silicon Valley and has over 25 years of experience in computer design and software development. He was the first modern writer to denounce joblessness caused by technological developments. He published his first book, *The Lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future*, in 2009. Ford has a degree in computer engineering from the University of Michigan, and a degree in business administration from the Anderson School of Management at UCLA.

Key ideas and opinion

Many economists and politicians tend to ignore the problems arising from the rapid development and penetration of technology in almost every sector of the economy. After all, emphasises the author, **the monotonous, poorly paid, and lowly skilled jobs that are lost to automation tend to be viewed as undesirable. Many economists even use the description 'free up':** as if the workers who lose their low-skilled jobs are given the opportunity to obtain more education and better opportunities. **The assumption is that the West will always be able to create jobs that require higher qualifications and so offer better wages to absorb the newly 'freed up' workers** – and that these workers will manage to acquire the necessary training. The premises beneath this assumption, however, are shaky. For Ford, increased education and training are not the solutions for safeguarding employment. This is because, according to the author, **automation is coming to white collar jobs.**

The clearest evidence is found in the information technology industry itself. In 2012, for example, **Google generated a profit of nearly \$12 billion while employing fewer than 38,000 workers. In contrast, at its peak in 1979, General Motors had a workforce of 840,000 and revenues of \$11 billion.** The vehicle industry also created millions of jobs

in peripheral areas such as driving, repair, insurance, and rental. It is true that the internet also generates peripheral jobs. But research shows that while the internet can have an equalising effect (everyone can write a blog, open a shop on eBay, or develop a mobile application), the opportunities and salaries generated are very different from the solid middle-class jobs previously generated by businesses such as the vehicle industry. **Ford notes that revenues from internet activities tend to follow a logic of 'the winner takes all'**. Sales of books and music, classified advertising, and film rental, for example, are increasingly dominated by a handful of online distribution hubs. The obvious result has been a massive elimination of jobs.

As the number of people who lose jobs that anchor them in the middle-class increases, so the number of people who try their luck in the digital economy grows. Only a few, according to Ford, are lucky enough to star in success stories, and the vast majority will have difficulty maintaining a lifestyle considered as middle-class. **In developed economies, there have always been people who worked at the margins of the economy. However, to some extent, they were able to survive because of the wealth generated by a critical mass of middle-class consumers.** For Ford, the presence of a strong middle-class is one of the main factors that differentiates developed nations from poor ones. **Nevertheless, the erosion of the middle-class is increasingly evident in Europe, and even more so in America.**

According to Ford, higher education and the health sector are two critical areas in which technological progress is transforming employment. In the former, the main example given by Ford to explore the impact of automation is the appearance of massive and open online courses (**MOOCs**). The growth and improvement of this new phenomenon represent a global revolution that will finally bring quality education to hundreds of millions of poor people worldwide. But in the medium term, stresses the author, the evidence suggests that such courses mostly attract students who want to further their studies. Assuming that employers eventually give the same value to degrees obtained through **MOOCs** as to classic university degrees, the result could be a dramatic disruption of the entire higher education sector. **MOOCs will cause the cost of obtaining a university degree to fall, yet they represent a double-edged sword.** For example, the Georgia Institute of Technology has teamed up with Udacity (an educational not-for-profit organization) to provide the first MOOC master in information technology (for \$6,600 or 80% less than the on-campus master). **However, this same technology could devastate an industry that is a major employer. Ford argues that there may be a natural synergy between more MOOCs and the relocation of skilled jobs.** If massive online courses eventually offer university degrees, it seems inevitable that a large proportion of the new students, many whom will obtain excellent results, will be from developing countries. These developments, along with new automated marking algorithms, and adaptive learning systems, seem likely to disrupt the education sector.

The health sector is another key sector that will be affected by automation, although Ford says that the impact has been limited so far. In some areas of medicine, especially those that do not require direct contact with patients, advances in artificial intelligence will significantly increase productivity – and these areas may even become completely automated. For example, radiologists are trained to interpret images produced by medical scanners. Image processing and recognition technology is advancing so rapidly that the traditional role of **radiologists** may become redundant. In fact, in 2012 the Food and Drug Administration (FDA) approved an automated ultrasound system for early detection of breast cancer. Automated systems also virtually eliminate the possibility of human error. At the University of California Medical Center in San Francisco, some 10,000 doses of medication are prepared daily without a **pharmacist** touching a pill. In 2010, the Camino Hospital in Mountain View, California, acquired 19 robots for supply tasks at a cost of \$350,000. According to a hospital administrator, paying staff to do the same job would have cost millions of dollars a year.

These are clear examples of how the galloping progress of information technology and communication can turn the efforts of a small number of workers into valuable and profitable enterprises. These examples also offer convincing evidence of the change seen in the relationship between technology and jobs. **There is a widespread belief, based on historical data going back to the Industrial Revolution, that technology may destroy some jobs, businesses, and even entire industries, but that it also creates new jobs. In this process, known as ‘creative destruction’, technology is expected to create new industries and new jobs.** However, Ford emphasises that information technology has reached the point where it can be considered a utility, such as electricity. It seems almost inconceivable that a new industry would not benefit from this powerful utility and the intelligent machines that accompany it. Therefore, the author stresses, **emerging industries will (almost) never be labour-intensive. In addition, wages have stagnated, because recent increases in productivity have not been reflected in pay packets.** In the UK, between 2000 and 2007, each pound of increased productivity generated only 43 pence of increase in wage growth. The relationship is similar in America.

Beyond the moral issue of **a small elite capturing most of society’s technological capital**, there are also practical implications for the health of an economy in which income inequality becomes too extreme. **As employment and income drop because of automation, most consumers will not have the purchasing power necessary to sustain economic growth.** Almost all the major industries that form the backbone of Western economies are oriented towards mass consumer markets (including vehicles, financial services, electronics, telecommunications, and healthcare). **The author notes that a millionaire may buy a luxury car, or even a dozen such cars, but this does not equal the purchase of thousands of more modest cars.** Even retailers such as Walmart in America, or Tesco and Sainsbury’s in the UK have experienced a loss of income over the last ten years compared to competitors such as Aldi and Lidl (which offer deeper

discounts and reduced prices). Consumer attitudes also matter, in this trend of diminishing employment levels. **Traditionally, unemployment was seen as temporary.** If a job was lost, people used to be confident of finding another with a similar salary in a relatively short period of time, and so savings or credit cards were generally used to continue spending at nearly the same level. **Obviously, this is no longer the case today.**

Another element of study is the capacity of technology to reduce prices – however, there is a major problem with this scenario. Ford explains that **prosperity has traditionally been the result of wages increasing faster than prices.** If we imagine the reverse situation (incomes falling, but prices falling even faster), we are facing a difficult situation. The initial problem will be the difficulty of breaking a **deflationary cycle.** If you know that something will be cheaper tomorrow, why buy today? Secondly, **it is difficult for companies to cut wages, and more likely that they cut jobs.** That is why deflation is associated with rising unemployment (producing even more consumers with no income). And, thirdly, in a deflationary economy, **prices may fall, but not the repayments on mortgages and loans already issued.**

It may seem reasonable to assume that consumers in fast-growing developing nations will help compensate for this lack of demand that inequality and demographics are causing in advanced economies. Such hopes are focused mainly on **China.** However, Ford explains that the lack of a social safety net in China is one of the main causes of high savings rates, estimated at around 40% of salary. Another important factor is the high price of housing. Total personal consumption accounts for only 35% of income, approximately half that of the United States. The need to restructure the Chinese economy to encourage domestic consumption is something the government has been discussing for several years. **But for this to happen, wages must increase – and the deficiencies that cause such a high rate of savings, such as problems with pensions and the health system, must be resolved.**

The challenges facing poorer countries are even more complicated, as the advance of automation may mean the disappearance of the well-trodden path to prosperity – an expanding manufacturing sector. Between 1995 and 2002, some 22 million jobs disappeared in the world because of automation. During that same period, industrial performance increased by 30%.

These technological trends are, for the author, realistic and even conservative. **But there is, according to Ford, an even more extreme possibility, which could lead to even more terrible scenarios: the advance of artificial intelligence towards an artificial general intelligence. This would enable the production of systems that reprogram their software and so improve themselves.** Such an explosion of intelligence, claims Ford, would have shocking implications for humanity. In the words of the futuristic inventor, Ray Kurzweil, such developments would ‘rupture the fabric of history’ and start what he calls **singularity.** In astrophysics, singularity refers to the point around a black hole where the laws of physics are not met. Kurzweil, as Ford points out, has founded

successful companies that sell optical character recognition systems, speech generators, and musical synthesisers. **His work on singularity, however, is a coherent narrative based on technological acceleration that is mixed with ideas that seem so speculative that they apparently border on the absurd – such as the conviction that humans will merge with machines.** One of Kurzweil’s most celebrated predictions is that humans will exponentially increase their intelligence with implants. The most controversial aspect, perhaps, is the belief that we will become immortal. Ford shows that there is a vibrant community defending Kurzweil’s ideas. There is even an academic institution, the Singularity University in Silicon Valley, that offers non-accredited degree programmes that study the potential impact of technology (sponsors include Google, Genentech, Cisco, and Autodesk).

For Ford, however, artificial general intelligence is not one of the main arguments for the need to address the challenges that advancing automation poses to our societies. AI simply represents an amplification of a problem that threatens to increase inequality and unemployment. The solution to the problem, Ford explains in *The Rise of the Robots*, does not involve further education and training. **For the author, the most effective solution would be the introduction of some form of basic income guarantee.** Although in the current political context, the author says this proposal may be considered ‘socialist’, back in the day, one of the idea’s strong supporters was **Friedrich Hayek** – an iconic figure for current conservatives. In *Law, Legislation and Liberty*, published between 1973 and 1979, Hayek suggested that a guaranteed income would be a legitimate government policy to provide protection against adversity. He posited that the creation of this safety net would be the direct result of a transition to a more open and mobile society, in which many individuals could no longer rely on traditional support mechanisms. **For Hayek, therefore, a basic income had nothing to do with equality or a fairer distribution** (as this proposal would be seen today, says Ford), but was simply **an insurance against adversity that fulfils an efficient economic and social function.** **According to Ford, this mechanism would give individuals the freedom of choice, thereby preventing the state from getting involved in personal economic decisions.** It would also enable individuals to participate in the market without the introduction of less efficient measures, such as higher wage levels.

According to Ford, if Hayek’s pragmatic approach were accepted and applied to the current situation, governments would most likely apply similar types of action to address the growing socio-economic risks generated by technological advancements over the coming years. **According to the author, the most efficient option – and relatively cheap administratively – would be to set a basic income at a level that would ensure that the number of individuals who prefer not to work is minimised.** Although Ford considers this as the most suitable solution, he provides **other options that focus on wealth rather than income** (such as employee share ownership). Moreover, if we accept that Western economies will require less and less labour, then it becomes evident that **the tax burden should be transferred from workers to capital.** As long as taxes fall disproportionately



on industries and businesses that require large labour forces, there will always be a strong incentive to increase automation whenever possible – until a point is reached when the system becomes unsustainable. For this reason, **Ford proposes that taxes be increased for businesses that are highly dependent on technology and employ comparatively few people. At some point, not too far in the future, we must abandon the idea that employees must pay for pensions and social programmes, and assume that our economy as a whole must provide this support.**