

Population Matters' response to the Robots and Artificial Intelligence Inquiry of the Science and Technology Committee

About Population Matters

Population Matters is a UK-based charity that addresses population size and its effects on environmental sustainability. We see population growth as a major contributor to environmental degradation, conflicts, migration and many other problems. We conduct research, inform the public and advocate policies that promote smaller and thus more sustainable families.

Questions to which we are responding

Population Matters is responding to the following questions:

1. *The implications of robotics and artificial intelligence on the future UK workforce and job market, and the government's preparation for the shift in the UK skills base and training that this may require.*
4. *The social, legal and ethical issues raised by developments in robotics and artificial intelligence technologies, and how they should be addressed.*

Summary of our response

- Widespread use of robotics and artificial intelligence in the workforce will allow a wider range of people access to the workforce, increase productivity per capita and reduce dependency on human capacity.
- This could render many individuals lacking appropriate skills unemployable, and lead to increased unemployment.
- To overcome this challenge, the government should promote population-stabilization policies and embrace the opportunities provided by an ageing, and potentially falling, population.

1. Implications of robotics and artificial intelligence for the future of the UK workforce

The impact of an invention on society is largely dependent on how it affects productivity and efficiency.¹ The past has shown that inventions that have had a big impact on society have always improved the efficiency and productivity of either the workforce as a whole, or individual workers. For example:

- The eyeglass allowed individuals to extend their working lives significantly by overcoming eyesight deterioration. Consequently, individuals could contribute more to the workforce over a lifetime.²

- Antibiotics and penicillin in the 20th century increased longevity. Longer lives meant more years of productivity.³
- The water wheel made industrial processes, such as grinding grains, less labour-intensive and thus more efficient.⁴ The invention of the steam engine, and later the combustion engine, further improved efficiency and productivity.⁵ It also resulted in less dependence on natural forces, such as water.

While many more inventions could be highlighted, these three give a good illustration of the implications robotics and artificial intelligence will have for the future of the UK workforce.

Assistance

Technology can be used as a means of support for humans in both a direct and indirect fashion. Currently, robotics are already utilised for a wide range of tasks, and such developments will continue.

Direct assistance

Technological advancements can enable a larger proportion of the population to access the workforce. They can do so in the following ways:

- Technology could support humans when their careers are threatened by their own physical deterioration. Robots could perform physically-demanding jobs, which would allow humans to focus on more intellectual tasks.
- Disabled people often experience difficulty when accessing the job market. Robotics could improve their mobility and offer them a voice. Assistive technologies, such as the Intel communicative system used by scientist Stephen Hawking, could be developed further, for example.⁶ Prosthetic limbs, currently most commonly used to help war veterans recover from their injuries, could also be developed further.⁷
- Inventions such as Skype would allow those who are incapable of traveling, and those who work remotely, to attend meetings.

Indirect assistance

Robots can also assist humans when they are at work. Not only does this potentially make their jobs easier, it could also reduce the strain on public services, such as the UK's NHS, and reduce the number of employees whose skills are underused.

- Robots could assist medics during operations and medical check-ups. This would reduce both costs and the number of medical errors, while increasing efficiency and speed.⁸
- In the UCSF Medical Center (USA), robots are used to carry out easy tasks such as delivering meals and medicine. This has allowed the hospital to reduce costs and enables staff to spend more time on the more socially complex aspects of their job.⁹
- Robots could take over jobs in which they hold a comparative advantage over humans. Consequently, humans would have to train themselves in highly-skilled jobs.¹⁰ It is projected that, by 2020, 46.5 per

cent of the UK's workforce will be highly educated.¹¹ When robots take over low-skilled jobs, fewer skills would have to be underused.

Increased productivity per capita

The use of robotics and artificial intelligence will increase production per capita significantly. Not only because robots are much faster and more accurate at computing, but also because they can work more precisely, and therefore waste less material.

- The use of 3D printers could eliminate parts in products, saving resources. This would reduce both production costs and waste material.
- Robots do not need rest as humans do. This means that a human can programme a robot to work overnight without having to stay by its side. Such a development increases the length of the working day dramatically.

Reduced dependency

Extensive incorporation of robotics in the workforce reduces the workforce's dependency on humans. In the Industrial Revolution, machines replaced simple human jobs and helped humans with more difficult tasks. This development forced humans to upgrade their skills and to turn to more sophisticated work. Robotics today are more intelligent, and are expected to replace humans completely in a wider range of mid-skilled jobs.¹² This indicates that the future workforce will not be as dependent on human capacity.

4. Social and ethical issues raised by developments in robotics and artificial intelligence technologies

Ethical challenge

It is generally accepted that the life of a human is more valuable than that of a robot. Yet, when society replaces humans with robots for increased efficiency and productivity at the expense of that human, an ethical dilemma emerges. Could a robot rightfully replace a human for the benefit of society, if it means that individuals end up unemployed? Is it right to choose economics over the well-being of individual members of society?

Social challenge

Robotics are expected to replace humans completely in a wide range of mid-skilled jobs.¹³ The UK's unemployment rate is forecast to fluctuate between 5 – 5.5 per cent between now and 2020.¹⁴ Should robots indeed start replacing humans on a wider scale, these numbers could increase dramatically. Given that the UK population is projected to rise from 64.4 million in 2014 to 70 million by 2027, it seems inevitable that society will face even higher unemployment rates when more robots are utilised.^{15,16} This creates a major challenge for the UK: after all, the government will have to find a way to guarantee a good

quality of life for all in a scenario where it is probable that an increasing portion of residents will rely on state benefits.

Population size

Given that robotics will play an increasingly significant role in the UK workforce in future years, the government needs to pay attention to the way in which its population develops. Population growth will inevitably cause great problems, because robots will outperform humans and increase the productivity of each individual in the workforce. Consequently, fewer humans will be needed. Should the population grow, it will be impossible for the government to guarantee employment for all.

Contrary to this, the widespread existence of robotics in societies with falling or ageing populations is very advantageous:

- Falling populations generate a fear of a shrinking Gross Domestic Product (GDP) due to a smaller available workforce. Robotics would eliminate that fear, as a smaller workforce would be sufficient for the needs of society as long as it is supported by the right technology.
- The proportion of elderly people is growing in many developed nations, including the UK. It is expected that these societies — followed by developing nations — will face further ageing in future years.¹⁷ Ageing societies would also benefit from the improved ease with which people can access the workforce, thanks to technology. Not only can technology assist older members of the workforce directly, but it can also potentially help to keep elderly members of society healthier for longer.

Conclusion

It is inevitable that robotics and artificial intelligence will be used more widely in the future. This development could lead to great prosperity in society, but will also create challenges for the government. The main problem is that robots might render a large part of the population redundant. This is unacceptable. Since the use of robotics in the workforce cannot be stopped, the government should embrace policies that aim at population stabilisation instead. It should see the ageing of society, or the falling of population numbers, as a golden opportunity for the creation of a sustainable society in the long term.

¹ http://www.bbc.co.uk/history/british/victorians/speed_01.shtml

² https://tsu.ge/data/file_db/faculty_humanities/Landes%20-%20The%20Wealth%20and%20the%20Poverty%20of%20Nations.pdf

³ <http://www.healio.com/endocrinology/news/print/endocrine-today/%7B15afd2a1-2084-4ca6-a4e6-7185f5c4cfb0%7D/penicillin-an-accidental-discovery-changed-the-course-of-medicine>

⁴ https://tsu.ge/data/file_db/faculty_humanities/Landes%20-%20The%20Wealth%20and%20the%20Poverty%20of%20Nations.pdf

⁵ http://www.bbc.co.uk/history/british/victorians/speed_01.shtml

⁶ <http://www.wired.com/2015/01/intel-gave-stephen-hawking-voice/>

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- ⁷ <http://www.foxnews.com/tech/2015/10/27/with-technology-and-determination-war-veteran-who-lost-his-arms-legs-gets-his-life-back.html>
 - ⁸ <http://www.allonrobots.com/robots-in-hospitals.html>
 - ⁹ <http://www.wired.com/2015/02/incredible-hospital-robot-saving-lives-also-hate/>
 - ¹⁰ <http://bgr.com/2015/11/16/robots-replacing-human-jobs/>
 - ¹¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470017/skill_levels_2014.pdf
 - ¹² <http://bgr.com/2015/11/16/robots-replacing-human-jobs/>
 - ¹³ <http://bgr.com/2015/11/16/robots-replacing-human-jobs/>
 - ¹⁴ <http://www.statista.com/statistics/374800/unemployment-rate-forecast/>
 - ¹⁵ http://www.ons.gov.uk/ons/dcp171776_422383.pdf
 - ¹⁶ <http://www.bbc.co.uk/news/uk-34666382>
 - ¹⁷ <http://populationmatters.org/wp-content/uploads/D27Ageingpopulations.pdf?phpMyAdmin=e11b8b687c20198d9ad050fbb1aa7f2f>